

# **VARDHAMAN COLLEGE OF ENGINEERING**

**(AUTONOMOUS)**

Affiliated to JNTUH, Approved by AICTE, Accredited by NAAC and ISO 9001:2008 Certified

Shamshabad - 501 218, Hyderabad, Telangana State, India.

[www.vardhaman.org](http://www.vardhaman.org)

## **BACHELOR OF TECHNOLOGY COMPUTER SCIENCE AND ENGINEERING (Accredited by NBA)**

### **ACADEMIC REGULATIONS COURSE STRUCTURE (VCE-R15)**

#### **CHOICE BASED CREDIT SYSTEM**

**B. Tech. - Regular Four Year Degree Program  
(For batches admitted from the Academic Year 2015 - 2016)**

**&**

**B. Tech. - Lateral Entry Scheme  
(For batches admitted from the Academic Year 2016 - 2017)**





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## PRELIMINARY DEFINITIONS AND NOMENCLATURES

- ❖ “Autonomous Institution / College” means an institution / 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” means 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.
- ❖ “Branch” means specialization in a program like B. Tech. Degree program in Civil Engineering, B. Tech. Degree program in Computer Science and Engineering etc.
- ❖ “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, A4001: Linear Algebra and Ordinary Differential Equations, A4501: Programming for Problem Solving, etc. The description of allocation of course code is mentioned in the table 1.

**Table 1: Course Code Description**

First Digit	Second Digit	Third Digit	Fourth and Fifth Digits
Indicates Program	Indicates Regulation	Indicates Department	Indicates Course Number
A : B. Tech. B : M. Tech. C : MBA	1 : R11 2 : R14 3 : R15	0: H&S/MBA 1 : Civil 2 : EEE 3 : MECH 4 : ECE 5 : CSE 6 : IT	01 02 .. ..

- ❖ T – Tutorial, P – Practical, D – Drawing, L – Theory, C – Credits



## FOREWORD

The autonomy 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 norms set by 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.

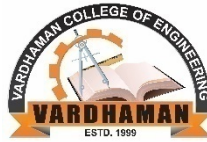
Vardhaman College of Engineering is proud to win the credence of all the above bodies monitoring the quality in education and has gladly accepted the responsibility of sustaining, if not improving upon the standards and ethics for which it has been striving for more than a decade in reaching its present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

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

All the faculty, parents and students are requested to go through all the rules and regulations carefully. Any clarifications, if 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**





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### **Vision:**

To be a pioneer institute and leader in engineering education to address societal needs through education and practice.

### **Mission:**

- ❖ To adopt innovative student centric learning methods.
- ❖ To enhance professional and entrepreneurial skills through industry institute interaction.
- ❖ To train the students to meet dynamic needs of the society.
- ❖ To promote research and continuing education.

### **Quality Policy:**

We at Vardhaman College of Engineering, endeavour to uphold excellence in all spheres by adopting best practices in effort and effect.



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## DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

### Department Vision:

To be a leading source of competent computer engineers, meeting the needs of industry and society at large.

### Department Mission:

- ❖ Facilitate learning in advanced technologies adopting innovative methods
- ❖ Associate continuously with industry, to design and implement experiential curriculum
- ❖ Promote Research and Development through Special Interest Groups (SIGs)
- ❖ Provide platform for harnessing entrepreneurial and leadership qualities.

### Program Educational Objectives (PEOs)

- PEO1:** Graduate will establish himself/herself as effective professionals by solving real world problems using investigative and analytical skills along with the knowledge acquired in the field of Computer Science and Engineering.
- PEO2:** Graduate will demonstrate his/her ability to adapt to rapidly changing environment in advanced areas of Computer Science and scale new height in their profession through lifelong learning.
- PEO3:** Graduate will prove his/her ability to work and communicate effectively as a team member and /or leader to complete the task with minimal resources, meeting deadlines.
- PEO4:** Graduate will embrace professional code of ethics in the profession while deliberately being part of projects which contributes to the society at large without disturbing the ecological balance.

### Program Outcomes (POs):

- PO1: Engineering Knowledge:** Apply knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- PO2: Problem Analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.
- PO3: Design/ Development of Solutions:** Design solutions for complex engineering problems and design system components or processes that meet specified needs with appropriate consideration for the public health and safety, and cultural, societal, and environmental considerations.

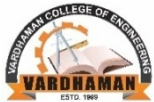


- PO4: Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions.
- PO5: Modern Tool Usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- PO6: The Engineer and Society:**Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice.
- PO7: Environment and Sustainability:**Understand the impact of professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- PO8: Ethics:**Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- PO9: Individual and Team Work:**Function effectively as an individual, and as a member or leader in diverse teams, and in multi-disciplinary settings.
- PO10: Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- PO11: Project Management and Finance:**Demonstrate knowledge and understanding of engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- PO12: Life-long Learning:** Recognize the need for, and have the preparation and ability to engage in independent and life- long learning in the broadest context of technological change.

#### **Program Specific Outcomes (PSOs)**

- PSO1:** To collect requirements, analyze, design, implement and test software Systems.
- PSO2:** To analyze the errors and debug them accordingly.





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## ACADEMIC REGULATIONS

**B. Tech. - Regular Four Year Degree Program  
(For batches admitted from the Academic Year 2015 - 2016)  
&  
B. Tech. - Lateral Entry Scheme  
(For batches admitted from the Academic Year 2016 - 2017)**

For pursuing undergraduate Bachelor Degree Program of study in Engineering (B. Tech.) offered by Vardhaman College of Engineering under Choice Based Credit System (CBCS) and herein after Vardhaman College of Engineering is 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 2015-2016 onwards. Any reference to "College" in these rules and regulations stands for Vardhaman College of Engineering.

### 2. EXTENT

All the rules and regulations, specified hereinafter shall be read as a whole for the purpose of interpretation and as and when a doubt arises, the interpretation of the Chairman of Academic Council is final. As per the requirements of statutory bodies, Principal, Vardhaman College of Engineering shall be the Chairman of the Academic Council.

### 3. ADMISSION

#### 3.1. Admission into First year of Four Year B. Tech. Degree Program of study in Engineering:

##### 3.1.1. Eligibility:

A student seeking admission into the first year of four-year B. Tech. Degree Program should have

- (i) Passed either Intermediate Public Examination (I.P.E) conducted by the Board of Intermediate Education, Telangana, with Mathematics, Physics and Chemistry as optional subjects or any equivalent examination recognized by Board of Intermediate Education, Telangana or a Diploma in Engineering in the relevant branch conducted by the Board of Technical Education, Telangana or equivalent Diploma recognized by Board of Technical Education for admission as per the guidelines of Telangana State Council for Higher Education (TSCHE).
- (ii) Secured a rank in the EAMCET examination conducted by TSCHE for allotment of a seat by the Convener, EAMCET, for admission into the program offered by the Institution.

##### 3.1.2. Admission Procedure:

Admissions are made into the first year of four-year B.Tech. Degree Program as per the stipulations of TSCHE.

- (a) Category A seats are filled by the Convener, EAMCET.
- (b) Category B seats are filled by the Management.

#### 3.2. Admission into the Second year of Four Year B. Tech. Degree Program in Engineering

##### 3.2.1. Eligibility:

A student seeking admission under lateral entry into the II year I semester B. Tech. Degree Program should have passed the qualifying exam (B.Sc. Mathematics & Diploma holders), based on the rank secured by the student at Engineering Common Entrance Test (FDH) in accordance with the instructions received from the Convener, ECET and Government of Telangana.

### **3.2.2. Admission Procedure:**

Admissions are made into the II year of four-year B. Tech degree Program through Convener, ECET (FDH) 20% against the sanctioned strength in each Program of study under lateral entry scheme.

## **4. PROGRAMS OFFERED**

**Vardhaman College of Engineering**, an autonomous college affiliated to JNTUH, offers the following B. Tech Programs of study leading to the award of B. Tech. Degree under the autonomous status.

- 1) B. Tech. - Civil Engineering
- 2) B. Tech. - Electrical and Electronics Engineering
- 3) B. Tech. - Mechanical Engineering
- 4) B. Tech. - Electronics and Communication Engineering
- 5) B. Tech. - Computer Science and Engineering
- 6) B. Tech. - Information Technology

## **5. MEDIUM OF INSTRUCTION**

The medium of instruction is English for all the courses.

## **6. DURATION OF THE PROGRAMS**

### **6.1. Minimum Duration**

**6.1.1.** B. Tech. Degree program duration is for a period of minimum four academic years leading to the Degree of Bachelor of Technology (B.Tech.) of the Jawaharlal Nehru Technological University Hyderabad.

**6.1.2.** For students admitted under lateral entry scheme, B. Tech. Degree program duration is for a period of minimum three academic years leading to the Degree of Bachelor of Technology (B.Tech.) of the Jawaharlal Nehru Technological University Hyderabad (JNTUH).

### **6.2. Maximum Duration**

**6.2.1.** The maximum period within which a student must complete a full-time academic program is eight academic years for B. Tech. If a student fails to complete the program within the maximum duration as specified above, student will forfeit the seat.

**6.2.2.** For students admitted under lateral entry scheme the maximum duration is six academic years. If a student fails to complete the program within the maximum duration as specified above, student will forfeit the seat.

**6.2.3.** The period is calculated from the academic year in which the student is admitted for the first time into the B. Tech. Degree Program.

## **7. SEMESTER STRUCTURE**

The College follows semester system. An academic year consists of first semester, second semester and the summer term follows in sequence. The duration of each semester shall be of 23 weeks spell which includes time for course work, preparation and examinations. Each semester shall have a minimum of 90 instructional days.

Each semester has Continuous Internal Evaluation (CIE) and Semester End Examination (SEE). Choice Based Credit System (CBCS) and Credit Based Semester System (CBSS) as indicated by UGC and curriculum/course structure as suggested by AICTE are followed.

**Table 2: Academic Calendar**

<b>FIRST SEMESTER (23 weeks)</b>	Instruction Period :17 weeks	19 weeks
	Mid Semester Tests :2 weeks	
	Preparation & Practical Examinations	2 weeks
	External Examinations	2 weeks
<b>Semester Break</b>		2 weeks
<b>SECOND SEMESTER (23 weeks)</b>	Instruction Period :17 weeks	19 weeks
	Mid Semester Tests :2 weeks	
	Preparation & Practical Examinations	2 weeks
	External Examinations	2 weeks
<b>Summer Vacation</b>		4 weeks

**8. PROGRAM STRUCTURE**

The Program of instruction consists of:

- (i) Humanities, Social Sciences and Management, Basic Sciences, Basic Engineering, and other Mandatory / Audit courses.
- (ii) Core Engineering courses impart skills among the students on the fundamentals of engineering in the branch concerned.
- (iii) Elective courses enabling the students to take up a group of professional and open courses of their interest.

In addition, a student has to carry out a mini project, project work and technical seminar.

Every course of the B. Tech. Program will be placed in one of the ten groups of courses with credits as listed in the Table 3.

**Note:** All components prescribed in the curriculum of any program of study shall be conducted and evaluated.

**Table 3: Group of courses**

S. NO	GROUP OF COURSES	CATEGORY	RANGE OF TOTAL CREDITS
1	Humanities, Social Sciences and Management	HS	5% to 10%
2	Basic Sciences	BS	15% to 20%
3	Basic Engineering	BE	15% to 20%
4	Core Engineering	CE	30% to 40%
5	Professional Elective	PE	10% to 15%
6	Open Elective	OE	5% to 10%
7	Audit Course	AC	0%
8	Mini Project	MP	10% to 15%
9	Technical Seminar	TS	
10	Project Work	PW	

**9. CREDIT BASED SYSTEM**

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

- 9.1. The duration of each semester will normally be 23 weeks with 6 days a week (the second Saturday will be observed as holiday in a month). A working day shall have 6 lecture hours each of 60 minutes duration.

**Table 4: Credit Representation**

Lectures (hrs/wk/Sem.)	Tutorials (hrs/wk/Sem.)	Practical Work (hrs/wk/Sem.)	Credits (L: T: P)	Total Credits
3	0	0	3:0:0	3
3	1	0	3:0:0	3
3	2	0	3:1:0	4
4	0	0	4:0:0	4
4	1	0	4:0:0	4
0	2	4	0:1:2	3
0	0	3	0:0:2	2
0	0	2	0:0:1	1
0	0	20	0:0:12	12

- 9.2. The four-year curriculum of any B. Tech. program of study shall have 192 credits in total. The exact requirements of credits for each course will be as recommended by the Board of Studies concerned and approved by the Academic Council.

In the case of lateral entry students, B. Tech. program for III, IV, V, VI VII and VIII semesters of study shall have a total 144 credits.

- 9.3. For courses like mini project / project work / technical seminar, where formal contact hours are not specified, credits are assigned based on the complexity of the work.

## 10. 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, practical / computer aided engineering drawing lab. In addition, mini-project and technical seminar work shall be evaluated for 100 marks each and project work shall be evaluated for 200 marks.

### 10.1 Theory Courses

The evaluation of the students in each course is a continuous process and is based on their performance in different examinations and attendance as mentioned below:

**Table 5: Method of Evaluation**

<b>Continuous Internal Evaluation</b>	Mid Semester Test	15 Marks
	Online Objective Test	05 Marks
	Attendance	05 Marks
<b>External Evaluation</b>	End Semester Examination	75 Marks

#### 10.1.1. Mid Semester Test

There will be two Mid Semester Tests in theory courses for a maximum of 15 marks, to be answered in one and half hour duration. The first Mid Semester Test will be held in the 09<sup>th</sup> week as per the given schedule for the first half of the total syllabus. The second Mid Semester Test will be held in the 18<sup>th</sup> week as per the given schedule with the second half of the total syllabus. In case a student does not appear for Mid Semester Test or underperformance, makeup test will be conducted upon the recommendations of the standing committee, subject to payment of a prescribed fee for each examination missed.

#### 10.1.2. Online Objective Test

There will be one Online Objective Test in Theory Courses for a maximum of 05 marks, to be answered in 20minutes duration. The Online Objective Test will be held in the 18<sup>th</sup> week as per the schedule declared covering all the units of syllabus. In case a student does not appear for the Online Objective Test due to any reason whatsoever, no makeup test shall be conducted.

#### 10.1.3. Attendance

Five marks shall be allocated subject wise for the percentage of attendance as mentioned in Table 6 at the end of the semester.

**Table 6: Marks for attendance**

Attendance Percentage	Marks Awarded
Below 75	0
75% to < 80%	1
80% to < 85%	2
85% to < 90%	3
90% to < 95%	4
95% to 100%	5

#### 10.1.4. Mid Marks

The final marks of Mid Exam, is the average of Mid Semester Test 1 and Mid Semester Test 2 along with Online Objective Test marks and subject wise aggregate percentage of attendance.

#### 10.1.5. End Semester Examination

The end semester examination question paper in theory courses will be for a maximum of 75 marks to be answered in three hours duration. There shall be two questions of descriptive type from each unit with internal choice. Each question carries 15 marks. Each theory course shall consist of five units of syllabus.

The question paper shall be set externally and evaluated both internally and externally. If the difference between the first and second valuation is less than 15 marks, the average of the two valuations shall be awarded, and if the difference between the first and second valuation is more than or equal to 15 marks, third evaluation will be conducted and the average marks given by all three examiners shall be awarded as final marks.

#### 10.2 Practical

Practical shall be evaluated for 100 marks, out of which 75 marks shall be for external examination and 25 marks for internal. The 25 internal marks are distributed as 15 marks for day-to-day evaluation and 10 marks for internal examination. The external end - examination shall be conducted by the teacher concerned and an external examiner from outside the college.

**10.3** For Engineering Drawing-I, Engineering Drawing-II and Machine Drawing, the distribution shall be 25 marks for internal evaluation (15 marks for day-to-day evaluation and 10 marks for internal tests) and 75 marks for end examination. There shall be two internal evaluations in a semester and the average of the two internal evaluations is considered for the awarding internal marks.

**10.4** The Computer Aided Engineering Drawing Lab wherever offered is to be treated as a practical subject. Evaluation method adopted for practical subjects shall be followed here as well.

#### 10.5 Mini Project

The mini project in an industry shall be carried out during the summer break for a minimum of 4 weeks after the VI Semester and shall be completed before the start of the VII semester. A report has to be submitted for assessment to an internal evaluation committee comprising Head of the Department or his nominee and two faculty members of the department including the project supervisor for 100 marks. A minimum of 40% of maximum marks shall be obtained to earn the corresponding credits. The mini project and its report shall be evaluated in VII semester.

#### 10.6 Technical Seminar

The seminar shall have two components; one chosen by the student from the course-work without repetition and another 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 shall be made before an internal evaluation committee comprising the Head of the Department or his 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 100 marks each. The average of the two components shall be taken as the final score. A minimum of 40% of maximum marks shall be obtained to earn the corresponding credits.

#### 10.7 Project Work

The project work shall be evaluated for 200 marks of which 50 marks shall be for internal evaluation and 150 marks for end-semester evaluation. The project work shall be somewhat innovative in nature, exploring the research bent of mind of the student. A project batch shall comprise of not more than four students.

In VIII semester, a mid-course review is conducted by Head of the Department and the project supervisor on the progress of the project for 25 marks. On completion of the project, a second evaluation is conducted for award of internal marks for another 25 marks before the report is submitted making the total internal marks to be 50. The end semester examination shall be based on the report submitted and a viva-voce exam for 150 marks by committee comprising of the Head of the Department, project supervisor and an external examiner. A minimum of 40% of maximum marks shall be obtained to earn the corresponding credits.

#### **11. ATTENDANCE REQUIREMENTS TO APPEAR FOR THE END SEMESTER EXAMINATION**

- 11.1.** A student shall be eligible to appear for end semester examinations if he acquires a minimum of 75% of attendance in aggregate of all the subjects in a semester.
- 11.2.** 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.
- 11.3.** Shortage of attendance that is below 65% in aggregate shall in no case be condoned.
- 11.4.** The shortage of attendance shall not be condoned more than four times during the entire course of study.
- 11.5.** Students whose shortage of attendance is not condoned in any semester are not eligible to take their end semester examination of that class and their registration shall stand cancelled.
- 11.6.** 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.
- 11.7.** A stipulated fee shall be payable towards condonation of shortage of attendance to the College.
- 11.8.** 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 Telangana norms in vogue.

#### **12. EVALUATION**

**Following procedure governs the evaluation.**

- 12.1.** The marks for the internal evaluation components will be added to the external evaluation marks secured in the end semester examinations to arrive at total marks for any subject in that semester.
- 12.2.** Performance in all the courses is tabulated course-wise and will be scrutinized by the Examination Committee. Moderation is applied, if needed, based on the recommendations of results committee and then course-wise grade lists are finalized.
- 12.3.** Student-wise tabulation is done and grade sheet is generated which is issued to the student.

#### **13. REVALUATION**

Students shall be permitted to apply for revaluation after the declaration of semester end examination results within due dates by paying prescribed fee. After revaluation if there is any betterment in the grade, then improved grade will be considered. Otherwise old grade shall be retained.

#### **14. SUPPLEMENTARY EXAMINATION**

##### **14.1. 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 or absent in regular examinations. Such students writing supplementary examinations may have to write more than one examination per day.

##### **14.2. Advanced Supplementary Examination:**

Advanced supplementary examinations will be conducted for IV year II semester after announcement of regular results.

#### **15. ACADEMIC REQUIREMENTS FOR PROMOTION / COMPLETION OF REGULAR B. TECH. PROGRAM OF STUDY**



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

**FOR STUDENTS ADMITTED INTO B. TECH. PROGRAM (BATCHES ADMITTED FROM 2015–2016)**

- i. A student shall be deemed to have satisfied the minimum academic requirements for each theory, practical, design, drawing subject and project, if he secures not less than 35% of marks in the end semester examination and a minimum of 40% of marks in the sum of the internal evaluation and end semester examination taken together.
- ii. In case of mini project and technical seminar, a student shall be deemed to have satisfied the minimum academic requirements and earned the credits allotted to each of them, if he secures not less than 40% 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 secures not less than 40% of marks on the aggregate in the internal evaluation and external end-evaluation taken together.
- iv. A student shall be promoted from I Year to II Year program of study only if he fulfills the academic requirement of securing **24 out of 48** credits from the regular examinations held till the end of I year II semester including supplementary examinations.
- v. A student shall be promoted from II Year to III Year program of study only if he fulfills the academic requirement of securing **48 out of 96** credits from the regular examinations held till the end of II year II semester including supplementary examinations.
- vi. A student shall be promoted from III year to IV year program of study only if he fulfills the academic requirements of securing **72 out of 144** credits, from the regular examinations held till the end of III year II semester including supplementary examinations.
- vii. A student shall register for all 192 credits and has to earn all the 192 credits. Marks obtained in best 184 credits shall be considered for the award of the class based on aggregate of grades.
- viii. A student who fails to earn 192 credits as indicated in the course structure within **eight** academic years from the year of their admission shall forfeit his seat in the B. Tech. program and his admission stands cancelled.

**FOR LATERAL ENTRY STUDENTS (BATCHES ADMITTED FROM 2016–2017)**

- i. A student shall be deemed to have satisfied the minimum academic requirements for each theory, practical, design, drawing subject or project, if he secures not less than 35% of marks in the end semester examination and a minimum of 40% of marks in the sum total of the internal evaluation and end semester examination taken together.
- ii. In case of mini project and technical seminar, a student shall be deemed to have satisfied the minimum academic requirements and earned the credits allotted to each of them, if he secures not less than 40% 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 secures not less than 40% of marks on the aggregate in the internal evaluation and external end-evaluation taken together.
- iv. A student shall be promoted from II Year to III Year program of study only if he fulfills the academic requirement of securing **24 out of 48** credits from the regular examinations held till the end of II year II semester including supplementary examinations held till the end of II year II semester.
- v. A student shall be promoted from III year to IV year program of study only if he fulfills the academic requirements of securing **48 out of 96** credits, from the regular examinations held till the end of III year II semester including supplementary examinations held till the end of III year II semester.
- vi. A student shall register for all 144 credits and earn all the 144 credits. Marks obtained in best 136 credits shall be considered for the award of the class based on aggregate of grades.
- vii. A student who fails to earn 144 credits as indicated in the course structure within **six** academic years from the year of his admission shall forfeit his seat in the B. Tech. Program and his admission stands cancelled.

**16. TRANSITORY REGULATIONS**

Students who are detained for lack 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 eight years, and a lateral entry student within six years, for the award of the B. Tech. Degree.

#### **17. TRANSFER OF STUDENTS FROM OTHER COLLEGES/UNIVERSITIES**

Transfer of students from other colleges or universities are permitted subjected to the rules and regulations of TSCHE (TE Department) and JNTUH in vogue.

#### **18. TRANSCRIPTS**

After successful completion of the entire program 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.

#### **19. AWARD OF DEGREE**

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

##### **19.1. For students admitted into B.Tech. program (Batches admitted from 2015-2016)**

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

- The candidate shall pursue a course of study for not less than four academic years and not more than eight academic years.
- The candidate shall register for 192 credits and has to secure all the 192 credits. Marks obtained in best 184 credits shall be considered for the award of the class based on aggregate of grades.
- The candidate has to obtain not less than 40% of marks (minimum requirement for declaring as passed).
- The candidate has no dues to the college, hostel, and library etc. and to any other amenities provided by the College.
- The candidate has no disciplinary action pending against him.

##### **19.2. For lateral entry students (batches admitted from 2016–2017)**

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

- The candidate shall pursue a course of study for not less than three academic years and not more than six academic years.
- The candidate shall register for 144 credits and secure all 144 credits. Marks obtained in best 136 credits shall be considered for the award of the class based on aggregate of grades.
- The candidate has to obtain not less than 40% of marks (minimum requirement for declaring as passed).
- The candidate has no dues to the college, hostel, and library etc. and to any other amenities provided by the College.
- The candidate has no disciplinary action pending against him.

##### **19.3. Award of class**

After a student has satisfied the requirement prescribed for the completion of the Program and is eligible for the award of B. Tech. Degree, he shall be placed in one of the following four classes shown in Table 7:

**Table 7: Declaration of Class based on CGPA (Cumulative Grade Point Average)**

Class Awarded	Grades to be Secured	From the aggregate marks secured from <b>184</b> Credits for Regular Students and <b>136</b> Credits for Lateral Entry Students.
First Class with Distinction	≥ 8.0 CGPA	
First Class	6.5 to <8.0 CGPA	
Second Class	5.5 to <6.5 CGPA	
Pass Class	5.0 to <5.5 CGPA	
Fail	Below 5.0 CGPA	

#### 19.4. Letter Grade and Grade Point

It is necessary to provide equivalence of percentages and/or *Class* awarded with *GradePoint Average (GPA)*. This shall be done by prescribing certain specific thresholds in averages for *Distinction, First Class and Second Class*, as mentioned in Table 8.

**Table 8: Percentage Equivalence of Grade Points (For a 10-Point Scale)**

Grade	Grade Points (GP)	Percentage of Marks
O	10	≥ 80 and above
A+	9	≥ 70 and < 80
A	8	≥ 60 and < 70
B+	7	≥ 55 and < 60
B	6	≥ 50 and < 55
C	5	≥ 45 and < 50
P	4	≥ 40 and < 45
F	0	Below 40
AB	0	

For calculating the final percentage of marks equivalent to the computed CGPA, the following formula may be used.

$$\text{Percentage of marks} = (\text{CGPA} - 0.5) \times 10$$

#### SEMESTER GRADE POINT AVERAGE (SGPA)

The SGPA is the ratio of sum of the product of the number of credits with the grade points scored by a student in all the courses taken by a student and the sum of the number of credits of all the courses undergone by a student, i.e.

$$\text{SGPA} (S_i) = \sum (C_i \times G_i) / \sum C_i$$

Where  $C_i$  is the number of credits of the  $i^{\text{th}}$  course and  $G_i$  is the grade point scored by student in the  $i^{\text{th}}$  course.

#### CUMULATIVE GRADE POINT AVERAGE (CGPA)

The CGPA is also calculated in the same manner taking into account all the courses undergone by a student over all the semesters of a program, i.e.

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

Where  $S_i$  is the SGPA of the  $i^{\text{th}}$  semester and  $C_i$  is the total number of credits in that semester.

## 20. ADDITIONAL ACADEMIC REGULATIONS

**20.1** Courses like projects / mini projects / seminars can be repeated only by re-registering for all the

components in that semester.

**20.2** When a student is absent for any examination (internal or external), he is treated as to have obtained absent in that component (course) and aggregate of marks is done accordingly.

**20.3** When a component is cancelled as a penalty, he is awarded zero marks in that component.

## **21. REGISTRATION**

**21.1.** Each student has to compulsorily register for course work at the beginning of each semester as per the schedule mentioned in the Academic Calendar IN PERSON. It is absolutely compulsory for the student to register for courses in time. IN ABSENTIA registration will not be permitted under any circumstance.

**21.2.** Registration without fine: The courses prescribed for a semester can be registered on the date scheduled in the academic calendar. The registration is also permitted on the second day (which is the first working day of the semester) without fine.

**21.3.** Registration with fine: Late registration shall be permitted by the HOD concerned up to seven working days inclusive of the date of registration on payment of a late registration fee of stipulated amount.

**21.4. Procedure to get permission for late registration:** The student concerned shall apply with proper reason to the HOD concerned through the Academic Counselor to get the permission of the Dean (UG) for the late registration of the courses. Beyond the prescribed time limit, no student shall be permitted to register the courses for a particular semester.

## **22. 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. If the student fails to satisfy the requirements of the program within the maximum period stipulated for that program.
- II. If the student fails to satisfy the norms of discipline specified by the Institute from time to time.

## **23. CURRICULUM**

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

## **24. WITHHOLDING OF RESULTS**

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

## **25. GRIEVANCES REDRESSAL COMMITTEE**

**“Grievance and Redressal Committee” (General)** constituted by the Principal shall deal in 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 and 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.

## **26. MALPRACTICE PREVENTION COMMITTEE**

A malpractice prevention committee shall be constituted to examine and punish the student who involves in

malpractice/behaves in an in-disciplinary manner during the examination. The committee shall consist of:

- Principal
- Subject expert
- Head of the department to which the student belongs to
- The invigilator concerned
- Controller of Examinations

The committee constituted shall conduct the meeting on the same day of examination or latest by next working day of the incident and punish the student as per the guidelines prescribed by the JNTUH from time to time.

Any action on the part of student at the examination like trying to get undue advantage in the performance at examinations, 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, evaluating 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 will be recommended for appropriate punishment after thorough enquiry.

## **27. 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.

## **28. STUDENTS' FEEDBACK**

It is necessary for the College 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 is 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.

## **29. GRADUATION DAY**

The College shall have its own annual *Graduation Day* for the distribution 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.

## **30. AWARD OF A RANK UNDER AUTONOMOUS SCHEME**

**30.1.** 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., 4 years for B. Tech. and 3 years for B. Tech. under lateral entry scheme.

**30.2.** A student shall be eligible for a merit rank at the time of award of Degree in each branch of Bachelor of Technology, provided, the student has passed all subjects prescribed for the particular Degree program in first attempt only.

## **31. CODE OF CONDUCT**

**31.1.** Each student shall conduct himself in a manner befitting his association with VCE.

**31.2.** He is expected not to indulge in any activity, which is likely to bring disrepute to the college.

**31.3.** He should show due respect and courtesy to the teachers, administrators, officers and employees of the college and maintain cordial relationships with fellow students.

**31.4.** Lack of courtesy, decorum, indecorous behaviour or untoward attitude both inside and outside the college premises is strictly prohibited. Willful damage or discard of Institute's property or the belongings of fellow students are not at all accepted. Creating disturbance in studies or adopting any unfair means during the examinations or breach of rules and regulations of the Institute or any such undesirable means and activities shall constitute violation of code of conduct for the student.

**31.5. Ragging in any form is strictly prohibited and is considered a serious and punishable offence as per**

**law. It will lead to the expulsion of the offender from the college.**

- 31.6.** 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.
- 31.7.** 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.
- 31.8.** A student may be denied the award of Degree/certificate even though he has satisfactorily completed all the academic requirements if the student is found guilty of offences warranting such an action.
- 31.9.** Attendance is not given to the student during the suspension period.

### **32. 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 21<sup>st</sup> century, it becomes necessary that certain improvements are introduced at different stages of their education system. These include:

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

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

- a.** 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.
- b.** Life-long learning opportunities for faculty, students and alumni, to facilitate their dynamic interaction with the society, industries and the world of work.
- c.** Generous use of ICT and other modern technologies in everyday activities.

### **33. 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.***

**MALPRACTICES RULES**  
**DISCIPLINARY ACTION FOR / IMPROPER CONDUCT IN EXAMINATIONS**

	Nature of Malpractices/Improper conduct	Punishment
	<i>If the student:</i>	
<b>1. (a)</b>	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 student 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>(b)</b>	Gives assistance or guidance or receives it from any other student orally or by any other body language methods or communicates through cell phones with any student 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 students involved. In case of an outsider, he will be handed over to the police and a case is registered against him.
<b>2.</b>	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 student is appearing.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the student 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 student is to be cancelled and sent to the University.
<b>3.</b>	Impersonates any other student in connection with the examination.	The student who has impersonated shall be expelled from examination hall. The student is also debarred and forfeits the seat. The performance of the original student, 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 student is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the student 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.
<b>4.</b>	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 student 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 student is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the student is subject to the academic regulations in connection with forfeiture of seat.
<b>5.</b>	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.
<b>6.</b>	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,	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 student(s) has (have) already appeared and shall not be permitted to appear for the

	or threatens the officer-in charge or any person on duty in or outside the examination hall of any injury to his person or to any of his relations whether by words, either spoken or written or by signs or by visible representation, assaults the officer-in-charge, or any person on duty in or outside the examination hall or any of his relations, or indulges in any other act of misconduct or mischief which result in damage to or destruction of property in the examination hall or any part of the College campus or engages in any other act which in the opinion of the officer on duty amounts to use of unfair means or misconduct or has the tendency to disrupt the orderly conduct of the examination.	remaining examinations of the subjects of that semester/year. The students also are debarred and forfeit their seats. In case of outsiders, they will be handed over to the police and a police case is registered against them.
<b>7.</b>	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 student 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 student is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the student is subject to the academic regulations in connection with forfeiture of seat.
<b>8.</b>	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 student 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 student is also debarred and forfeits the seat.
<b>9.</b>	If student of the college, who is not a student 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 student 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 student 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.
<b>10.</b>	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 student 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.
<b>11.</b>	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 student has appeared including practical examinations and project work of that semester/year examinations.
<b>12.</b>	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.	



## **COURSE STRUCTURE (VCE-R15)**



**B. TECH - COMPUTER SCIENCE AND ENGINEERING**

REGULATIONS: VCE-R15

<b>I SEMESTER</b>									
Code	Course	Category	Periods per Week			Credits	Scheme of Examination Maximum Marks		
			L	T	P		Internal	External	Total
A3001	Mathematics – I	BS	4	1	0	4	25	75	100
A3004	Probability Theory and Numerical Methods	BS	3	1	0	3	25	75	100
A3005	Technical English	HS	3	0	0	3	25	75	100
A3201	Basic Electrical Engineering	BE	4	1	0	4	25	75	100
A3501	Computer Programming	BE	4	1	0	4	25	75	100
A3008	English Language Communication Skills Lab	HS	0	0	3	2	25	75	100
A3502	Computer Programming Through C Lab	BE	0	0	3	2	25	75	100
A3305	Engineering Workshop	BE	0	0	3	2	25	75	100
<b>TOTAL</b>			<b>18</b>	<b>04</b>	<b>09</b>	<b>24</b>	<b>200</b>	<b>600</b>	<b>800</b>
<b>II SEMESTER</b>									
Code	Course	Category	Periods per Week			Credits	Scheme of Examination Maximum Marks		
			L	T	P		Internal	External	Total
A3006	Mathematics – II	BS	4	1	0	4	25	75	100
A3002	Engineering Physics	BS	3	1	0	3	25	75	100
A3003	Engineering Chemistry	BS	3	0	0	3	25	75	100
A3401	Electronic Devices and Circuits	BE	4	1	0	4	25	75	100
A3503	Data Structures	BE	4	1	0	4	25	75	100
A3007	Engineering Physics and Engineering Chemistry Lab	BS	0	0	3	2	25	75	100
A3504	Data Structures Lab	BE	0	0	3	2	25	75	100
A3403	Electronic Devices and Circuits Lab	BE	0	0	3	2	25	75	100
<b>TOTAL</b>			<b>18</b>	<b>04</b>	<b>09</b>	<b>24</b>	<b>200</b>	<b>600</b>	<b>800</b>
<b>III SEMESTER</b>									
Code	Course	Category	Periods per Week			Credits	Scheme of Examination Maximum Marks		
			L	T	P		Internal	External	Total
A3011	Managerial Economics and Financial Analysis	HS	3	1	0	3	25	75	100
A3404	Digital Logic Design	BE	3	1	0	3	25	75	100
A3505	Discrete Mathematical Structures	BS	3	1	0	3	25	75	100
A3506	Design and Analysis of Algorithms	CE	4	0	0	4	25	75	100
A3507	Computer Organization and Microprocessors	CE	3	1	0	3	25	75	100
A3509	Object Oriented Programming	BE	4	1	0	4	25	75	100
A3510	Computer Organization and Microprocessors Lab	CE	0	0	3	2	25	75	100
A3511	Object Oriented Programming through Java Lab	BE	0	0	3	2	25	75	100
A3021	Gender Sensitization	AC	0	3	0	0	25*	50*	75*
<b>TOTAL</b>			<b>20</b>	<b>08</b>	<b>06</b>	<b>24</b>	<b>200</b>	<b>600</b>	<b>800</b>

## B. TECH - COMPUTER SCIENCE AND ENGINEERING

REGULATIONS: VCE-R15

IV SEMESTER									
Code	Course	Category	Periods per Week			Credits	Scheme of Examination Maximum Marks		
			L	T	P		Internal	External	Total
A3010	Environmental Science	BS	3	0	0	3	25	75	100
A3512	Principles of Programming Languages	CE	3	1	0	3	25	75	100
A3513	Formal Languages and Automata Theory	CE	3	1	0	3	25	75	100
A3514	Software Engineering	CE	3	1	0	3	25	75	100
A3515	Operating Systems	CE	4	1	0	4	25	75	100
A3516	Database Management Systems	CE	4	0	0	4	25	75	100
A3517	Operating Systems Lab	CE	0	0	3	2	25	75	100
A3518	Database Management Systems Lab	CE	0	0	3	2	25	75	100
<b>TOTAL</b>			<b>20</b>	<b>04</b>	<b>06</b>	<b>24</b>	<b>200</b>	<b>600</b>	<b>800</b>
V SEMESTER									
Code	Course	Category	Periods per Week			Credits	Scheme of Examination Maximum Marks		
			L	T	P		Internal	External	Total
A3602	Computer Graphics	CE	3	1	0	3	25	75	100
A3601	Web Technologies	CE	4	1	0	4	25	75	100
A3612	Software Testing Methodologies	CE	3	0	0	3	25	75	100
A3519	Computer Networks	CE	4	0	0	4	25	75	100
A3520	Compiler Design	CE	3	1	0	3	25	75	100
A3607	Object Oriented Analysis and Design	CE	3	1	0	3	25	75	100
A3603	Web Technologies Lab	CE	0	0	3	2	25	75	100
A3609	CASE Tools Lab	CE	0	0	3	2	25	75	100
A3012	Professional Ethics and Human Values	AC	3	0	0	0	25*	75*	100*
<b>TOTAL</b>			<b>23</b>	<b>04</b>	<b>06</b>	<b>24</b>	<b>200</b>	<b>600</b>	<b>800</b>
VI SEMESTER									
Code	Course	Category	Periods per Week			Credits	Scheme of Examination Maximum Marks		
			L	T	P		Internal	External	Total
A3521	Wireless and Mobile Computing	CE	3	1	0	3	25	75	100
A3608	Information Security	CE	3	1	0	3	25	75	100
A3522	Data Warehousing and Data Mining	CE	3	1	0	3	25	75	100
	<b>Open Elective – I</b>	OE	3	0	0	3	25	75	100
	<b>Professional Elective - I</b>	PE	4	0	0	4	25	75	100
	<b>Professional Elective - II</b>	PE	4	0	0	4	25	75	100
A3523	Network Simulation Lab	CE	0	0	3	2	25	75	100
A3524	Data Warehousing and Data Mining Lab	CE	0	0	3	2	25	75	100
A3013	Intellectual Property Rights	AC	3	0	0	0	25*	75*	100*
<b>TOTAL</b>			<b>23</b>	<b>03</b>	<b>06</b>	<b>24</b>	<b>200</b>	<b>600</b>	<b>800</b>

\*Marks awarded for audit courses will not be considered for calculating SGPA and CGPA

**B. TECH - COMPUTER SCIENCE AND ENGINEERING**

REGULATIONS: VCE-R15

<b>VII SEMESTER</b>									
Code	Course	Category	Periods per Week			Credits	Scheme of Examination Maximum Marks		
			L	T	P		Internal	External	Total
A3604	Open Source Technologies	CE	3	1	0	3	25	75	100
A3525	Cloud Computing	CE	3	1	0	3	25	75	100
A3611	Mobile Application Development	CE	3	1	0	3	25	75	100
	<b>Open Elective - II</b>	OE	3	0	0	3	25	75	100
	<b>Professional Elective – III</b>	PE	4	0	0	4	25	75	100
	<b>Professional Elective – IV</b>	PE	4	0	0	4	25	75	100
A3614	Mobile Application Development Lab	CE	0	0	2	1	25	75	100
A3606	Open Source Technologies Lab	CE	0	0	2	1	25	75	100
A3526	Mini Project	MP	0	0	0	2	100	0	100
<b>TOTAL</b>			<b>20</b>	<b>03</b>	<b>04</b>	<b>24</b>	<b>300</b>	<b>600</b>	<b>900</b>
<b>VIII SEMESTER</b>									
Code	Course	Category	Periods per Week			Credits	Scheme of Examination Maximum Marks		
			L	T	P		Internal	External	Total
A3014	Management Sciences	HS	3	0	0	3	25	75	100
	<b>Open Elective – III</b>	OE	3	0	0	3	25	75	100
	<b>Professional Elective – V</b>	PE	4	0	0	4	25	75	100
A3527	Technical Seminar	TS	0	0	3	2	100	0	100
A3528	Project Work	PW	0	0	20	12	50	150	200
<b>TOTAL</b>			<b>10</b>	<b>0</b>	<b>23</b>	<b>24</b>	<b>225</b>	<b>375</b>	<b>600</b>

## B. TECH. - COMPUTER SCIENCE AND ENGINEERING

REGULATIONS: VCE-R15

Professional Elective - I			
Code	Course	Code	Course
A3652	Software Architecture	A3552	Distributed Databases
A3551	Advanced Computer Architecture	A3553	Artificial Intelligence and Neural Networks
Professional Elective - II			
Code	Course	Code	Course
A3554	Image Processing	A3556	Human Computer Interaction
A3555	Struts and Spring Framework	A3557	Semantic Web and Social Networks
Professional Elective - III			
Code	Course	Code	Course
A3655	Design Patterns	A3559	Information Retrieval Systems
A3558	Distributed Operating Systems	A3560	Ad-hoc and Sensor Networks
Professional Elective - IV			
Code	Course	Code	Course
A3561	Computer Vision	A3563	User Experience Engineering
A3562	Hibernate framework	A3654	Web Services
Professional Elective - V			
Code	Course	Code	Course
A3661	Software Project Management	A3564	Big Data Analytics
A3656	Cyber Security	A3565	Pattern Recognition
Open Electives			
Code	Course	Code	Course
A3576	Fundamentals of Database Management Systems	A3577	Fundamentals of Image Processing
A3578	Operating System Fundamentals	A3579	JAVA programming
A3676	Cyber Laws	A3677	E-Commerce Trends
A3678	Principles of Software Engineering	A3679	Scripting Languages
A3476	Digital Electronics	A3477	Principles of Analog and Digital Communications
A3478	Transducers and Measurements	A3479	Communication Networking Devices
A3276	Nano Technology Applications to Electrical Engineering	A3277	Industrial Electronics
A3278	Solar Energy and Applications	A3279	Energy Management and Audit
A3376	Elements of Mechanical Engineering	A3377	Basic Thermodynamics and Heat Transfer
A3378	Mechanical Measurements and Instrumentation	A3379	Engineering Optimization
A3176	Environmental pollution and management	A3177	Remote sensing and GIS
A3178	Disaster Management	A3179	Constructing planning and management
A3081	Basic Program in Entrepreneurship	A3077	Human Resource Management
A3078	Organization Behavior	A3079	Logistics and Supply Chain Management
A3576	Fundamentals of Database Management Systems	A3577	Fundamentals of Image Processing
A3080	National Service Scheme (NSS)	A3680	Python for Data Science

### Course Categories

<p><b>HS</b> – Humanities and Social Sciences</p> <p><b>BE</b> – Basic Engineering</p> <p><b>AC*</b> – Audit Course</p> <p><b>PE</b> – Professional Elective</p> <p><b>TS</b> – Technical Seminar</p>	<p><b>BS</b> – Basic Sciences</p> <p><b>CE</b> – Core Engineering</p> <p><b>OE</b> – Open Elective</p> <p><b>MP</b> – Mini Project</p> <p><b>PW</b> – Project Work</p>
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**Note:** Open electives to be offered will be notified by each department at the time of registration.

# **SYLLABI FOR I SEMESTER**

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE I Semester

VCE-R15

**MATHEMATICS - I**

Course Code: A3001

L	T	P	C
4	1	0	4

**Course Overview:**

This course develops the theory of differential equations and indicating its applications. This course deals with more advanced Engineering Mathematics topics which provide students with the relevant mathematical tools required in the analysis of problems in engineering and scientific professions. Topics include the differential equations of first order and their applications, higher order linear differential equations and their applications, Functions of single variable and multiple integrals, Laplace transforms, Vector integral theorems (Green's, Stoke's and Gauss's divergence theorems). The mathematical skills derived from this course form a necessary base to analytical and design concepts encountered in the program.

**Prerequisite(s):** NIL

**Course Outcomes:**

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

- CO1. Solve the first and higher order linear differential equations.
- CO2. Make use of differential equations to solve orthogonal trajectories, rate of growth/decay, and Newton's law of cooling, electrical circuits and simple harmonic motion problems.
- CO3. Examine extremum of a function of several variables and evaluate the multiple integrals.
- CO4. Apply Laplace transforms to solve differential equation.
- CO5. Evaluate line, surface and volume integrals using vector integral theorems.



**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE I Semester

VCE-R15

**MATHEMATICS - I**

Course Code: A3001

L	T	P	C
4	1	0	4

**SYLLABUS**

**UNIT – I**

(12 Lectures)

**DIFFERENTIAL EQUATIONS OF FIRST ORDER AND THEIR APPLICATIONS:** Formation of a differential equation – Differential equations of first order and first degree – Linear equations, Bernoulli's equation, Exact equations and equations reducible to exact form - Applications of first order differential equations - Orthogonal trajectories - Newton's law of cooling - Law of natural growth and decay.

**UNIT – II**

(11 Lectures)

**HIGHER ORDER LINEAR DIFFERENTIAL EQUATIONS AND THEIR APPLICATIONS:** Linear differential equations of second and higher order with constant coefficients, Non-homogeneous term of the type  $Q(x) = e^{ax}, \sin ax, \cos ax, x^n, e^{ax}V(x), x^nV(x)$  - Equations reducible to linear equations with constant coefficients – Cauchy's homogeneous linear equation – Legendre's linear equation - Method of variation of parameters - Applications to  $L$ -  $C$ -  $R$  Circuits and Simple Harmonic Motion.

**UNIT – III**

(13

Lectures)

**FUNCTIONS OF SINGLE AND SEVERAL VARIABLES, MULTIPLE INTEGRALS:** Mean Value Theorems - Rolle's Theorem - Lagrange's mean value theorem – Cauchy's mean value theorem - Generalized mean value theorem (all theorems statements and their verification). Functions of several variables - Functional dependence - Jacobian - Maxima and Minima of functions of two variables – Lagrange's method of undetermined multipliers. Multiple integrals - Double and triple integrals - Change of order of integration - Change of variables in double integrals.

**UNIT – IV**

(10

Lectures)

**LAPLACE TRANSFORM AND ITS APPLICATIONS TO ORDINARY DIFFERENTIAL EQUATIONS:** Laplace transforms of elementary functions - First shifting theorem - Change of scale property - Multiplication by  $t^n$  - Division by  $t$  - Laplace transforms of derivatives and integrals - Unit step function - Second shifting theorem - Periodic function - Evaluation of integrals by Laplace transforms - Inverse Laplace transforms - Method of partial fractions - Other methods of finding inverse transforms - Convolution theorem - Applications of Laplace transforms to ordinary differential equations.

**UNIT-V**

(10

Lectures)

**VECTOR CALCULUS:** Scalar and vector point functions - Gradient, divergence, curl and their related properties - Solenoidal and irrotational vector point functions - Scalar potential function - Laplacian operator - Line integral - work done - surface integrals - volume integral - Vector integral theorems - Green's theorem in a plane - Stoke's theorem - Gauss divergence theorem (all theorem statements and their verification).

**TEXT BOOKS:**

1. B S Grewal (2012), *Higher Engineering Mathematics*, 42<sup>nd</sup> Edition, New Delhi, Khanna Publishers.
2. B V Ramana (2010), *Engineering Mathematics*, New Delhi, Tata Mc Graw Hill Publishing Co. Ltd

**REFERENCE BOOKS:**

1. Kreyszig Ervin, *Advanced Engineering Mathematics*, 10<sup>th</sup> Edition, New Jersey, John Wiley & Sons
2. T K V Iyengar, B Krishna Gandhi & Others. (2011), *Engineering Mathematics Vol - I*, Tenth Revised Edition, New Delhi, S.Chand & Co.Ltd.
3. H K Dass, Er Rajnish Varma (2012), *Higher Engineering Mathematics*, Second Revised Edition, New Delhi, S Chand & Co. Ltd

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE I Semester

VCE-R15

**PROBABILITY THEORY AND NUMERICAL METHODS**

Course Code: A3004

L	T	P	C
3	1	0	3

**Course Overview:**

This course is a study of probability theory and numerical techniques used to model engineering systems. Topics in probability include: basic axioms of probability, Baye's Theorem, random variables, discrete and continuous probability distributions. It involves the development of mathematical models and the application of the computer to solve engineering problems using the following computational techniques: root-finding using bracketing and open methods, Interpolation, numerical differentiation, numerical integration, linear and polynomial curve fitting and the solution of differential equations using single step methods and multi -step methods.

**Prerequisite(s):**NIL

**Course Outcomes:**

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

CO1.Solve real world problems using the theory of probability.

CO2.Identify the types of random variables involved in a given problem and calculate relevant probabilities.

CO3.Develop appropriate Numerical methods to approximate a function.

CO4.Make use of Numerical differentiation and integration in solving problems of engineering.

CO5.Apply appropriate method to find numerical solution of a differential equation.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE I Semester

VCE-R15

**PROBABILITY THEORY AND NUMERICAL METHODS**

Course Code: A3004

L	T	P	C
3	1	0	3

**SYLLABUS**

**UNIT-I** **(8 Lectures)**

**PROBABILITY:** Sample space and events, probability- axioms of probability-some Elementary theorems-conditional probability.-Bayes Theorem.

**UNIT-II** **(8 Lectures)**

**RANDOM VARIABLES & DISTRIBUTIONS:** Random variables. Discrete distribution – continuous distribution. Binomial distribution - Poisson distribution –Normal distribution-Related properties. Normal Approximation to binomial distribution

**UNIT-III** **(12 Lectures)**

**ALGEBRAIC AND TRANSCENDENTAL EQUATIONS, INTERPOLATION:** Bisection method - Regula-falsi method - Iteration method – Newton - Raphson method.

**INTERPOLATION:** Finite differences: Forward, Backward and Central differences - Other difference operators and relations between them - Differences of a polynomial – Missing terms - Newton's forward interpolation, Newton's backward interpolation, Interpolation with unequal intervals – Lagrange's interpolation.

**UNIT-IV** **(8 Lectures)**

**NUMERICAL DIFFERENTIATION, INTEGRATION AND CURVE FITTING:** Numerical differentiation: Derivatives using Newton's interpolation formulae. Numerical integration: Newton-cotes quadrature formula - Trapezoidal rule - Simpson's one-third rule - Simpson's three-eighth rule.

Curve Fitting: Method of least squares - Fitting a straight line, second degree parabola and non-linear curves of the form by the method of least squares.

**UNIT-V** **(8 Lectures)**

**NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS:** Single step methods: Taylor's series method - Euler's and modified Euler's Methods - Fourth order Runge-Kutta method for solving first order equations – Multistep method: Adam's bash forth Predictor and Corrector method.

**TEXT BOOKS:**

1. B S Grewal, (2012), *Higher Engineering Mathematics*, 42<sup>nd</sup> Edition, New Delhi, Khanna Publishers.
2. Richard Arnold Johnson, Irwin Miller, John E. Freund, (2011), *Probability and Statistics for Engineers*, Eighth Edition, New Delhi, Prentice Hall

**REFERENCE BOOKS:**

1. G S S Bhisma Rao (2011), *Probability and Statistics*, Fifth Edition, Hyderabad, Scitech Publications Pvt.Ltd.
2. N P Bali and N Ch Narayana Iyengar , (2004), *A Textbook of Engineering Mathematics*, Sixth Edition, New Delhi, Laxmi Publications.
3. S S Sastry ,(2005), *Introductory Methods of Numerical Analysis*, Fourth Edition, New Delhi, PHI Learning Pvt.Ltd.
4. Iyengar T.K.V., Krishna Gandhi B. & Others., (2013), *Numerical Methods*, Second Revised Edition, New Delhi, S.Chand & Co.Ltd.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE I Semester

VCE-R15

**TECHNICAL ENGLISH**

Course Code: A3005

L	T	P	C
3	0	0	3

**Course Overview:**

The basic idea behind offering Technical English as a subject at the undergraduate level is to acquaint students with a language held by common consent to be the most popular language. The lessons included as part of syllabus, aim to take the nuances of English to students as it reveals its strengths and complexity when used to perform a variety of functions such as present technical seminars, prepare technical papers, abstracts, write effective business, formal and job application letters, publish articles, etc. For prospective engineers, nothing could be more useful or productive than being able to reach out to the world of technology and business through communication skills.

**Prerequisite(s):**NIL

**Course Outcomes:**

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

- CO1. Develop an understanding of the significance of humanity, love and service to mankind and be involved in community service
- CO2. Perceive the importance of technological impact on society and plan for the technological advancement
- CO3. Apply the rules of grammar effectively (articles, prepositions, concord, tenses etc.) in writing reports, technical articles, essays and in day-to-day conversations.
- CO4. Build creativity for career planning and entrepreneurship.
- CO5. Develop effective written communication skills in academic writing.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE I Semester

VCE-R15

**TECHNICAL ENGLISH**

Course Code: A3005

L T P C  
3 0 0 3

**SYLLABUS**

**UNIT – I** **(8 Lectures)**

Chapter entitled **Heaven's Gate** From Enjoying Everyday English published by Orient Black Swan, Hyderabad.

Chapter entitled **Mother Teresa** from Inspiring speeches and lives Published by Maruthi Publication, Hyderabad.

**Grammar** : Articles – Prepositions

**Vocabulary** : Word formation with Prefixes and Suffixes – Synonyms and Antonyms – Homonyms, Homophones and Homographs – Idiomatic Expressions – Phrasal Verbs.

**Writing** : Paragraph Writing.

**UNIT - II** **(8 Lectures)**

Chapter entitled **The Connoisseur** From Enjoying Everyday English published by Orient Black Swan, Hyderabad.

Chapter entitled **Sam Pitroda** from Inspiring speeches and lives Published by Maruthi Publication, Hyderabad.

**Grammar** : Concord (Subject verb Agreement) - Adjectives and Degrees of Comparisons

**Vocabulary** : Word formation with Prefixes and Suffixes- Synonyms and Antonyms-Collocations- One word substitutes

**Writing** : Letter Writing: Types of letters, Styles of letters, Parts of letters, Letter of Apology and reply, Letter of Complaint and Reply.

**UNIT - III** **(8 Lectures)**

Chapter entitled **The Odds Against Us** From Enjoying Everyday English published by Orient Black Swan, Hyderabad.

Chapter entitled **I have a Dream** by Martin Luther King from Inspiring speeches and lives Published by Maruthi Publication, Hyderabad.

**Grammar** : Tenses, Question Tags

**Vocabulary** : Technical Vocabulary, Word formation with Prefixes and Suffixes- Synonyms and Antonyms Morphemes

**Writing** : Speech Writing, Dialogue and Speech Writing, Writing Technical Articles

**UNIT - IV** **(8 Lectures)**

Chapter entitled **The Cuddalore Experience** From Enjoying Everyday English published by Orient Black Swan, Hyderabad.

**Grammar** : Active and Passive Voice

**Vocabulary** : Synonyms and Antonyms, Words often confused / mis-spelt

**Writing** : Letter of Application and Preparation of Resume

**UNIT - V** **(10 Lectures)**

Chapter entitled **Obama** from Inspiring speeches and lives Published by Maruthi Publication, Hyderabad.

**Grammar** : Simple, Compound and Complex - Direct and Indirect Speech

**Vocabulary** : One word substitutes and Technical Vocabulary

**Writing** : Report Writing –Types of reports, importance of Reports, Styles of Reports,  
Structure  
of Reports–Writing informational, Progress Reports and Analytical Reports in  
Technical  
Contexts.

**TEXT BOOKS:**

1. Ramakrishna Rao. A (2009). Enjoying Every day English. Hyderabad: Sangam Books.
2. Yadava Raju. B. & Muralikrishna .C (2009). Inspiring Speeches and Lives. Guntur: Maruthi Publications.
3. Meenakshi Raman & Sangeeta Sharma, (2009). Technical Communication. Oxford University Press.

**REFERENCE BOOKS:**

1. Ashraf Rizvi M, (2005). Effective Technical Communication. New Delhi: Tata Mc Graw Hill.
2. Raymond Murphy, (2004). Murphy's English Grammar with CD. 3<sup>rd</sup> edition. Cambridge University Press.
3. Wren & Martin (1936), revised by N.D.V.Prasad Rao(1999), English Grammar and Composition, S. Chand Publications
4. Mario Rinvoluceri & Paul Davis (2005), More Grammar Games. Cambridge University Press.
5. Edgar Thorpe & Showick Thorpe., (2008). Basic Vocabulary for Competitive Examination. Pearson Education.



**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE I Semester

VCE-R15

**BASIC ELECTRICAL ENGINEERING**

Course Code: A3201

L	T	P	C
4	1	0	4

**Course Overview:**

This is a basic course for all Engineering students of first Year. The objective is to make them familiar with basic principles of Electrical Engineering. The course addresses the underlying concepts & methods behind Electrical Engineering. The course is present a problem oriented introductory knowledge of the Fundamentals of Electrical Engineering and to focus on the study of basic electrical parameters, basic principles, different types of electrical circuit and methods to solve electrical circuit.

**Prerequisite(s):**NIL

**Course Outcomes:**

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

- CO1. Apply network reduction techniques and Knowledge of Alternating quantities to calculate Current, Voltage and Power for complex circuits.
- CO2. Analyze electrical Circuits using Nodal Analysis, Mesh analysis and Network theorems.
- CO3. Apply the concepts of network topology to obtain Node incidence, Tie set and Cut set matrices.
- CO4. Design two port networks, their equivalent circuits and obtain their parameters.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE I Semester

VCE-R15

**BASIC ELECTRICAL ENGINEERING**

Course Code: A3201

L	T	P	C
4	1	0	4

**SYLLABUS**

**UNIT - I** **(11 Lectures)**

**INTRODUCTION TO ELECTRICAL CIRCUITS:** Concept of Circuit, R-L-C parameters, voltage and current sources, Independent and dependent sources, source transformation, voltage - current relationship for passive elements, Kirchhoff's laws, network reduction techniques, series, parallel and compound circuits.

**UNIT – II** **(11 Lectures)**

**ANALYSIS OF ELECTRICAL CIRCUITS:** Mesh analysis: mesh equations by inspection method, super mesh analysis, nodal analysis: nodal equations by inspection method, supernode analysis, star-to-delta or delta-to-star transformation.

**NETWORK TOPOLOGY:** Definitions, graph, tree, basic tieset and basic cutset matrices for planar networks duality & dual networks.

**UNIT-III** **(11 Lectures)**

**SINGLE PHASE AC CIRCUITS:** R.M.S, average values and form factor for different periodic wave forms, steady state analysis of R, L and C (in series, parallel and series parallel combinations) with sinusoidal excitation, concept of reactance, impedance, susceptance and admittance. Concepts of phase and phase difference.

**POWER AND POWER FACTOR:** Concept of power factor, real and reactive powers, J notation, complex and polar forms of representation, complex power.

**UNIT – IV** **(12 Lectures)**

**NETWORK THEOREMS:** Thevenin's, Norton's, Maximum Power Transfer, Superposition, Reciprocity, Millman's, Tellegen's, and Compensation theorems for DC and AC excitations

**UNIT – V** **(11 Lectures)**

**NETWORK PARAMETERS:** Two port network parameters, Z, Y, ABCD, Inverse ABCD, hybrid parameters and Inverse hybrid and their relations.

**TEXT BOOKS:**

1. William H. Hayt, Jack E. Kemmerly, Steven M. Durbin (2006), *Engineering Circuits Analysis*, 7<sup>th</sup> Edition, Mc Graw Hill, New Delhi.
2. Joseph Edminister (2001), *Electric Circuits*, 6th Edition Schaum's Outlines, Tata Mc Graw Hill, New Delhi.

**REFERENCE BOOKS:**

1. Van Valkenburg, M. E. (1974), *Network Analysis*, 3<sup>rd</sup> Edition, Prentice Hall of India, New Delhi.
2. Wadhwa C. L (2009), *Electric Circuits Analysis*, New Age International Publications, New Delhi.
3. Sudhakar, Shyammohan S. Palli (2003), *Electrical Circuits*, 2<sup>nd</sup> Edition, Tata Mc Graw Hill, New Delhi.
4. Chakrabarthy (2005), *Circuit Theory*, 4th Edition, Dhanpat Rai & Sons Publications, New Delhi.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE I Semester

VCE-R15

**COMPUTER PROGRAMMING**

Course Code: A3501

L	T	P	C
4	1	0	4

**Course Overview:**

The course is a Basic Engineering course for all computing aspiring students. It is designed to provide a comprehensive study of the C programming language that covers the fundamental principles of computer programming, with an emphasis on problem solving strategies using structured programming techniques. The syntax and constructs of data types, control statements, arrays, functions and pointers are elaborated. The derived data types like structures, union and enumerations is also importantly discussed. The console and file I/O systems are explained with the wide variety of examples and applications. It stresses the strengths of C, which provide students with the means of writing efficient, maintainable and reusable code to solve mathematical, engineering and simple data processing problems.

**Prerequisite(s):**NIL

**Course Outcomes:**

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

- CO1. Write algorithm and draw corresponding flowchart for simple problems besides explaining functions of computer components.
- CO2. Select the right identifiers, data types and operators for effective computation.
- CO3. Write programs, demonstrating use of control statements, arrays and strings.
- CO4. Demonstrate use of functions and pointers by writing programs.
- CO5. Write programs for simple real life problems using structures and unions.
- CO6. Illustrate use of files by writing programs.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE I Semester

VCE-R15

**COMPUTER PROGRAMMING**

Course Code: A3501

L	T	P	C
4	1	0	4

**SYLLABUS**

**UNIT – I** **(15 Lectures)**

**INTRODUCTION TO COMPUTERS:** Computer systems, Computing environments, Computer languages, Creating and Running Programs, System Development - Algorithm, Pseudo Code, Flow Charting.

**INTRODUCTION TO THE C LANGUAGE:** Background, C Programs, Identifiers, Types, Variables, Constants, Formatted and Unformatted Console I/O Functions.

**OPERATORS AND EXPRESSIONS:** Arithmetic, Relational and Logical Operators, Assignment Operators, Increment and Decrement Operators, Conditional Operator, Bitwise Operators, Special Operators, Expressions, Precedence and Associativity, Side Effects, Type Conversion

**UNIT – II** **(14 Lectures)**

**STATEMENTS:** Null, Expression, Return, Compound, Selection, Iteration, Jump Statements.

**ARRAYS:** Using Arrays in C, Two-Dimensional Arrays, Multidimensional Arrays,

**STRINGS:** String Concepts, C Strings, String Input/output Functions, Array of Strings, String Manipulation Functions.

**UNIT – III** **(12 Lectures)**

**FUNCTIONS:** User-Defined Functions, Inter-Function Communication, Standard Functions, Storage Classes, Recursion, Preprocessor Commands.

**POINTERS:** Introduction, Pointers for Inter-Function Communication, Pointers to Pointers, Arrays and Pointers, Pointer Arithmetic and Arrays, Passing an Array to a Function, Array of Pointers, Pointers to Void and to Functions, Memory Allocation Functions, Command-Line Arguments.

**UNIT – IV** **(09 Lectures)**

**STRUCTURES, UNIONS, ENUMERATIONS AND TYPEDEF:** Structure Definition, Initialization, Accessing Structures, Nested Structures, Arrays of Structures, Structures and Functions, Passing Structures through Pointers, Self-referential Structures, Unions, Bit-Fields, typedef, Enumerations.

**UNIT – V** **(08 Lectures)**

**FILE I/O:** Streams, Files, File Operations, File Opening Modes, Formatted File I/O Functions, Unformatted File I/O Functions, File Status Functions, File Positioning Functions.

**TEXT BOOKS:**

1. B. A. Fouruzan and R. F. Gilberg (2014), *C Programming & Data Structures*, 3<sup>rd</sup> Edition, CENGAGE Learning, India.

**REFERENCE BOOKS:**

1. Herbert Schildt (2013), *C: The Complete Reference*, 4<sup>th</sup> Edition, Mc Graw Hill Education (India) Pvt Ltd.
2. B. W. Kerninghan, Dennis M. Ritchie (1988), *The C Programming Language*, 2<sup>nd</sup> edition, Prentice Hall Software Series, India.
3. Stephen G. Kochan (2014), *Programming in C*, 4<sup>th</sup> Edition, Addison-Wesley Professional.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE I Semester

VCE-R15

**ENGLISH LANGUAGE COMMUNICATION SKILLS LAB**

Course Code: A3008

L	T	P	C
0	0	3	2

**Course Overview:**

The basic idea behind offering English as a practical subject at the undergraduate level is to acquaint the students with a language that enjoys currently as a lingua franca of the globe. In the ELCS lab the students are trained in Communicative English Skills: phonetics, word accent, word stress, rhythm and intonation, making effective oral presentations- both extempore and Prepared- seminars, group discussions, presenting techniques of writing, role play, telephonic skills, asking and giving directions, information transfer, debates, description of person, place, objects etc. The lab encourages students to work in a group, engage in peer-reviews and inculcate team spirit through various exercises on grammar, vocabulary, listening and pronunciation games, etc.

**Prerequisite(s):**NIL

**Course Outcomes:**

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

- CO1.Improve their pronunciation using the rules of Phonetics.
- CO2.Take part in role-plays and interviews to perform effectively in real life situations.
- CO3.Choose appropriate words and phrases to make the telephonic conversation conveying the meaning with etiquettes.
- CO4.Minimize the stage fear and make presentations with proper body language.
- CO5.Adapt the art of debating and group discussion to present their view point convincingly.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE I Semester

VCE-R15

**ENGLISH LANGUAGE COMMUNICATION SKILLS LAB**

Course Code: A3008

L	T	P	C
0	0	3	2

**LIST OF EXPERIMENTS**

- a. **Computer Assisted Language Learning (CALL) Lab**
- b. **Interactive Communication Skills (ICS) Lab**

The following course content is prescribed for the **English Language Communication Skills Lab**

**Exercise – I**

**CALL Lab:** Introduction to Phonetics – Speech Sounds – Vowels and Consonants

**ICS Lab:** Ice-Breaking activity and JAM session Articles, Prepositions, Word formation- Prefixes & Suffixes, Synonyms & Antonyms

**Exercise – II**

**CALL Lab:** Structure of Syllables - Past Tense Marker and Plural Marker – Weak Forms and Strong Forms -Consonant Clusters.

**ICS Lab:** Situational Dialogues – Role-Play- Expressions in Various Situations – Self-introduction and Introducing Others – Greetings – Apologies – Requests – Social and Professional Etiquette - Telephone Etiquette -Concord (Subject in agreement with verb) and Words often mis-spelt-confused/misused.

**Exercise - III**

**CALL Lab:** Minimal Pairs- Word accent and Stress Shifts- Listening Comprehension.

**ICS Lab:** Descriptions- Narrations- Giving Directions and guidelines - Sequence of Tenses, Question Tags and One word substitutes.

**Exercise – IV**

**CALL Lab:** Intonation and Common errors in Pronunciation.

**ICS Lab:** Extempore- Public Speaking Active and Passive Voice - Common Errors in English, Idioms and Phrases

**Exercise – V**

**CALL Lab:** Neutralization of Mother Tongue Influence and Conversation Practice

**ICS Lab:** Information Transfer- Oral Presentation Skills - Reading Comprehension and Job Application with Resume preparation.

**Suggested Software's:**

- Cambridge advanced learners' English dictionary with CD.
- The Rosetta stone English library.
- Clarity pronunciation power –part I.
- Oxford advanced learner's compass, 7th Edition.
- Learning to speak English -4 CDs.
- Vocabulary in use, Michael McCarthy, felicity o'den, Cambridge.
- Murphy's English grammar, Cambridge with CD.

**REFERENCE BOOKS:**

1. Suresh Kumar. E. & Sreehari P.A (2007), Handbook for English Language Laboratories,
2. Cambridge University Press India Pvt. Ltd, New Delhi.
3. Mandal S. K (2006), Effective Communication & Public Speaking, Jaico Publishing House, New Delhi.
4. Grant Taylor (2004), English Conversation Practice, Tata McGraw Hill, New Delhi.
5. Balasubramanian .T (2000), A text book of English Phonetics for Indian Student, MacMillan Publishers, India.
6. Kamalesh Sadanand, Susheela Punitha (2008), Spoken English: A foundation Course: Parts 1 & 2, New Delhi, Orient Longman Pvt. Ltd

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE I Semester

VCE-R15

**COMPUTER PROGRAMMING THROUGH C LAB**

Course Code: A3502

L	T	P	C
0	0	3	2

**Course Overview:**

This hands-on course provides a comprehensive introduction to the ANSI C language, emphasizing portability and structured design. Students are introduced to all major language elements including data types, control statements and preprocessor directives. Thorough treatment is given to the topics of arrays, functions and pointers. The course elucidates the use of structures, unions, and enumerations. Emphasis is given to the processing of command line arguments and file systems, so as to write flexible, user-friendly programs. Comprehensive hands on exercises are integrated throughout to reinforce learning and develop real competency. It is used to program desktop applications, compilers, tools and utilities and even hardware devices.

**Prerequisite(s):**NIL

**Course Outcomes:**

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

- CO1.Implement programs by selecting the right identifiers, data types and operators for effective computation
- CO2.Implement programs, demonstrating use of control statements, arrays and strings.
- CO3.Implement programs, demonstrating use of functions and pointers.
- CO4.Implement C programs for simple real life problems using structures and unions
- CO5.Implement programs illustrating use of files.
- CO6. Debug erroneous programs related to the course

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE I Semester

VCE-R15

**COMPUTER PROGRAMMING THROUGH C LAB**

Course Code: A3502

L T P C  
0 0 3 2

**LIST OF EXPERIMENTS**

**Week – 1 (Operators)**

1. Write C programs for the following:
  - a) Swapping of two numbers without using a third variable.
  - b) Check whether the given number is odd or even using conditional operator.
  - c) Read two integers and shift the first integer by two bits to the left and second integer by one bit to the right.

**Week – 2 (if and switch statements)**

2. Write C programs for the following:
  - a) Check whether the input alphabet is a vowel or not.
  - b) Find the roots of a quadratic equation.
  - c) Which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +, -, \*, /, % and use Switch Statement)

**Week – 3 (Loops)**

3. Write C programs for the following:
  - a) Print Armstrong numbers between 1 to n where n value is entered by the user. An Armstrong number is defined as the sum of the cubes of the individual digits of the given number. (e.g.  $371 = 3^3 + 7^3 + 1^3$ )
  - b) Generate the first n terms of the Fibonacci sequence.
  - c) Calculate the following sum:  
Sum= $1 + x^2/2! + X^4/4! + \dots$  up to given 'n' terms.

**Week – 4 (Loops)**

4. Write C programs for the following:
  - a) Generate all the prime numbers between 1 and n, where n value is supplied by the user.
  - b) Print first n lines of the Pascal's Triangle. Pascal's Triangle is a triangular array of the binomial coefficients.

```
      1
     1 1
    1 2 1
   1 3 3 1
```

- c) Print first n lines of Floyd's Triangle.

```
1
2 3
4 5 6
7 8 9 10
11 12 13 14 15
```

**Week – 5 (Arrays)**

5. Write C programs for the following:
  - a) Find the largest and smallest number among a list of integers.
  - b) Read a list of elements into an array 45, 14, 78, 36, 64, 9, 25, 99, 11 and find whether a particular element is present in the list or not using linear search.
  - c) Read two matrices and find the addition and multiplication of two matrices.

**Week – 6 (Strings)**

6. Write C programs for the following:
  - a) Check whether the given string is palindrome or not with and without using string functions.



- b) Insert a sub-string in to given main string from a given position.
- c) Count the number of lines, words and characters in a given string.

### **Week – 7 (Functions)**

7. Write C programs that uses both recursive and non-recursive functions:
  - a) Find the factorial of a given number.
  - b) Find the N<sup>th</sup> Fibonacci number.
  - c) Find the reverse of a number.

### **Week – 8 (Pointers)**

8. Write C programs for the following:
  - a) Reverse a string using pointers.
  - b) Read a list of elements into an array. Find the sum of array elements using pointers.
  - c) Read an array of integers whose size will be specified interactively at run time.

### **Week – 9 (Command line arguments)**

9. Write C programs for the following:
  - a) Pass n number of arguments at the command line and display total number of arguments and their names.
  - b) Add two numbers using command line arguments.

### **Week – 10 (Structure and Union)**

10. Write C programs for the following:
  - a) Read the full name and date of birth of a person and display the same using nested structure.
  - b) Create a Student structure containing name, rollNo and grade as structure members. Display the name, rollNo and grade of n students by using array of structures concept.
  - c) Create a union named Item that contains, itemName, itemPrice and itemQuantity as members and find the size of the union and number of bytes reserved for it.

### **Week – 11 (Enumerated Data Types, Typedef, Bit Fields, Pre-processor Directives)**

11. Write C programs for the following:
  - a) Create enumerated data type for 7 days of a week. Display their values in integer constants.
  - b) Find the biggest number among two numbers using a parameterized macro.
  - c) Create a Student structure using typedef containing id, name and age as structure members. Declare a bit field of width 3 for age and display the student details.

### **Week – 12 (Files)**

12. Write C programs for the following:
  - a) Copy the contents of one file to another.
  - b) Merge the contents of two files and store it in a third file.
  - c) Reverse the contents of a file.

### **Week – 13 (Additional Programs)**

13. Write C programs for the following:
  - a) Read the student marks in five courses and based on the calculated average display the grade of the student.
  - b) Read two strings and compare these two strings character by character. Display the similar characters found in both the strings.
  - c) Read name and marks of N student records from user and store them in a file.

### **REFERENCE BOOKS:**

1. Yashawanth Kanethkar (2014), *Let us C*, 13<sup>th</sup> Edition, BPB Publications, India.
2. E. Balaguruswamy (2014), *Computer Programming*, 1<sup>st</sup> Edition, McGraw-Hill, India
3. Pradip Dey, Ghosh Manas (2009), *Programming in C*, Oxford University Press, USA.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE I Semester

VCE-R15

**ENGINEERING WORKSHOP**

Course Code: A3305

L	T	P	C
0	0	3	2

**Course Overview:**

This course provides comprehensive knowledge of the various trades and tools used in an Engineering workshop. It emphasizes on the use of various workshop tools with safety aspects. The essence of this lab is also to make the students know about identifying hardware devices in PC, hardware assembling and disassembling, and internet capabilities and understand the usage different software's like MS Office.

**Prerequisite(s):**NIL

**Course Outcomes:**

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

CO1. Identify the tools and equipment utilized in workshop.

CO2. Choose the required trade for the suitable operations.

CO3. Make the Wooden joints, MS fittings, house wiring, sheet metal components and simple forgings.

CO4. Explain the working of Arc Welding and Plumbing operations, uses of power tools and Installation of Software in the computer systems.

CO5. Prepare the documents, data sheets and power point slides by using the Microsoft office tools

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE I Semester

VCE-R15

**ENGINEERING WORKSHOP**

Course Code: A3305

L	T	P	C
0	0	3	2

**LIST OF EXPERIMENTS**

**PART – A**

**1. TRADES FOR PRACTICE:**

**Note: At least four trades have to be practiced from Part-A.**

- a. Carpentry
- b. Fitting
- c. House Wiring
- d. Tin-Smithy
- e. Foundry

**PART-B**

**2. DEMONSTRATION TRADES:**

- a. Black Smithy
- b. Welding
- c. Plumbing

**PART-C**

**Note: At least four tasks have to be carried out from Part-C**

**Task 1**

**Introduction to Computer:** block diagram of the CPU along with the configuration of each peripheral component and its functions. Practice to disassemble and assemble the components of a PC to working condition.

**Task 2**

**Installation of operating systems:** like MS Windows, Linux and different packages on a PC. Diagnosis of PC malfunction, types of faults, common issues and how to fix them. Basic hardware & software troubleshooting steps, PC diagnostic tools.

**Task 3**

**Introduction to Network:** types of Networks, types of network topologies, types of network protocols, drivers loading and configuration settings, mapping of IP addresses, configuration of internet and Wi-Fi , bookmarks, search toolbars and pop up blockers.

**Task 4**

**Introduction to Search Engines and Cyber Hygiene:** types of search engines and how to use search engines, awareness of various threats on internet, types of attacks and how to overcome. Installation of antivirus software, configuration of personal firewall and windows update on computers.

**Task 5**

**Introduction to Word:** importance of word as word processor, overview of toolbars, Saving, accessing files, using help and resources.

**Creating project Certificate:** Abstract Features to be covered:-Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check , Track Changes, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes and Paragraphs.

**Creating Time Table:** Abstract Features to be covered:-Formatting Styles, Inserting table.

**Task 6**

**Introduction to Power Point:** Utilities, Overview of toolbars, PPT Orientation, slide layouts, Types of views.

**Creating Front page of The presentation:** Create a power point presentation using the features - slide layouts, inserting text, word art, formatting text, bullets and numbering, auto shapes, lines and arrows, hyperlinks, inserting –images, clip art, audio, video, objects, tables and charts.

#### **Task 7**

**Introduction to Excel:** Overview of toolbars, accessing, Saving excel files, Using help and resources. Create a excel using the features - gridlines, format cells, summation, auto fill, formatting text, cell referencing, formulae in excel – average, standard deviation, charts, renaming and inserting worksheets, hyper linking, count function, sorting, conditional formatting.

**Creating a Scheduler:** Features to be covered:- Gridlines, Format Cells, Summation, auto fill, Formatting Text

#### **Task 8**

**Introduction to latex:** importance of LaTeX, Details of LaTeX word accessing, overview of toolbars, saving files and using help and resources, features to be covered in LaTeX word and LaTeX power point.

**Creating project Certificate:** Abstract Features to be covered:-Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check , Track Changes, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes and Paragraphs

#### **TEXT BOOKS:**

1. H. S. Bawa (2007), *Workshop Practice*, Tata McGraw-Hill Publishing Company Limited, New Delhi.
2. A. Rajendra Prasad & P. M. M. S. Sarma (2002), *Workshop Practice*, SreeSai Publication, New Delhi.

#### **REFERENCE BOOKS:**

1. K. Jeyachandran, S. Natarajan, S. Balasubramanian (2007), *A Primer on Engineering Practices Laboratory*, Anuradha Publications, New Delhi.
2. T. Jeyapooan, M. Saravanapandian, S. Pranitha (2006), *Engineering Practices Lab Manual*, Vikas Publishing House Private Limited, New Delhi
3. W.A.J. Chapman, *Workshop Technology*, Part 1, Viva Low Priced Student Edition.
4. *Introduction to Information Technology*, ITL Education Solutions limited, Pearson Education.
5. *IT Essentials PC Hardware and Software Companion Guide* 3<sup>rd</sup> Edition by David Anfinson and Ken.
6. Quamme. – CISCO Press, Pearson Education.
7. Kate J. Chase, *PC Hardware and A+Handbook*, PHI (Microsoft)

# **SYLLABI FOR II SEMESTER**

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE II Semester

VCE-R15

**MATHEMATICS - II**

Course Code: A3006

L	T	P	C
4	1	0	4

**Course Overview:**

This course focus on basic areas of theory and more advanced Engineering Mathematics topics which provide students with the relevant mathematical tools required in the analysis of problems in engineering and scientific professions. Topics to be covered in this course include: solution for linear systems, Eigen values & Eigen vectors, linear transformations, partial differential equations, Fourier series, Fourier transforms & Z - transforms. The mathematical skills derived from this course form a necessary base to analytical and design concepts encountered in the program.

- **Prerequisite(s):**Mathematics – I (A3001)

**Course Outcomes:**

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

- CO1.Solve system of linear equations using rank of a matrix.
- CO2.Examine the nature of the Quadratic form by eigen values and eigen vectors.
- CO3.Classify and solve Partial differential equations.
- CO4.Develop Fourier series and Fourier transforms of a function
- CO5.Apply Z- Transforms to solve difference equations.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE II Semester

VCE-R15

**MATHEMATICS - II**

Course Code: A3006

L	T	P	C
4	1	0	4

**SYLLABUS**

**UNIT – I (11 Lectures)**

**THEORY OF MATRICES:** Real matrices: Symmetric, skew – symmetric and orthogonal matrices - Complex matrices: Hermitian, Skew - Hermitian and Unitary matrices - Elementary row and column transformations - Elementary matrix - Finding rank of a matrix by reducing to Echelon form and Normal form - Finding the inverse of a matrix using elementary row/column transformations (Gauss-Jordan method) - Consistency of system of linear equations (homogeneous and non- homogeneous) using the rank of a matrix - Solving  $m \times n$  and  $n \times n$  linear system of equations by Gauss elimination - Cayley-Hamilton Theorem (Statement and Verification) - Finding inverse and powers of a matrix by Cayley-Hamilton theorem.

**UNIT – II (12 Lectures)**

**LINEAR TRANSFORMATIONS:** Linear dependence and independence of vectors - Linear Transformation, Orthogonal Transformation - Eigen values and eigen vectors of a matrix – Properties of eigen values and eigen vectors of real and complex matrices - Diagonalization of a matrix. Quadratic forms up to three variables - Rank, Index, Signature and Nature of quadratic form - Reduction of a quadratic form to canonical form using linear and orthogonal transformations.

**UNIT – III(10 Lectures)**

**PARTIAL DIFFERENTIAL EQUATIONS:** Formation of partial differential equation by elimination of arbitrary constants and arbitrary functions - Solutions of first order linear (Lagrange) equation and nonlinear (standard type) equations - Equations reducible to standard forms - Method of separation of variables for second order equations.

**UNIT – IV(10 Lectures)**

**FOURIER SERIES:** Determination of Fourier coefficients - Fourier series in an arbitrary interval - Fourier series of even and odd functions - Half-range Fourier sine and cosine expansions.

**UNIT – V(13 Lectures)**

**FOURIER TRANSFORMS & Z - TRANSFORMS:** Fourier integral theorem (statement) - Fourier sine and cosine integrals - Fourier transforms - Fourier sine and cosine transforms - Properties - Inverse transforms - Finite Fourier transforms.

**Z-transforms:** Definition - Some standard Z-transforms - Damping rule - Shifting rule - Multiplication by  $n$  - Initial and final value theorems - Inverse Z-transforms using partial fractions - Convolution theorem - Solution of difference equations by Z - transforms.

**TEXT BOOKS:**

1. B S Grewal (2012), *Higher Engineering Mathematics*, 42<sup>nd</sup> Edition, New Delhi, Khanna Publishers.
2. B V Ramana (2010), *Engineering Mathematics*, New Delhi, Tata Mc Graw Hill Publishing Co. Ltd

**REFERENCE BOOKS:**

1. Ervin Kreyszig, *Advanced Engineering Mathematics*, 10<sup>th</sup> Edition, New Jersey, John Wiley & Sons
2. T K V Iyengar, B Krishna Gandhi & Others. (2011), *Mathematical Methods*, Tenth Revised Edition New Delhi, S.Chand & Co. Ltd.
3. H K Dass, Er Rajnish Varma (2012), *Higher Engineering Mathematics*, Second Revised Edition, New Delhi, S.Chand & Co. Ltd.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE II Semester

VCE-R15

**ENGINEERING PHYSICS**

Course Code: A3002

L	T	P	C
3	1	0	3

**Course Overview:**

Engineering physics is the study of the combined disciplines of physics, engineering and mathematics in order to develop an understanding of the interrelationships of these three disciplines. Fundamental physics is combined with problem solving and engineering skills, which then has broad applications. Career paths for Engineering physics are usually "engineering, applied science or applied physics through research, teaching or entrepreneurial engineering". This interdisciplinary knowledge is designed for the continuous innovation occurring with technology.

**Prerequisite(s):**NIL

**Course Outcomes:**

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

- CO1. Analyze crystal structures in terms of lattice parameters and interpret the structures using X-ray diffraction methods
- CO2. Apply the principles of quantum mechanics to analyze the properties of the semiconducting materials.
- CO3. Categorize nano and dielectric materials. Discuss synthesis and react to environmental concerns due to nanotechnology
- CO4. Categorize magnetic materials and objectivize their role in science and technology. Apply magnetism to explain superconductivity.
- CO5. Illustrate working of a laser and examine the communication systems using optical fibers



**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSEII Semester

VCE-R15

**ENGINEERING PHYSICS**

Course Code: A3002

L T P C  
3 1 0 3

**SYLLABUS**

**UNIT - I**

**(10 Lectures)**

**INTRODUCTION TO CRYSTALLOGRAPHY:** Space lattice, Unit cell, lattice parameters, Atomic radius, co-ordination number and packing factor of SC, BCC, FCC, and diamond, Miller indices, Crystal planes and directions, Interplanar spacing of orthogonal crystal systems.

**X-Ray Diffraction:** Basic principles of X-ray diffraction, Bragg's law, Laue method, Rotating Crystal Method, Powder method, applications of X- ray diffraction.

**UNIT - II**

**(8 Lectures)**

**PRINCIPLES OF QUANTUM MECHANICS:** Waves and particles, De Broglie hypothesis, matter waves, Davisson and Germer experiment, G. P. Thomson experiment, Schrödinger's time independent wave equation, Application of Schrodinger equation (particle in one dimensional potential box).

**SEMICONDUCTOR PHYSICS:** Intrinsic and Extrinsic Semiconductors, p-n junction diode, Forward and reverse bias, V-I characteristics, Fermi level in Intrinsic and Extrinsic semiconductors (qualitative), Applications of Semiconductors (LED).

**UNIT - III**

**(8 Lectures)**

**NANO SCIENCE:** Origin of Nano science, Nano scale, surface to volume ratio, Bottom-up and Top-down approaches; Synthesis: Sol-gel, Chemical vapour deposition, physical vapour deposition, pulsed laser vapour deposition methods; Applications of Nanomaterials.

**DIELECTRIC PROPERTIES:** Electric dipole moment, dielectric constant, Types of polarization (qualitative), Local Field, Clausius – Mossotti Equation, Piezoelectricity and Ferroelectricity and their applications.

**UNIT - IV**

**(8 Lectures)**

**MAGNETIC PROPERTIES:** Magnetic moment, classification of magnetic materials, Weiss theory of ferromagnetism, hysteresis curve, soft and hard magnetic materials and their applications.

**SUPERCONDUCTORS:** Meissner effect, BCS Theory, Type-I and Type-II Superconductors, High temperature Superconductors, applications of superconductors.

**UNIT - V**

**(8 Lectures)**

**LASERS:** Characteristics of lasers, spontaneous and stimulated emission of radiation, population inversion, Einstein's coefficients, Pumping mechanisms, Ruby laser, Helium-Neon laser, semiconductor diode laser, applications of lasers.

**FIBER OPTICS:** Principle of optical fiber, acceptance angle, Numerical aperture, types of optical fibers, attenuation of signal in optical fibers, Functioning of Optical Fiber communication system, applications of optical fibers.

**TEXT BOOKS:**

1. Pillai, S.O. (2007), *Engineering Physics*, New Age International.
2. Arumugam.M (2005), *Engineering Physics*, Anuradha Publishers.

**REFERENCE BOOKS:**

1. Rajendran.V and Marikani.A(2004), *Engineering Physics*, Tata Mc Graw Hill Publications Ltd, 3<sup>rd</sup> Edition
2. H K Dass, Er Rajnish Varma (2012), *HigherEngineering Mathematics*, Second Revised Edition, S. Chand & Co. Ltd, New Delhi.
3. P.Sarah and M. Geetha (2012), *Engineering Physics and Engineering Chemistry*, VGS Booklinks, Hyderabad

4. M. Ratner, D. Ratner (2003), *Nanotechnology*, Pearson Edition, India.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE II Semester

VCE-R15

**ENGINEERING CHEMISTRY**

Course Code: A3003

L	T	P	C
3	0	0	3

**Course Overview:**

This course will involve minimum lecturing, content will be delivered through assigned reading and reinforced with large and small group discussions, as well as assigned in class (and occasional out of class) group activities. Water and its treatment for various purposes, engineering materials such as plastics, composites, ceramic, abrasives, their preparation, properties and applications, conventional and non-conventional energy sources, nuclear, solar, various batteries, combustion calculations, corrosion and control of metallic materials.

**Prerequisite(s):**NIL

**Course Outcomes:**

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

- CO1. Apply the knowledge of standard electrode potentials of various metals and nonmetals to protect them from corrosion.
- CO2. Identify difference and similarities of three types of Batteries.
- CO3. Compare different methods of softening of hard water.
- CO4. Apply the knowledge of Materials, Fuels and Nano particles in controlling pollution.
- CO5. Compare and contrast the chemical behavior, properties and applications of engineering substances.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE II Semester

VCE-R15

**ENGINEERING CHEMISTRY**

Course Code: A3003

L T P C  
3 0 0 3

**SYLLABUS**

**UNIT – I** **(11 Lectures)**

**ELECTROCHEMISTRY:** Introduction, Conductance-Specific, Equivalent and Molar conductance, effect of dilution on electrolytic conductance. EMF: Galvanic Cells, Nernst equation, numerical problems. Concept of concentration cells, electro chemical series-applications.

**BATTERIES:** Primary and secondary cells, (Leclanche cell, Lead-Acid cell, Ni- Cd cell, Lithium cells). Applications of batteries, Fuel cells: Hydrogen – Oxygen fuel cell, advantages of fuel cells.

**CORROSION AND ITS CONTROL:** Introduction, causes of corrosion, theories of corrosion – Chemical, Electrochemical corrosion. Corrosion control methods – Cathodic protection, sacrificial anode, impressed current cathode. Surface coatings – electroplating, metal cladding. Galvanizing.

**UNIT – II** **(8 Lectures)**

**WATER TREATMENT:** Introduction to Hardness, causes, expression of hardness, units. Types of hardness, numerical problems. Treatment of water: Internal treatment, types & External treatment: Zeolite process, Ion exchange process and Lime- soda process. Numerical problems on lime- soda and Zeolite process. Treatment of brackish water: Reverse osmosis and Electro dialysis.

**UNIT – III** **(10 Lectures)**

**ENGINEERING MATERIALS:**

**A) HIGH POLYMERS:** Introduction, Types of Polymerization. Plastics: Thermoplastic resins & Thermosetting resins, preparation, properties and engineering applications of plastics: polyethylene, Poly vinyl chloride, Teflon, Nylon. Rubbers: Natural rubber and vulcanization. Synthetic rubbers: Buna-S, Buna-N. Fibers: Polyester- applications. Conducting Polymers: Classification, doping and applications.

**B) MATERIAL CHEMISTRY:** Cement- Composition and manufacture of Port land Cement. Lubricants: Criteria of a good lubricant, classification. Refractory: Criteria of a good refractory, classification. Insulators & conductors: Classification of insulators. Characteristics of thermal & electrical insulators, Superconductors: Applications of Superconductors.

**UNIT – IV** **(7 Lectures)**

**ENERGY SOURCES:** Fuels: Classification -Conventional fuels: solid, liquid, gaseous fuels- comparison. Solid fuels: Coal- analysis- proximate and ultimate analysis, significance. Liquid fuels: Petroleum – origin, refining of petroleum. Synthetic petrol: Fischer Tropsch's and Bergius process. Gaseous fuels: Natural gas, Flue gas: Analysis of Flue gas by Orsat's method. Combustion: problems (calculation of amount and volume of oxygen for combustion).

**UNIT – V** **(7 Lectures)**

**A) PHASE RULE:** Gibb's phase rule expression, terms involved: Phase, Component and Degree of Freedom. Significance and limitations of phase rule. Phase diagrams: One component system- Water system. Two component system- Silver- lead system.

**B) SURFACE CHEMISTRY:** Adsorption: Types of adsorption. Adsorption isotherm: Langmuir adsorption isotherm, applications of adsorption. Colloid: Classification of colloids. Properties of colloid: Electrical & optical properties. Applications of colloids: Natural and industrial applications. Nanomaterials: Introduction, preparation and applications of nanomaterial.

**TEXT BOOKS:**

1. S.S Dara & Mukkanti, (2006). Engineering Chemistry, S. Chand & Co. New Delhi.

**REFERENCE BOOKS:**

1. PC Jain & Monica Jain, (2008). Engineering Chemistry, Dhanpatrai Publishing Company.
2. K.N Mishra, R.P Mani & B. Rama Devi(2009). Chemistry of Engineering Materials, CENGAGE.
3. J.C Kuriacase & J Raja ram (2004), Engineering Chemistry, Tata McGraw Hills Co. New Del.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE II Semester

VCE-R15

**ELECTRONIC DEVICES AND CIRCUITS**

Course Code: A3401

L	T	P	C
4	1	0	4

**Course Overview:**

This course covers fundamental topics that are common to a wide variety of electronic devices, circuits and systems. The topics include right from the inception of evolution of semiconductor devices to their real time applications. This course starts with basics of semiconductors, review the operation and characteristics of semiconductor devices (namely, semiconductor diodes, BJTs, JFETs and MOSFETs), and build-up to more advanced topics in analog circuit designs. This course provides a basis for students to continue education by undertaking advanced study and research in the variety of different branches of semiconductor device applications.

**Prerequisite(s):**

- Engineering Physics (A3002)
- Basic Electrical Engineering (A3201)

**Course Outcomes:**

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

CO1. Analyze the physical behavior of diodes and transistors.

CO2. Compare various rectifiers, filters, transistors, biasing circuits and transistor amplifier configurations.

CO3. Apply various stabilization and compensation techniques to obtain stable operating point of transistor.

CO4. Analyze single stage amplifier circuits using small signal low frequency transistor model.

CO5. Design regulated power supply and amplifier circuits for given specifications.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSEII Semester

VCE-R15

**ELECTRONIC DEVICES AND CIRCUITS**

Course Code: A3401

L	T	P	C
4	1	0	4

**SYLLABUS**

**UNIT - I**

**(11 Lectures)**

**SEMICONDUCTOR DIODE CHARACTERISTICS:** Review of semiconductors, Continuity Equation, Hall Effect, and Open-circuited p-n junction, Energy band diagrams, the current components in p-n diode, Diode current equation, Volt-ampere characteristics, Ideal versus practical diodes, static and dynamic resistances, equivalent circuits, Temperature dependence, Transition and Diffusion capacitances.

**UNIT – II**

**(12 Lectures)**

**SPECIAL PURPOSE DIODES:** Breakdown Mechanisms in Semiconductor diodes, Zener diode characteristics, Zener diode as voltage regulator, Principle of operation and Characteristics of Tunnel Diode (With the help of Energy band diagrams) and Varactor Diode.

**RECTIFIERS AND FILTER:** The P-N junction as a rectifier – Half Wave Rectifier, Full Wave Rectifier, Bridge Rectifier, Ripple Factor, Harmonic components in Rectifier Circuits, Filters – Inductor Filters, Capacitor Filters, L-section Filters,  $\pi$ -section Filters.

**UNIT - III**

**(10 Lectures)**

**BIPOLAR JUNCTION TRANSISTOR (BJT) -** Construction, Principle of Operation, Amplifying Action, Common Emitter, Common Base and Common Collector configurations.

**FIELD EFFECT TRANSISTOR (FET):** JFET - Construction, Principle of Operation, Pinch-Off Voltage, Volt-Ampere Characteristic, Comparison of BJT and JFET. MOSFET - Depletion and Enhancement type MOSFETs, operation and volt-ampere characteristics.

**UNIT - IV**

**(11 Lectures)**

**BJT BIASING:** Need for biasing, operating point, load line analysis, biasing and stabilization techniques: fixed bias, collector to base bias, voltage divider bias, Stabilization against variations in  $I_{CO}$ ,  $V_{BE}$  and  $\beta$ , bias compensation techniques, thermal runaway, heat sink and thermal stability.

**JFET BIASING:** Biasing techniques: Fixed bias, Self-bias and Voltage divider bias.

**UNIT - V**

**(12 Lectures)**

**SINGLE STAGE AMPLIFIERS:** Transistor as an amplifier, Classification of amplifiers, Transistor hybrid model, the h-parameters, analysis of a transistor amplifier circuit (CE, CB, CC) using h-parameters, simplified Common Emitter hybrid model.

**JFET AMPLIFIERS:** Small signal JFET model, common source amplifier, common drain amplifier, common gate amplifier.

**TEXT BOOKS:**

1. J. Millman, C. C. Halkias, and Satyabratha Jit (2011), Electronic Devices and Circuits, 3<sup>rd</sup> Edition, Tata McGraw Hill, New Delhi.
2. R.L. Boylestad and Louis Nashelsky (2006), Electronic Devices and Circuits, 9<sup>th</sup> Edition, Pearson/Prentice Hall.

**REFERENCE BOOKS:**

1. S. Salivahanan, N. Suresh Kumar, A. Vallavaraj (2008), Electronic Devices and Circuits, 2nd edition, Tata McGraw Hill, New Delhi.
2. Rober T. Paynter (2003), Introduction to Electronic Devices and Circuits, 6th edition, Pearson Education, New Delhi, India.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE II Semester

VCE-R15

**DATA STRUCTURES**

Course Code: A3503

L	T	P	C
4	1	0	4

**Course Overview:**

Data Structures is a subject of primary importance to the discipline of Computer Science and Engineering. It is a logical and mathematical model of sorting and organizing data in a particular way in a computer, required for designing and implementing efficient algorithms and program development. Different kinds of data structures like arrays, linked lists, stacks, queues, etc, are suited to different kinds of applications. Some specific data structures are essential ingredients of many efficient algorithms, and make possible the management of huge amounts of data, such as large databases and internet indexing services. Nowadays, various programming languages like C, C++ and Java are used to implement the concepts of Data Structures, of which C remains the language of choice for programmers across the world.

**Prerequisite(s):**

- Computer Programming (A3501)

**Course Outcomes:**

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

- CO1. Solve computer software problems by using recursive, non-recursive techniques and, analyze various algorithms with respect to time and space complexity.
- CO2. Demonstrate ability to exhibit knowledge of various searching and sorting techniques and identify potential benefits of each one over the other and propose appropriate technique to solve programming problems.
- CO3. Illustrate the application of linear stack and queue.
- CO4. Exhibit the skills of demonstrating use of linked list.



**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE II Semester

VCE-R15

**DATA STRUCTURES**

Course Code: A3503

L	T	P	C
4	1	0	4

**SYLLABUS**

**UNIT – I** **(12 Lectures)**

**INTRODUCTION TO DATA STRUCTURES AND ALGORITHMS:** Basic Terminology, Classification of Data Structures, Operations on Data Structures, Algorithms, Different Approaches to Design an Algorithm, Control Structures used in Algorithms, Time and Space Complexity, Asymptotic Notations, Linear and Binary Recursion, Fibonacci sequence, Towers of Hanoi.

**SEARCHING:** Basic Terminologies, Linear Search, Binary Search, and Fibonacci Search.

**UNIT – II** **(12 Lectures)**

**SORTING TECHNIQUES:** Introduction To Sorting, Sorting Techniques: Bubble Sort, Selection Sort, Insertion Sort, Shell Sort, Merge Sort, Quick Sort, Radix Sort, Comparison of Sorting Algorithms.

**UNIT – III** **(10 Lectures)**

**LINEAR DATA STRUCTURES - STACKS:** Introduction to Stacks, Array Representation of Stacks, Operations on a Stack, Applications of Stacks-Infix-to-Postfix Transformation, evaluating Postfix Expressions.

**QUEUES:** Introduction to Queues, Array Representation of Queues, Operations on a Queue, Types of Queues-DeQueue, Circular Queue, Applications of Queues-Round Robin Algorithm.

**UNIT – IV** **(12 Lectures)**

**LINKED LISTS:** Introduction, Singly Linked List, Representation of a Linked List in Memory, Operations on a Single Linked List, Applications of Linked Lists - Polynomial Representation and Sparse Matrix Manipulation, Circular Linked Lists, Doubly Linked Lists, Linked List Representation and Operations of Stack, Linked List Representation and Operations of Queue.

**UNIT – V** **(12 Lectures)**

**NON LINEAR DATA STRUCTURES - TREES:** Basic Terminologies, Definition and Concepts of Binary Trees, Representations of a Binary Tree using Arrays and Linked Lists, Operations on a Binary Tree- Insertion, Deletion, Traversals, Heap Sort, Types of Binary Trees- Expression Trees, Binary Search Trees, Threaded Binary Trees.

**GRAPHS:** Introduction, Graph Terminologies, Representation of Graphs- Set, Linked, Matrix, Graph Traversals- Breadth First Search (BFS) and Depth First Search (DFS), Minimum Spanning Trees.

**TEXT BOOKS:**

1. Reema Thareja (2014), *Data Structures Using C*, 2<sup>nd</sup> Edition, Oxford University Press India.
2. Samanta Debasis (2012), *Classic Data Structures*, 2<sup>nd</sup> Edition, Prentice Hall of India.

**REFERENCE BOOKS:**

1. Horowitz, Ellis, Sahni, Sartaj, Anderson-Freed, Susan (2008), *Fundamentals of Data Structure in C*, 2<sup>nd</sup> Edition, University Press, India.
2. Richard F. Gilberg, Behrouz A. Forouzan (2012), *Data Structures: A Pseudo code approach with C*, 2<sup>nd</sup> Edition, CENGAGE Learning, India.
3. G. A. V. Pai (2008), *Data Structures and Algorithms: Concepts, Techniques and Applications*, McGraw-Hill Education, India.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE II Semester

VCE-R15

**ENGINEERING PHYSICS AND ENGINEERING CHEMISTRY LAB**

Course Code: A3007

L	T	P	C
0	0	3	2

**Course Overview:**

Engineering physics laboratory course includes the experimental methods for the determination of mechanical property (Rigidity modulus of a given material), frequency of an AC signal, basic electronic circuits (LED, RC circuit), and to study characteristics of LASERS & Optical fiber (LASER wavelength, divergence, Numerical aperture of fiber, Losses in fibers). This interdisciplinary knowledge is designed for the continuous innovation occurring with technology.

**Prerequisite(s):** NIL

**Course Outcomes:**

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

- CO1. Analyze the rigidity modulus of the given material to interpret the mechanical properties.
- CO2. Estimate the frequency of AC power supply and time constant of a R-C circuit.
- CO3. Apply the principles of optics to evaluate the characteristics of LED, laser and optical fibres.
- CO4. Apply various titrations for the estimation of strengths of solutions and hardness of water.
- CO5. Analyze the effect of temperature on viscosity and surface tension of liquids.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE II Semester

VCE-R15

**ENGINEERING PHYSICS AND ENGINEERING CHEMISTRY LAB**

Course Code: A3007

L	T	P	C
0	0	3	2

**LIST OF EXPERIMENTS**

**LIST OF EXPERIMENTS (ENGINEERING PHYSICS LAB):**

1. Determination of Rigidity modulus ( $\eta$ ) of the material of the given wire using a Torsional pendulum.
2. Determination of Frequency ( $n$ ) of an AC supply using sonometer.
3. Study of V-I characteristics of light emitting diode and determination of the Threshold voltage of LED.
4. Study of exponential decay of charge in a R.C. Circuit and determination of time constant of R.C circuit
5. Determination of numerical aperture of a given optical fiber.
6. Determination of wavelength of a given source of laser light using a plane transmission grating by normal incidence method.
7. Determination of angular divergence of the laser beam.
8. Determination of Losses in optical fibers.
9. Determination of Dispersive power of material of a prism(Demonstration Experiment).

**LIST OF EXPERIMENTS (ENGINEERING CHEMISTRY LAB):**

**INSTRUMENTAL METHODS:**

1. **Conductometry:**
  - a. Conductometric titration of strong acid Vs strong base.
  - b. Conductometric titration of mixture of acids Vs strong base.
2. **Potentiometry:**
  - a. Potentiometric titration of strong acid Vs strong base.
  - b. Potentiometric titration of weak acid Vs strong base.
3. **Complexometry:**
  - a. Estimation of hardness of water by EDTA method.
4. **Physical Properties:**
  - a. Determination of viscosity of sample oil by Ostwald's viscometer
  - b. Determination Surface Tension of lubricants.
5. **Organic Synthesis:**
  - a. Preparation of organic compounds Aspirin

**DEMONSTRATION EXPERIMENTS**

1. Preparation of Thiokol rubber

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSEII Semester

VCE-R15

**DATA STRUCTURES LAB**

Course Code: A3504

L	T	P	C
0	0	3	2

**Course Overview:**

This Laboratory is meant to make the students to learn efficient data structures and algorithms that use them, designing and writing large programs. This laboratory emphasizes on how to choose appropriate data structures for solving real world problems with best efficiency and performance.

**Prerequisite(s):**Computer Programming Through C Lab: A3502

**Course Outcomes:**

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

- CO1 .Solve computer hardware and software problems by using recursive, non-recursive or both techniques and to Apply asymptotic notations to evaluate the performance of an algorithm.
- CO2. Familiarize and define the programming syntax and constructs of data structures to develop elegant, legible and reusable codes
- CO3.Analyze and implement various searching techniques suitable to resolve data searching problems.
- CO4. Demonstrate ability to exhibit knowledge of various sorting techniques and identify the potential benefits of each one over the other.
- CO5.Illustrate about linear data structures like stacks and queues representations and operations and apply them to design and build C based real-time applications.
- CO6. Create novel solutions for non-linear data structures by applying Trees and Graphs traversals.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE II Semester

VCE-R15

**DATA STRUCTURES LAB**

Course Code: A3504

L	T	P	C
0	0	3	2

**LIST OF EXPERIMENTS**

**Week- 1: (Recursion function)**

1. Write recursive C programs for the following:
  - a) Calculation of Factorial of an integer.
  - b) Calculation of GCD (n, m).
  - a) For Towers of Hanoi: N disks are to be transferred from peg S to peg D with Peg I as the intermediate peg.

**Week- 2: (Searching Techniques)**

2. Write C programs that use both recursive and non-recursive functions to perform for the following:
  - a) Searching operations for a key value in a given list of integers by using linear search technique.
  - b) Searching operations for a key value in a given list of integers by using binary search technique.
  - c) Searching operations for a key value in a given list of integers by using Fibonacci search technique.

**Week-3: (Sorting Techniques)**

3. Write C programs for the following:
  - a) Implement Bubble sort, to sort a given list of integers in descending order.
  - b) Implement Selection sort, to sort a given list of integers in ascending order.
  - c) Implement Insertion sort, to sort a given list of integers in descending order.

**Week-4: (Sorting Techniques)**

4. Write C programs for the following:
  - a) Implement Shell sort, to sort a given list of integers in descending order.
  - b) Implement Merge sort, to sort a given list of integers in ascending order.

**Week-5: (Sorting Techniques)**

5. Write C programs for the following:
  - a) Implement Quick sort, to sort a given list of integers in ascending order.
  - b) Implement radix sort, to sort a given list of integers in ascending order.

**Week- 6: (Linked List)**

6. Write C programs for the following:
  - a) Uses functions to perform the following operations on single linked list.
    - (i) Creation
    - (ii) insertion
    - (iii) deletion
    - (iv) traversal
  - b) To store a polynomial expression in memory using linked list.
  - c) To represent the given sparse matrix using linked list

**Week-7: (Linked List)**

7. Write C programs for the following:
  - a) Uses functions to perform the following operations on Circular linked list.
    - (i) Creation
    - (ii) insertion
    - (iii) deletion
    - (iv) traversal
  - b) Uses functions to perform the following operations on double linked list.
    - (i) Creation
    - (ii) insertion
    - (iii) deletion
    - (iv) traversal in both ways.

**Week- 8: (Stack)**

8. Write C programs for the following:
  - a) Implement Stack operations using array.
  - b) Implement Stack operations using linked list.

- c) Write a function called `copystack()` that copies those contents of one stack into another. The algorithm passes two stacks, the source stack and the destination stack. The order of the stack must be identical. (Hint: Use a temporary stack to preserve the order).

#### **Week-9: (Stack)**

9. Write C programs for the following:

- a) Uses Stack operations to convert infix expression into postfix expression.
- b) Uses Stack operations for evaluating the postfix expression.

#### **Week-10: (Queue)**

10. Write C programs for the following:

- a) Implement Queue operations using array.
- b) Implement Queue operations using linked list.

#### **Week-11: (Trees)**

11. Write C programs for the following:

- a) To create a Binary Tree of integers.
- b) Uses Recursion for traversing a binary tree in preorder, in-order and post-order.
- c) Write a C program to implement the following operations on Binary Search Tree.  
(i) insert                      (ii) delete                      (iii) search                      (iv) traverse

#### **Week-12: (Graphs)**

12. Write C programs for the following:

- a) Implement the Breadth First Search Graph Traversal.
- b) Implement the Depth First Search Graph Traversal.

#### **Week-13: (Additional Programs)**

13. Write C programs for the following:

- a) Consider the motor racing game in which there are 7 participants. Out of 7, one quits the race due to bad vehicle condition. Others completed the race and their scores are as follows: p1 (56 points), p2 (96 points), p3 (40 points), p4 (89 points), p5 (66 points), p6 (22 points). Now write a program for sorting the positions of players in ascending order based on points scored using merge sort and print the highest score.
- b) Implement heap sort, to sort a given list of integers in ascending order.
- c) Reverse elements of a single linked list.
- d) Non-recursion for traversing a binary tree in preorder, in-order and post-order.

#### **REFERENCE BOOKS:**

1. Reema Thareja (2014), *Data Structures Using C*, 2<sup>nd</sup> Edition, Oxford University Press India.
2. Debasis, Samanta (2012), *Classic Data Structures*, 2<sup>nd</sup> Edition, Prentice Hall of India.
3. Horowitz, Ellis, Sahni, Sartaj, Anderson-Freed, Susan (2008), *Fundamentals of Data Structure in C*, 2<sup>nd</sup> Edition, University Press, India.
4. Richard F. Gilberg, Behrouz A. Forouzan (2012), *Data Structures: A Pseudo code approach with C*, 2<sup>nd</sup> Edition, CENGAGE Learning, India

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE II Semester

VCE-R15

**ELECTRONIC DEVICES AND CIRCUITS LAB**

Course Code: A3403

L	T	P	C
0	0	3	2

**Course Overview:**

The electronic devices and circuits lab is one of the first electronics and communication engineering lab course that a student will undergo. The students become familiar with laboratory test and measuring instruments such as CRO, dual regulated power supply, function generator and multimeter. The exposure of the students to these instruments and the knowledge about basic electronic components will enable them to design, construct and test the basic electronic circuits such as power supplies and amplifiers.

**Prerequisite(s):** NIL

**Course Outcomes:**

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

- CO1. Identify and use various electronic components, test and measuring instruments that are frequently used in experimentation of various circuits.
- CO2. Interpret the V - I characteristics of various electronic devices so as to realize the applications like switching, regulation and amplification.
- CO3. Design a simple regulated power supply by making use of rectifiers, filters and regulators.
- CO4. Apply various biasing techniques to fix the operating point and stabilize the given transistor.
- CO5. Analyze the transient and frequency response of single stage amplifier circuits.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE II Semester

VCE-R15

**ELECTRONIC DEVICES AND CIRCUITS LAB**

Course Code: A3403

L	T	P	C
0	0	3	2

**LIST OF EXPERIMENTS**

**PART - A: ELECTRONIC WORKSHOP PRACTICE**

1. Identification, Specifications, Testing of R, L, C Components (Color Codes), Potentiometers, Switches (SPDT, DPDT, and DIP), Coils, Relays, Bread Boards, PCB's.
2. Identification, Specifications and Testing of Active Devices: Diodes, BJTs, JFETs, MOSFETs, Power Transistors, LED's, LCD's, SCR, UJT.
3. Study and operation of
  - Multimeters (Analog and Digital)
  - Function Generator
  - Regulated Power Supply (RPS)
  - CRO

**PART - B:**

1. Forward and Reverse Bias Characteristics of PN junction diode.
2. Zener Diode Characteristics.
3. Zener diode as voltage regulator.
4. Half wave rectifier with and without filters.
5. Full wave rectifier with and without filters.
6. Input & output characteristics of transistor in CB configuration.
7. Input & output characteristics of transistor in CE configuration.
8. Input & output characteristics of transistor in CC configuration
9. Drain and Transfer characteristics of JFET.
10. Voltage divider bias using BJT.
11. Gain and frequency response of CE amplifier.
12. Gain and frequency response of CS amplifier



**SYLLABI FOR  
III SEMESTER**

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE III Semester

VCE-R15

**MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS**

Course Code: A3011

L	T	P	C
3	1	0	3

**Course Overview:**

This course addresses the concepts, principles and techniques of Managerial Economics and Financial Analysis. It covers the fundamentals of Managerial Economics and its various techniques such as demand, elasticity of demand, demand forecasting, production laws, cost concepts, price determination in various type of markets and pricing strategies. Apart from Capital budgeting and its techniques, Financial Analysis gives clear idea about concepts and conventions of accounting, accounting procedures like journal, ledger, trial balance, balance sheet and interpretation of financial statements through ratios.

**Prerequisite(s):**NIL

**Course Outcomes:**

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

- CO1. Explain and infer the concepts of Managerial Economics and Financial Accounting.
- CO2. Analyze the demand, production, cost and break even to know interrelationship of among variables and their impact
- CO3. Classify the market structure to decide the fixation of suitable price.
- CO4. Apply capital budgeting techniques to select best investment opportunity.
- CO5. Prepare financial statements and analyze them to assess financial health of business.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE III Semester

VCE-R15

**MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS**

Course Code: A3011

L	T	P	C
3	1	0	3

**SYLLABUS**

**UNIT – I**

**(12 Lectures)**

**INTRODUCTION TO MANAGERIAL ECONOMICS & DEMAND:** Managerial Economics - Definition, Nature and Scope of Managerial Economics, –Demand Analysis: Demand- Types, Demand Determinants, Law of Demand and its exceptions.

**ELASTICITY OF DEMAND:** Types, Measurement and Significance, Demand Forecasting: Meaning, methods of demand forecasting.

**UNIT – II**

**(10 Lectures)**

**THEORY OF PRODUCTION:** Production function – Isoquants and Isocosts, MRTS, Least Cost Combination of Inputs. Laws of Production, Internal and External Economies of Scale.

**COST & BREAK EVEN ANALYSIS:** Cost concepts, Opportunity cost, Fixed vs. Variable costs, Explicit costs Vs. Implicit costs, Out of pocket costs vs. Imputed costs. Break-even Analysis (BEA)- Determination of Break-Even Point (simple problems) - Managerial Significance and limitations of BEA.

**UNIT – III**

**(8 Lectures)**

**INTRODUCTION TO MARKETS:** Market structures-Types of competition, Features of Perfect competition, Monopoly and Monopolistic Competition, oligopoly - Price-Output Determination in case of Perfect Competition, Monopoly.

**PRICING:** Objectives and Policies of Pricing- Methods of Pricing: Cost Plus Pricing, Marginal Cost Pricing, Sealed Bid Pricing, Going Rate Pricing, Limit Pricing, Market Skimming Pricing, Penetration Pricing, Two-Part Pricing, Block Pricing, Bundling Pricing, Peak Load Pricing, Cross Subsidization.

**UNIT – IV**

**(10 Lectures)**

**CAPITAL AND CAPITAL BUDGETING:** Capital and its significance, Types of Capital, Components of working capital & Factors determining the need of working capital. Methods and sources of raising finance.

**CAPITAL BUDGETING:** Nature and scope of capital budgeting, features of capital budgeting proposals, Methods of Capital Budgeting: Payback Method, Accounting Rate of Return (ARR), Net Present Value Method, Profitability Index, Internal rate of return (simple problems).

**UNIT – V**

**(12 Lectures)**

**INTRODUCTION TO FINANCIAL ACCOUNTING:** Accounting Principles - Concepts, Conventions, Double-Entry Book Keeping, Journal, Ledger, Trial Balance- Final Accounts with simple adjustments.

**FINANCIAL ANALYSIS THROUGH RATIOS:** Importance, types: Liquidity Ratios, Activity Ratios, Turnover Ratios and Profitability ratios. (Simple problems).

**TEXT BOOK:**

1. A.R. Aryasri (2011), *Managerial Economics and Financial Analysis*, TMH, India.

**REFERENCE BOOKS:**

1. Varshney & Maheswari (2003), *Managerial Economics*, Sultan Chand.
2. Ambrish Gupta (2011), *Financial Accounting for Management: An Analytical Perspective*, 4<sup>th</sup> Edition, Pearson Education, New Delhi.
3. Richard Lipsey and Alec Chrystal (2012), *Economics*, Oxford University Press.
4. Domnick Salvatore: *Managerial Economics in a Global Economy*, 4<sup>th</sup> Edition, Thomson.

**VARDHAMAN COLLEGE OF ENGINEERING**

**DIGITAL LOGIC DESIGN**

**Course Code: A3404**

L	T	P	C
3	1	0	3

**Course Overview:**

This course provides a modern introduction to logic design and the basic building blocks used in digital systems, in particular digital computers. It starts with a discussion of information representation and number systems, Boolean algebra, logic gates and minimization techniques. The second part of the course deals with combinational and sequential logic, where in the procedures to analyze and design the same will be discussed. State machines will then be discussed and illustrated through case studies of complex systems. The course has an accompanying lab that integrates hands-on experience with LabVIEW software including logic simulation, implementation and verification of all the combinational and sequential circuits. Moreover, this course forms the basis for the study of advanced subjects like Computer Architecture and Organization, Microprocessors and Interfacing and Embedded systems.

**Prerequisite(s):** NIL

**Course Outcomes:**

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

- CO1. Demonstrate the importance of various number systems and to perform different arithmetic operations on them.
- CO2. Make use of Boolean algebra postulates-map and tabulation method to minimize Boolean functions and to implement with logic gates.
- CO3. Construct and analyze various combinational and sequential circuits used in digital systems such as adders, subtractors, code-convertors, decoders, encoders, multiplexer, flip flop, register and counters
- CO4. Design various combinational PLDs such as ROMs, PALS, PLAS and PROMs.
- CO5. Minimize the finite state machine and to construct special flow charts called ASMs charts to define digital hardware algorithms.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE III Semester

VCE-R15

**DIGITAL LOGIC DESIGN**

Course Code: A3404

L	T	P	C
3	1	0	3

**SYLLABUS**

**UNIT-I**

**(9 Lectures)**

**DIGITAL SYSTEMS AND BINARY NUMBERS:** Digital systems, binary numbers, number base conversions, octal and hexadecimal numbers, complements, signed binary numbers, binary codes.

**BOOLEAN ALGEBRA AND LOGIC GATES:** Basic definitions, axiomatic definition of Boolean algebra, basic theorems and properties of Boolean algebra, Boolean functions, canonical and standard forms, other logic operations, digital logic gates.

**UNIT-II**

**(9 Lectures)**

**GATE LEVEL MINIMIZATION:** The k-map method, four-variable map, five-Variable map, Sum of Products and Product of Sums simplification, don't-care conditions, NAND and NOR implementation, AND-OR-INVERT, OR-AND-INVERT implementations, exclusive – OR function, The tabulation (Quine Mccluskey) method, determination and selection of Prime implicants.

**UNIT-III**

**(11 Lectures)**

**COMBINATIONAL LOGIC:** Introduction, combinational circuits, analysis procedure, design procedure, binary adder, binary subtractor, BCD adder, binary multiplier, Magnitude comparator, decoder, encoders, multiplexers.

**SEQUENTIAL LOGIC:** Classification of Sequential circuits (Synchronous, Asynchronous, Pulse mode, Level mode with examples), latches, Flip-Flops, analysis of clocked sequential circuits, state reduction and assignment, design procedure.

**UNIT-IV**

**(8 Lectures)**

**REGISTERS AND COUNTERS:** Registers, shift registers, Ripple counters, synchronous counters, counter with unused states, ring counter, Johnson counter, LFSR counter.

**MEMORY AND PROGRAMMABLE LOGIC:** introduction, Random-access memory, memory decoding, error detection and correction, read only memory, programmable logic array, programmable array logic, sequential programmable devices

**UNIT-V**

**(9 Lectures)**

**FINITE STATE MACHINES (FSM):** Finite State Machine - Capabilities and limitations, Mealy and Moore models minimization of completely specified sequential machines, Partition techniques, incompletely specified sequential machines using merger table.

**ALGORITHMIC STATE MACHINES (ASM):** Salient features of ASM chart, Simple examples, System design using data path and control sub-systems – Control implementations – Examples of weighing machine and Binary multiplier.

**TEXT BOOKS:**

1. M. Morris Mano, Michael D. Ciletti (2008), *Digital Design*, 4<sup>th</sup> edition, Pearson Education/PHI, India.
2. Thomas L. Floyd (2006), *Digital fundamentals*, 9<sup>th</sup> edition, Pearson Education International.

**REFERENCE BOOKS:**

1. Zvi. Kohavi (2004), *Switching and Finite Automata Theory*, Tata McGraw Hill, India.
2. C.V.S. Rao (2009), *Switching and Logic Design*, 3<sup>rd</sup> edition, Pearson Education, India.
3. Donald D.Givone (2002), *Digital Principles and Design*, Tata McGraw Hill, India.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE III Semester

VCE-R15

**DISCRETE MATHEMATICAL STRUCTURES**

Course Code: A3505

L	T	P	C
3	1	0	3

**Course Overview:**

This course is an elementary discrete mathematics oriented towards applications in Computer Science and Engineering. It emphasizes mathematical definitions and proofs as well as applicable methods. Topics include formal logic notation, proof methods; induction, well-ordering; sets, relations; growth of functions; permutations and combinations, counting principles. Further selected topics may also be covered, such as recursive definition, recurrences; generating functions

**Prerequisite(s):** Mathematics-II (A3006)

**Course Outcomes:**

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

- CO1. Identifies the difference between the notion of discrete and continuous mathematical structures.
- CO2. Analyze the basic concepts of relations and functions
- CO3. Demonstrate the ability to solve problems using counting techniques and combinatorics to solve complex problems.
- CO4. Define and relate basic notions in graph theory
- CO5. Apply different recurrence relation solving methods to solve real time applications.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE III Semester

VCE-R15

**DISCRETE MATHEMATICAL STRUCTURES**

Course Code: A3505

L	T	P	C
3	1	0	3

**SYLLABUS**

**UNIT - I**

**(10 Lectures)**

**MATHEMATICAL LOGIC:** Statements and Notations, Connectives, Statement Formulas and Truth Tables, Well-formed formulas, Tautologies, Equivalence of Formulas, Normal Forms, Rules of Inference, Consistency of Premises and Indirect Method of Proof

**PREDICATES:** The Predicate calculus, Variables and Quantifiers, Free and Bound Variables, Inference theory of predicate calculus. (T1: Chapter-1)

**UNIT - II**

**(10 Lectures)**

**RELATIONS AND ORDERING:** Relations, Properties of Binary Relations in a Set, Equivalence Relations, Compatibility Relations, and Partial Ordering.

**FUNCTIONS:** Composition of Functions, Inverse Functions. (T1: Chapter-2- 2.3 & 2.4)

**ALGEBRAIC STRUCTURES:** Algebraic Systems: Examples and General Properties. Semi groups and Monoids. Groups: Definitions and Examples, Subgroups and Homomorphisms. (T1: Chapter-3- 3.1, 3.2 & 3.5)

**UNIT - III**

**(9 Lectures)**

**LATTICES:** Lattices as Partially Ordered Sets - Definition and Examples, Properties of Lattices, Lattices as Algebraic Systems, Sub lattices, Direct Product and Homomorphism, Some Special Lattices. (T1: Chapter- 4.1)

**GRAPH THEORY:** Representation of Graph, Planar graphs, Isomorphism and Sub graphs, Euler circuits, Hamiltonian graphs, Chromatic Number (T2: Chapter-5)

**UNIT - IV**

**(8 Lectures)**

**ELEMENTARY COMBINATORICS:** Basics of Counting, Combinations and Permutations, Enumeration of Combinations and Permutations, Enumerating Combinations and Permutations with Repetitions, Enumerating Permutations with Constrained Repetitions, Binomial Coefficients, The Binomial and Multinomial Theorems, The Principle of Inclusion- Exclusion. (T2: Chapter-2)

**UNIT - V**

**(8 Lectures)**

**RECURRENCE RELATIONS:**

Solving Recurrence Relations by Substitution and Generating Functions, the Method of Characteristic Roots, Solutions of Inhomogeneous Recurrence Relations. (T2: Ch 3)

**TEXT BOOKS:**

1. J. P. Trembly, R. Manohar (2012), *Discrete Mathematical Structures with Applications to Computer Science*, Tata McGraw Hill, India.
2. Joe L. Mott, Abraham Kandel, Theodore P. Baker (2011), *Discrete Mathematics for Computer Scientists and Mathematicians*, 2nd edition, Prentice Hall of India Learning Private Limited, New Delhi, India.

**REFERENCE BOOKS:**

1. R1. Kenneth H. Rosen (2007), *Discrete Mathematics and its Applications*, 7<sup>th</sup> Edition, Tata McGraw Hill, India.
2. R2. C.L. Liu, D.P. Mohapatra (2009), *Elements of Discrete Mathematics*, 3<sup>rd</sup> Edition, McGraw Hill, India.
3. R3. Ralph P. Grimaldi, B.V.Ramana (2008), *Discrete and Combinatorial Mathematics - An Applied Introduction*, 5<sup>th</sup> Edition, Pearson Education, India

**VARDHAMAN COLLEGE OF ENGINEERING**

**DESIGN AND ANALYSIS OF ALGORITHMS**

Course Code: A3506

L	T	P	C
4	0	0	4

**Course Overview:**

This course is to introduce the topic of algorithms as a precise mathematical concept, and study how to design algorithms, establish their correctness, also study their efficiency and memory needs. The course offers a strong mathematical component in addition to the design of various algorithms.

**Prerequisite(s):**Data Structures (A3503)  
Mathematics –II (A3006)

**Course Outcomes:**

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

- CO1. Demonstrate the importance various algorithmic notations and their usage to give asymptotic upper, lower bounds on time and space complexity of algorithms
- CO2. Apply divide and conquer strategy to solve various computing problems.
- CO3. Estimate all feasible solutions using greedy strategy and recite an algorithm that employs this strategy
- CO4. Construct algorithms for solving real world problems using dynamic programming
- CO5. Apply fundamental graph traversal techniques to solve various applications using backtracking.
- CO6. Analyze Branch and Bound techniques and explain the significance of NP Completeness.



**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSEIII Semester

VCE-R15

**DESIGN AND ANALYSIS OF ALGORITHMS**

Course Code: A3506

L	T	P	C
4	0	0	4

**SYLLABUS**

**UNIT - I**

**(11 Lectures)**

**INTRODUCTION** - Algorithm definition, Pseudo code Specifications, Performance Analysis-Space Complexity, Time Complexity, Asymptotic Notations-Big-Oh, Omega, Theta, little-oh, Recurrences-Iteration Method, Master's Method. Disjoint set Operations and algorithms-Find, Union

**DIVIDE AND CONQUER** - General Method, Binary Search, Finding Maximum and Minimum, Merge Sort, Quick sort, Strassen's Matrix Multiplication.

**UNIT - II**

**(8 Lectures)**

**THE GREEDY METHOD** - General Method, Real Knapsack Problem, Job sequencing with deadlines, Minimum-cost spanning trees- Prim's Algorithm and Kruskal's algorithm, Optimal storage on tapes, Optimal merge pattern, Single source shortest Path

**UNIT - III**

**(9 Lectures)**

**DYNAMIC PROGRAMMING** - General method, All pairs shortest path, Matrix Chain Multiplication, Optimal Binary search trees, 0/1 Knapsack, the traveling salesman problem, Reliability design, String Editing

**UNIT - IV**

**(9 Lectures)**

**GRAPHS** - Breadth first search, depth first search, connected and bi connected components, articulation points.

**BACK TRACKING** - The General Method, The n-Queens Problem, Sum of subsets, Graph coloring, Hamiltonian cycles, Knapsack Problem

**UNIT - V**

**(8 Lectures)**

**BRANCH AND BOUND** - General method, applications - Travelling sales person problem, 0/1 knapsack problem- LC Branch and Bound solution, FIFO Branch and Bound solution.

**NP-HARD AND NP-COMPLETE PROBLEMS** - Basic concepts, Non-deterministic algorithms, NP-Hard and NP-Complete Classes, Cook's Theorem

**TEXT BOOK:**

1. Ellis Horowitz, Sartaj Sahni (2013), *Fundamentals of Computer Algorithms*, Galgotia Publications, India.

**REFERENCE BOOKS:**

1. T.H. Cormen, C.E. Leiserson, R.L. Rivest, and C. Stein, *Introduction to Algorithms*, 2<sup>nd</sup> Edition, PHI Pvt.Ltd. / Pearson Education.
2. R.C.T. Lee, S.S. Tseng, R.C. Chang and T. Tsai, *Introduction to Design and Analysis of Algorithms A strategic approach*, McGraw-Hill, India.
3. Allen Weiss, *Data structures and Algorithm Analysis in C++*, 2<sup>nd</sup> Edition, Pearson Education.
4. Richard Johnsonbaugh and Marcus Schaefer, *Algorithms*, Pearson Education.
5. Thomas H Cormen, *Introduction To Algorithms*, PHI Pvt.Ltd.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE III Semester

VCE-R15

**COMPUTER ORGANIZATION AND MICROPROCESSORS**

Course Code: A3507

L	T	P	C
3	1	0	3

**Course Overview:**

The computer organization is concerned with the structure and behavior of digital computers. In spite of variety and pace in the computer field, certain fundamental concepts apply consistently throughout. Microprocessors course is intended to introduce the architecture, programming of microprocessors and interfacing various hardware circuits to microprocessors. The topics covered are architecture, addressing modes, instruction set of 8086, minimum and maximum mode operation of 8086, 8086 INSTRUCTION SET, Assembly language programming fundamentals, interfacing of static Ram, EPROM, DMA Controller, keyboard, display, 8279, stepper motor, A/D and D/A converters.

**Prerequisite(s):** Engineering workshop (A3305)  
Data Structures (A3503)

**Course Outcomes:**

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

- CO1. Comprehend the basic organization of modern computer systems.
- CO2. Analyze an instruction-set architecture, propose a suitable data path and control unit implementation.
- CO3. Analyze the operation of fixed and floating point arithmetic units.
- CO4. Understand and apply the internal working flow of 8086 microprocessor.
- CO5. Apply assembly language programming in design of microprocessor based system.
- CO6. Design and analyze the memory, I/ O peripheral interfacing process with 8086.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE III Semester

VCE-R15

**COMPUTER ORGANIZATION AND MICROPROCESSORS**

Course Code: A3507

L	T	P	C
3	1	0	3

**SYLLABUS**

**UNIT – I** **(10 Lectures)**

**STRUCTURE OF COMPUTERS:** Computer Functional units, Von-Neumann architecture, Bus structures, Basic Operational Concepts, Software, Performance, Data representation (Fixed and Floating point), Error detecting codes. (R1: Ch-1)

**REGISTER TRANSFER AND MICRO-OPERATIONS:** Register transfer language, Register transfer, Bus and memory transfers, Arithmetic micro-operations, Logic micro-operations, Shift micro-operations, and Arithmetic logic shift unit.(T1:Ch-4)

**UNIT - II** **(8 Lectures)**

**MICRO-PROGRAMMED CONTROL:** Control memory, Address sequencing, and design of control unit. (T1: Ch-7)

**COMPUTER ARITHMETIC:** Addition and Subtraction, Multiplication and Division algorithms, Floating-point arithmetic operation, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline Vector Processing, Array Processors.( T1: Ch-10)

**UNIT - III** **(9 Lectures)**

**INTRODUCTION TO 8086 MICROPROCESSOR:** Architecture of 8086 microprocessor, Register organization, 8086 flag register and its functions, addressing modes of 8086, Pin diagram of 8086, Minimum mode system operation, Timing diagram. (T2: Ch-2)

**UNIT - IV** **(10 Lectures)**

**ASSEMBLY LANGUAGE PROGRAMMING:** 8086 Instruction Set, Simple programs, Assembly language programs involving logical, branch and call instructions, sorting, evaluation of arithmetic expressions, string manipulation, assembler directives, procedures and macros. (T2: Ch-3 & 4)

**UNIT - V** **(8 Lectures)**

**8086 MEMORY AND DIGITAL INTERFACING:** 8086 addressing and address decoding, interfacing RAM, ROM, EPROM to 8086, 8255 programmable peripheral interface, various modes of operation and interfacing to 8086, interfacing keyboard, interfacing to alphanumeric displays, seven segment led displays, stepper motor, d/a and a/d converter interfacing.(T2: Ch-9 & Ch-10)

**TEXT BOOKS:**

1. M. Moris Mano (2006), *Computer System Architecture*, 3<sup>rd</sup> Edition, Pearson/PHI, India.
2. Douglas V.Hall (2007), *Microprocessors Interface*, 2<sup>nd</sup> Edition, TMH.

**REFERENCE BOOKS:**

1. Carl Hamacher, Zvonks Vranesic, SafeaZaky (2002), *Computer Organization*, 5<sup>th</sup> Edition, McGraw-Hill, New Delhi, India.
2. William Stallings (2010), *Computer Organization and Architecture- designing for performance*, 8<sup>th</sup> Edition, Prentice Hall, New Jersey.
3. A.K.Ray, K.M.Bhurchandi (2004), *Advanced Microprocessors and Peripherals- Architecture, Programming and interfacing*, Tata McGraw-Hill, New Delhi, India.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE III Semester

VCE-R15

**OBJECT ORIENTED PROGRAMMING**

Course Code: A3509

L	T	P	C
4	1	0	4

**Course Overview:**

The Course provides a comprehensive coverage of conceptual and practical Java language, describing its syntax, keywords, and fundamental programming principles to become a proficient Java Programmer. The course is divided into five units, each focusing on a different aspect of core Java Environment suitable to write efficient, maintainable, and portable code. At the outset, the course ignites Object Oriented thinking and explores with the evolution of Java and its basics. It gives strong foundation on Inheritance, Packages and Interfaces and also discusses Exception Handling and Multithreaded mechanisms. The course examines java concepts such as Applets and Event handling. The course end up with nourishing AWT Controls and Swing concepts used for GUI applications. Overall, the knowledge of this course is essential to learn advanced Java and other OOP based languages and hence, stands as a pre-requisite for few fore coming courses like Struts and Spring Framework, Hibernate Framework. The course also plays a vital role in building front-end applications for Mini and Major Project Works in the final year.

**Prerequisite(s):** Data Structures (A3503)

**Course Outcomes:**

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

- CO1. Use various programming constructs of object oriented language.
- CO2. Apply principles of object oriented programming to model/design real world problems.
- CO3. Use exception handling mechanism to develop fault tolerant applications.
- CO4. Analyze the concepts of multi threaded programming and synchronization.
- CO5. Use GUI controls and event handling mechanism to develop interactive window/desktop applications.
- CO6. Analyze need of applets, swings to develop simple web application.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE III Semester

VCE-R15

**OBJECT ORIENTED PROGRAMMING**

Course Code: A3509

L	T	P	C
4	1	0	4

**SYLLABUS**

**UNIT – I**

**(14 Lectures)**

**EVOLUTION OF JAVA:** Object-Oriented Programming, Two Paradigms, The Three OOP Principles, Evolution of Java, Java Buzzwords, Java Program Structure, Implementing a Java Program, JVM Architecture, Data Types, Variables, Type Conversion and Casting, I/O Basics, Reading Console Input, Writing Console Output, Operators, Control Statements,

**CLASS, METHODS, OBJECTS AND CONSTRUCTORS:** Introducing Classes, Objects, Methods, Constructors, Garbage Collection, finalize() method, Overloading Methods and Constructors, Argument Passing, Recursion, static and final Keywords, Nested and Inner classes, Arrays. Exploring String and String Buffer class, Command-Line Arguments.

**UNIT – II**

**(12 Lectures)**

**INHERITANCE:** Inheritance Basics, Member Access and Inheritance, this and super Keywords, Creating Multilevel Hierarchy, Method Overriding, Dynamic Method Dispatch, Abstract Classes, final keyword.

**PACKAGES AND INTERFACES:** Defining a Package, Finding Packages and CLASSPATH, Access Protection, Importing Packages, Defining an Interface, Implementing Interfaces, Variables in Interface, Interfaces can be extended.

**UNIT – III**

**(13 Lectures)**

**EXCEPTION HANDLING:** Exception-Handling Fundamentals, Exception Types, Uncaught Exceptions, Using try, catch, throw, throws and finally Keywords, Built-in Exceptions, Creating Own Exception Subclasses, Chained Exceptions.

**MULTITHREADED PROGRAMMING:** Thread Life Cycle, Creating a Thread - Extending Thread Class and Implementing Runnable Interface, Creating Multiple Threads, Thread Priorities, Synchronization, Interthread Communication.

**FILE I/O:** Streams, Stream Classes- Byte and Character, File Operations – Reading, Writing and Closing, exploring java.util package - ArrayList Class, Vector, Hashtable, StringTokenizer, and Date.

**UNIT – IV**

**(10 Lectures)**

**AWT CONTROLS:** AWT Classes, Window Fundamentals, Working with Frame Windows, Working with Graphics, Color, Fonts, Control Fundamentals, Labels, Buttons, Check Boxes, Checkbox Group, Choice Controls, Lists, Scroll Bars, TextArea, and Layout Managers.

**EVENT HANDLING:** Delegation Event Model, Event Classes, Sources of Events, Event Listener Interfaces, Handling Mouse and Keyboard Events, Adapter Classes, Inner Classes.

**UNIT – V**

**(10 Lectures)**

**SWINGS:** Introducing Swing, Features, Hierarchy of Swing, Top Level Containers - JFrame, JWindow, JApplet, Light Weight Containers - JPanel, Create a Swing Applet, Swing Components - JLabel and Image Icon, JTextField, JButton, JToggleButton, JCheckBox, JRadioButton, JComboBox, JTabbedPane, JScrollPane, JList, JTree, JTable.

**APPLETS:** Applet Basics, Applet Lifecycle, Applet Skeleton, Simple Applet Display Methods, the HTML APPLET Tag, Passing Parameters to Applets.

**TEXT BOOK:**

1. Herbert Schildt (2011), *Java: The Complete Reference*, 8<sup>th</sup> Edition, Tata McGraw-Hill Education, New Delhi.

**REFERENCE BOOKS:**

1. Michael Ernest (2013), *Java SE 7 Programming Essentials*, John Wiley & Sons Inc.
2. Y. Daniel Liang (2014), *Introduction to Java Programming, Comprehensive Version*, 10<sup>th</sup> Edition, Pearson Education, India.

3. Kathy Sierra, Bert Bates (2014), *OCA/OCP Java SE 7 Programmer I & II Study Guide* (Exams 1Z0-803 & 1Z0-804), 1<sup>st</sup> Edition, McGraw-Hill Education Publisher, USA.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE III Semester

VCE-R15

**COMPUTER ORGANIZATION AND MICRO PROCESSORS LAB**

Course Code: A3510

L	T	P	C
0	0	3	2

**Course Overview:**

Microelectronics is increasingly pervading all aspects of industry, education and the home. A leading example of microelectronic techniques is the microprocessor, and as its use increases the need for knowledge and understanding will also grow. This lab was designed to give an overview over the programming of such a microprocessor system. The students will write and debug assembly language programs using the Microsoft Macro Assembler (MASM). This Lab provides students with the opportunity to gain experience in microprocessor based system design, assembly language programming, and I/O interfacing to microprocessors

**Prerequisite(s):** Computer Programming Through C Lab: A3502

**Course Outcomes:**

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

- CO1. Show the interaction between CPU, memory and I/O ports by implementing programs.
- CO2. Program a microprocessor using instruction set of 8086.
- CO3. Master the assembly level programming using 8086 instruction set.
- CO4. Distinguish how different I/O devices can be interfaced to processor and will explore several techniques of interfacing.
- CO5. Demonstrate is clear understanding of the interaction for data transfer between CPU, memory and I/O ports

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE III Semester

VCE-R15

**COMPUTER ORGANIZATION & MICRO PROCESSORS LAB**

Course Code: A3510

L	T	P	C
0	0	3	2

**LIST OF EXPERIMENTS**

**Week – 1 (Arithmetic Operations-Add, Sub)**

1. Write programs for the following:
  - a) Addition and Subtraction of two 8-bit operands.
  - b) Addition and Subtraction of two 16-bit operands.
  - c) Multibyte Addition of two numbers.
  - d) Multibyte Subtraction of two numbers.

**Week – 2 (Arithmetic Operations-Mul, Div)**

2. Write programs for the following:
  - a) Multiplication and Division of two 8-bit operands
  - b) Multiplication and Division of two 16-bit operand)

**Week – 3 (Summation)**

3. Write programs for the following:
  - a) Calculate the sum of series of Five 8-bit numbers.
  - b) Calculate the sum of series of Five 16-bit numbers.
  - c) Calculate the sum of n natural numbers.
  - d) Calculate the sum of squares of n numbers.
  - e) Calculate the sum of cubes of n numbers.
  - f) Calculate the arithmetic mean of n numbers.

**Week – 4 (I/O Operations)**

4. Write programs for the following:
  - a) ALP program for reading a character.
  - b) ALP program for displaying a character.
  - c) ALP program to read an integer and display it.
  - d) ALP program to read a string.
  - e) ALP program to display a string.

**Week – 5 (Complement and Shift Operations)**

5. Write programs for the following:
  - a) Find the one's compliment of 8bit and 16 bit number.
  - b) Find the Two's compliment of 8bit and 16 bit number.
  - c) Perform shift left (1 bit) on 8 bit and 16 bit data.
  - d) Perform shift left (2 bits) on 8 bit and 16 bit data.
  - e) Write an Assembly Language Program to count the number of ones and zeros of a given binary operand using shift operations.
  - f) Write an Assembly Language Program to find whether the given number is even or odd using shift instructions.

**Week – 6 (Rotate Instructions, Masking of bits)**

6. Write programs for the following:
  - d) Perform ROL on given operand.
  - e) Perform ROR on given operand.
  - f) Program to mask off least significant nibble bits of a byte length number.
  - g) Program to mask off most significant nibble bits of a byte length number.

**Week – 7 (Code Conversion)**

7. Write programs that uses both recursive and non-recursive functions:
  - a) Convert Unpacked BCD number to packed BCD number.
  - b) Convert Unpacked BCD number to Binary number.



**Week – 8 (Control Statements)**

8. Write programs for the following:
  - a) Reverse Finding Largest number of 2 given numbers
  - b) Finding Smallest number of 2 given numbers
  - c) Finding Largest number from given series of numbers
  - d) Finding Smallest number from given series of numbers

**Week – 9 (Searching and Sorting)**

9. Write programs for the following:
  - a) Sort the given byte length numbers in ascending order and also in descending order using bubble sort or insertion sort.
  - b) Search for a given substring whether it is present in main string or not.
  - c) Use binary search for finding given key value on given word length integers.

**Week – 10 (String Manipulations)**

10. Write programs for the following:
  - a) To compare the two given strings.
  - b) Program for inserting a character into a string.
  - c) Move block of data from one memory location to another memory location

**Week – 11 (Interfacing Experiments)**

11. Write programs for the following:
  - a) Write an Assembly Language Program to interface 8255 to 8086 and observe the following:
    - i. Blink all LEDs connected to port B on/off with 2ms delay
    - ii. Blink LEDs alternatively connected to port A with 10 ms time delay.
  - b) Write an Assembly Language Program to interface stepper motor to 8086 and observe the following:
    - i. 5 rotations in clockwise direction
    - ii. 5 rotations in anticlockwise direction
    - iii. Continuous rotation in clockwise direction at much faster speed
  - c) Write an Assembly Language Program to interface A/D and D/A converters to 8086 and observe the following:
    - a. Square wave
    - b. Sinusoidal wave

**Week – 12 (Additional Programs)**

12. Write programs for the following:
  - a) Find GCD and LCM for given two byte length number.
  - b) Find the factorial for the given number.
  - c) Find square root of given number.
  - d) Write ALP program for converting Celsius to Fahrenheit and vice versa.
  - e) Write ALP for counting the number of odd and even numbers in a given array.
  - f) Write ALP for converting uppercase letter to lower case and vice versa?

**REFERENCE BOOKS:**

1. Douglas V.Hall (2007), *Microprocessors Interface*, 2<sup>nd</sup> Edition, TMH.
2. A.K.Ray, K.M.Bhurchandi (2004), *Advanced Microprocessors and Peripherals- Architecture, Programming and interfacing*, Tata McGraw-Hill, New Delhi, India.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSEIII Semester

VCE-R15

**OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB**

Course Code: A3511

L	T	P	C
0	0	3	2

**Course Overview:**

The hands-on course provides a comprehensive coverage of practical Java language, describing its syntax, keywords, and fundamental programming principles to become a proficient Java Programmer. The course stress on the strengths of Java to write efficient, maintainable, and portable code. The course focuses on a different aspect of core Java Environment suitable for advance learning, teaching, research, and commercial software development. At the outset it revise the control statements and then explores with the concepts of Inheritance and Interfaces. Exception Handling, Multithreaded mechanisms and File I/O is also been practiced. The concepts such as AWT Controls, Event handling, Applets and Swings are deeply Practiced to build GUI based applications. Overall, the knowledge of this course is essential to learn other similar OOP based technologies and advanced Java and hence stands as a pre-requisite for few fore coming courses like Struts and Spring Framework, Hibernate Framework, and to build Mini and Major Project Work applications

**Prerequisite(s):**Data structures Lab (A3504)

**Course Outcomes:**

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

- CO1. Use various constructs of object orient programming
- CO2. Write programs using string API.
- CO3. Analyze the need of object oriented programming principles.
- CO4. Apply exception handling mechanism to overcome run-time errors.
- CO5. Prepare for writing multi threaded applications.
- CO6. Use event handling and AWT to design GUI applications.

**VARDHAMAN COLLEGE OF ENGINEERING**  
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B. Tech. CSE III Semester

VCE-R15

**OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB**

Course Code: A3511

L	T	P	C
0	0	3	2

**LIST OF EXPERIMENTS**

**Week – 1 (Selection statements)**

1. Write Java programs for the following:
  - a) Prints all roots of the quadratic equation  $ax^2 + bx + c = 0$  based on the discriminate  $b^2 - 4ac$ . Read in a, b, c and use the quadratic formula.
  - b) The Fibonacci sequence is defined by the following rule: The first two values in the sequence are 0 and 1. Every subsequent value is the sum of the two values preceding it. Write a Java program that uses both recursive and non-recursive functions to print the  $n^{\text{th}}$  value in the Fibonacci sequence. Read two integers and shift the first integer by two bits to the left and second integer by one bit to the right.
  - c) Three friends Rahul, Anil and Anita planned to go for dinner. Rahul has Rs.500, Anil has Rs.600 and Anita has Rs.400. Rahul will order rice but the bill should be in the range of Rs.100 to Rs.300. Anil should order Desserts and the bill should be less than Rs.200. Anita should order Soup but the bill must be for Rs.300.
    - Calculate the total amount spent by the three.
    - Check whether any two bill amounts are same.
    - Calculate the remaining amount with them.

**Week – 2 (Control statements)**

2. Write Java programs for the following:
  - a. Prompts the user for an integer and then prints out all prime numbers up to that integer.
  - b. Read the order and elements of two matrices. Check the condition for matrix multiplication and display the result.
  - c. Read a line of integers, and then display each integer, and the sum of all the integers (Use String Tokenizer class of java.util).

**Week – 3 (Strings)**

3. Write Java programs for the following:
  - a. Check whether a given string is a Palindrome or not. Ex: MADAM is a palindrome.
  - b. Sort a given list of names in ascending order
  - c. Display the frequency count of words in a given text

**Week – 4 (Strings)**

4. Write Java programs for the following:
  - a. Consider a company requires the details of an employee identity card such as firstname, middlename, lastname. Convert each character from the entered name into uppercase and display the names.
  - b. Display the names of n members of a team whose name starts with 's' or 'S' and ends with 's' or 'S'.

**Week – 5 (Class, Method, Object, Constructor)**

5. Write Java programs for the following:
  - a. Declare a class called Employee having employee\_id and employee\_name as members. Extend class Employee to have a subclass called Salary having designation and monthly\_salary as members. Define following:
    - Required constructor

- A method to find and display all details of employees drawing salary more than Rs.20000/-
  - main() method to create an array that sorts these details.
- b. A software company is maintaining an Employee list of java\_platform, dotNet\_platform and RAD\_platform. Each employee should have employee\_name, and platform\_name. Print the following
- Display all java\_platform employee list.
  - Display all .Net Employee List.
  - Display all RAD EmployeeList.
- c. Create a class Account with two overloaded constructors. The first constructor is used to initialize the details of the account holder like account\_name, account\_number and initial\_amount. The second constructor is used to initialize account\_name, account\_number, address, account\_type and current\_balance. The Account class is having methods Deposit(), Withdraw(), and GetBalance(). Make the necessary assumptions for data members and return types of the methods. Create objects of Account class and use them.

### **Week – 6 (Method Overloading)**

6. Write Java programs for the following:
- a. Create an overloaded methods named void calc\_volume( ), that has been overloaded to perform the following functions. Execute the overloaded methods and display the volume in the respective functions:
- Volume of Sphere
  - Volume of Cylinder
  - Volume of Cone
- b. Create an abstract class named Shape that contains an empty method named numberOfSides(). Provide three classes named Trapezoid, Triangle and Hexagon such that each one of the classes extends the class Shape. Each one of the classes contains only the method numberOfSides( ) that shows the number of sides in the given geometrical figures.

### **Week – 7 (Interface)**

7. Write Java programs for the following:
- a. Implement an interface Student which has two methods displayGrade() and attendance() for PG\_Student and UG\_Student with necessary inputs of data. PG\_Student and UG\_Student are two different classes.
- b. Create an abstract base class Shape with two members base and height, a member function for initialization and a function to compute shapeArea(). Derive two specific classes Triangle and Rectangle which override the function shapeArea(). Use these classes in a main function and display the area of the triangle and the rectangle.

### **Week – 8 (Exception Handling)**

8. Write Java programs for the following:
- a. Create a user interface to perform integer divisions. The user enters two numbers in the text fields, Num1 and Num2. The division of Num1 and Num2 is displayed in the Result field when the Div- id button is clicked. If Num1 or Num2 were not an integer, the program would throw a NumberFormatException. If Num2 is Zero, the program would throw an ArithmeticException. Display the exception in a message dialog box.
- b. In the CustomExceptionTest class, the age is expected to be a positive number. It would throw the user defined exception NegativeAgeException if the age is assigned a negative number.

### **Week – 9 (Threads)**

9. Write Java programs for the following:

- a. Illustrate creation of threads using Runnable class. (Start method starts each of the newly created thread. Inside the run method there is sleep () for suspend the thread for 500 milliseconds).
- b. Create a multithreaded program by creating a subclass of Thread and then creating, initializing, and starting two Thread objects from your class. The threads will execute concurrently and display Java is object oriented, secure, and multithreaded in console window.

### **Week – 10 (Threads)**

10. Write Java programs for the following:

- a. Creates three threads in which First thread displays “Good Morning” every one second, the Second thread displays “Hello” every two seconds and the third thread displays “Welcome” every three seconds.
- b. Implement the concept of producer consumer problem.

### **Week – 11 (File Handling)**

11. Write Java programs for the following:

- a. Read a file name from the user, and then display information about whether the file exists, whether the file is readable, whether the file is writable, the type of file and the length of the file in bytes.
- b. Reads a file and displays the file on the screen, with a line number before each line.
- c. Displays the number of characters, lines and words in a text file.

### **Week – 12 (Event Handling)**

12. Write Java programs for the following:

- a. Create a simple calculator by using Grid Layout to arrange buttons for the digits and for the +, -, \*, and % operations. Add a text field to display the result of the operations.
- b. To implement mouse handling events.
- c. To implement key handling events.

### **Week – 13 (AWT Controls)**

13. Write Java programs for the following:

- a. Simulate a Traffic Light Signals in which the user selects one of three lights: Red, Yellow, Green. When a radio button is selected, the light is turned ON, and only one light can be ON at a time. No light is ON when the program starts.
- b. Write a Java program that allows the user to draw lines, rectangles and ovals.
- c. Develop an applet that displays a simple message in center of the screen

### **REFERENCE BOOKS:**

1. T. Budd (2010), *An Introduction to Object Oriented Programming*, 3<sup>rd</sup> Edition, Pearson Education, India.
2. Y. Daniel Liang (2014), *Introduction to Java Programming, Comprehensive Version*, 10<sup>th</sup> Edition, Pearson Education, India

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSEIII Semester

VCE-R15

**GENDER SENSITIZATION**

Course Code: A3021

L	T	P	C
0	3	0	0

**Course Overview:**

Gender Sensitization is one of the basic requirements for the normal development of an individual and primarily highlights the contribution of both the genders in creation and development of a well balanced society. A curriculum-based approach to bring a change is desired to inculcate sensitivity towards issues concerning the relationship between men and women, caste, declining sex ratio, struggles with discrimination, sexual harassment, new forums for justice, eve-teasing, etc., The need for this sensitivity has been felt and realized through times immemorial and in almost all kinds of human existence, across the globe.

Towards a World of Equals is a course that introduces you to different dimensions of the current discussion on gender issues through a variety of materials: academic studies, court cases, laws, theoretical analyses, newspaper reports, stories, poems, videos and autobiographical texts. The lessons critically scrutinize many commonly held assumptions about gender relations and demonstrate why they are unacceptable in a society committed to justice and equality.

**Prerequisite(s):**NIL

**Course Outcomes:**

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

- CO1. Build the significance of the process of socialization and relationships between men and women on the basis of a just and equal world.
- CO2. Examine the decline of female sex ratio and discrimination faced by people with different gender identities.
- CO3. Take part in house work, in order to allow for equality and share equal family spaces.
- CO4. Estimate women's contribution to the nation's economy.
- CO5. Analyze the consequences of sexual violence and importance of consent in friendship and other relationships.
- CO6. Perceive the invisibility of women in history and show how locating a woman in history makes them visible.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE III Semester

VCE-R15

**GENDER SENSITIZATION**

Course Code: A3021

L	T	P	C
0	3	0	0

**LIST OF EXPERIMENTS**

- 1. Gender Sensitization: Why should we study it?**
- 2. Socialization: Making Women, Making Men**  
Introduction  
Preparing for womanhood  
Growing up male  
First lessons in caste  
Different masculinities
- 3. Just Relationships: Being Together as Equals**  
Mary Kom and Onler  
Love and Acid just do not mix  
Love letters  
Mothers and fathers  
Further Reading: Rosa Parks-The Brave heart
- 4. Missing Women: Sex Selection and Its Consequences**  
Declining Sex Ratio  
Demographic Consequences
- 5. Gender Spectrum: Beyond the Binary**  
Two or Many?  
Struggles with Discrimination
- 6. Additional Reading: Our Bodies, Our Health**
- 7. Housework: The Invisible Labour**  
“My Mother doesn’t work”  
“Share the load”
- 8. Women’s Work: Its Politics and Economics**  
Fact and fiction  
Unrecognized and unaccounted work  
Further Reading: wages and conditions of work.
- 9. Sexual Harassment: Say No!**  
Sexual harassment, not eve-teasing  
Coping with everyday harassment  
Further Reading: “Chupulu”
- 10. Domestic Violence: Speaking Out**  
Is home a safe place?  
When women unite (Film)  
Rebuilding lives  
Further Reading: New Forums for justice.
- 11. Thinking about Sexual Violence**  
Blaming the Victim- “ I Fought for my life...”  
Further Reading: The caste face of violence.
- 12. Knowledge: Through the Lens of Gender**  
Point of view  
Gender and the structure of knowledge  
Further Reading: Unacknowledged women artists of Telangana
- 13. Whose History? Questions for Historians and Others**  
Reclaiming a Past  
Writing other Histories  
Further Reading: Missing pages from modern Telangana history

**TEXT BOOK:**

1. “Towards a World of Equals: A Bilingual Textbook on Gender”. Telugu Akademi, Hyderabad, 2015

**ADDITIONAL RESOURCES:**  
[www.worldofequals.org.in](http://www.worldofequals.org.in)



**SYLLABI FOR  
IV SEMESTER**

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE IV Semester

VCE-R15

**ENVIRONMENTAL SCIENCE**

Course Code: A3010

L	T	P	C
3	0	0	3

**Course Overview:**

Environmental study is interconnected; interrelated and interdependent subject. Hence, it is multidisciplinary in nature. The present course is framed by expert committee of UGC under the direction of Honourable Supreme Court to be as a core module syllabus for all branches of higher education and to be implemented in all universities over India. The course is designed to create environmental awareness and consciousness among the present generation to become environmental responsible citizens. The course description is: multidisciplinary nature of environmental studies, Natural Resources: Renewable and non-renewable resources; Ecosystems; Biodiversity and its conservation; Environmental Pollution; Social Issues and the Environment; Human Population and the Environment; pollution control acts and Field Work. The course is divided into five chapters for convenience of academic teaching followed by field visits.

**Prerequisite(s):** NIL

**Course Outcomes:**

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

- CO1. Understand the character of environmental problems and ways of addressing them, including interactions across local to global scales
- CO2. Apply systems concepts and methodologies to analyze and understand interactions between social and environmental processes.
- CO3. Understand key concepts from economic, political, and social analysis as they pertain to the design and evaluation of environmental policies
- CO4. Appraise the ethical, cross-cultural, and historical context of environmental issues and the links between human and natural systems
- CO5. Evaluate the concepts and methods from ecological and physical sciences and their application in environmental problem solving.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE IV Semester

VCE-R15

**ENVIRONMENTAL SCIENCE**

Course Code: A3010

L T P C  
3 0 0 3

**SYLLABUS**

**UNIT – I**

**(7 Lectures)**

**ENVIRONMENTAL SCIENCE INTRODUCTION:** Multidisciplinary nature of Environmental Studies: Definition, Scope and Importance. Need for Public Awareness.

**NATURAL RESOURCES:** Renewable and non-renewable resources. Natural resources and associated problems.

**FOREST RESOURCES:** Use and over – exploitation, deforestation, Timber extraction, Mining, dams and other effects on forest and tribal people.

**WATER RESOURCES:** Use and over utilization of surface and ground water, floods, drought, conflicts over water, dams – benefits and problems.

**MINERAL RESOURCES:** Use and exploitation, environmental effects of extracting and using mineral resources.

**FOOD RESOURCES:** World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity.

**ENERGY RESOURCES:** Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources, Case studies.

**LAND RESOURCES:** Land as a resource, land degradation, man induced landslides, soil erosion and desertification. Role of an individual in conservation of natural resources.

**UNIT- II**

**(7 Lectures)**

**ECOSYSTEMS:** Concept of an ecosystem. Structure and function of an ecosystem. Producers, consumers and decomposers. Energy flow in the ecosystem. Ecological succession. Food chains, food webs and ecological pyramids. Introduction, types, characteristic features, structure and function of the following ecosystem: Forest ecosystem, grassland ecosystem, desert ecosystem, aquatic ecosystems

**BIODIVERSITY AND ITS CONSERVATION:** Introduction. Definition: genetic, species and ecosystem diversity. Value of BIODIVERSITY: consumptive use, productive use, social, ethical, aesthetic and option values. Biodiversity at global, National and local levels. India as a mega diversity nation. Hot-spots of biodiversity. Threats to biodiversity- habitat loss, poaching of wildlife, man -wildlife conflicts. Endangered and endemic species of India. Conservation of biodiversity- In-situ and Ex-situ conservation of biodiversity.

**UNIT - III**

**(12 Lectures)**

**ENVIRONMENTAL POLLUTION:** Definition, Cause, effects and control measures of air pollution, water pollution, soil pollution, marine pollution, noise pollution, thermal pollution and nuclear hazards, Ill effects of fireworks.

**SOLID WASTE MANAGEMENT:** Causes, effects and control measures of urban and industrial wastes. Role of an individual in prevention of pollution. Pollution case studies.

**DISASTER MANAGEMENT:** floods, earthquake, cyclone and landslides. E-waste and plastic waste- recycling and reuse

**WATER CONSERVATION:** rain water harvesting, watershed management. Resettlement and rehabilitation of people; its problems and concerns. Case Studies. Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies.

**UNIT- IV**

**(8 Lectures)**

**GREEN ENVIRONMENTAL ISSUES:** Clean development mechanism, carbon foot printing, carbon credits, and carbon sequestration polluter pay principle. Green building practices. Approaches to

green computing and nanotechnology.ISO14000. Role of information Technology in Environment and human health. Case Studies.

**UNIT – V**

**(8 Lectures)**

**ENVIRONMENTALETHICS:** Environment Protection Act. -Air (Prevention and Control of Pollution) Act. -Water (Prevention and control of Pollution) Act -Wildlife Protection Act -Forest Conservation Act -Issues involved in enforcement of environmental legislation. Public awareness.

**ENVIRONMENTAL IMPACT ASSESSMENT:** Conceptual facts of EIA, Baseline data acquisition, planning and management of impact studies, operational aspects of EIA, methods for impact identification, prediction of impacts (air, water, noise, soil, biological and socio-economics).Environmental Management Plan.Role of NGOs in creating awareness among people regarding environmental issues.

**TEXT BOOKS:**

1. Erach Bharucha (2005), *Textbook of Environmental Studies for Undergraduate Courses*, Hyderabad, Universities Press.
2. Benny Joseph (2005), *Environmental Studies*, New Delhi, Tata McGraw Hill Publishing Co. Ltd.

**REFERENCE BOOKS:**

1. Anubha Kaushik (2006), *Perspectives in Environmental Science*, 3<sup>rd</sup> Edition, New Delhi, New age international.
2. M Anji Reddy (2007), *Textbook of Environmental Sciences and Technology*, Hyderabad, BS Publications.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE IV Semester

VCE-R15

**PRINCIPLES OF PROGRAMMING LANGUAGES**

Course Code: A3512

L	T	P	C
3	1	0	3

**Course Overview:**

This course focuses on high-level programming languages and their formal semantics. Such study enables precise reasoning about programs, their efficient implementation and easy reuse, as will be discussed in the course. The course includes axiomatic semantics, imperative programming languages, functional programming languages, object-oriented programming languages, logic programming languages, and higher-level languages with sets and maps. The course also includes topics like type systems, abstraction mechanisms, declarativeness, efficient implementations, concurrency and parallelism.

**Prerequisite(s):** Object Oriented Programming (A3509)

**Course Outcomes:**

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

- CO1. Analyze the designing criteria of different programming languages to choose appropriate language for implementation of real time applications
- CO2. Identify appropriate primitive/user defined data types for increasing program efficiency.
- CO3. Apply sub program concepts to improve the readability of the program.
- CO4. Analyze different object oriented programming features and to apply in developing efficient web programs with concurrent ability.
- CO5. Apply exception handling techniques to develop robust programs to sustain against all runtime exceptions.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE IV Semester

VCE-R15

**PRINCIPLES OF PROGRAMMING LANGUAGES**

Course Code: A3512

L	T	P	C
3	1	0	3

**SYLLABUS**

**UNIT I**

**(8 Lectures)**

**PRELIMINARY CONCEPTS:** Reasons for studying concepts of programming languages, Programming domains, Language Evaluation Criteria, influences on Language design, Language categories, Programming Paradigms – Imperative, Object Oriented, functional Programming , Logic Programming. Programming Language Implementation – Compilation and Virtual Machines, programming environments.

**SYNTAX AND SEMANTICS:** general Problem of describing Syntax and Semantics, formal methods of describing syntax - BNF, EBNF for common programming languages features, parse trees, ambiguous grammars, attribute grammars, axiomatic semantics for common programming language features.

**UNIT II**

**(9 Lectures)**

**DATA TYPES:** Introduction, primitive, character, user defined, array, associative, record, union, pointer and reference types, design and implementation uses related to these types. Names, Variable, concept of binding, type checking, strong typing, type compatibility, named constants, variable initialization.

**UNIT III**

**(10 Lectures)**

**EXPRESSIONS AND STATEMENTS:** Arithmetic relational and Boolean expressions, Short circuit evaluation mixed mode assignment, Assignment Statements, Control Structures – Statement Level, Compound Statements, Selection, Iteration, Unconditional Statements, and guarded commands.

**SUBPROGRAMS AND BLOCKS:** Fundamentals of sub-programs, Scope and lifetime of variable, static and dynamic scope, Design issues of subprograms and operations, local referencing environments, parameter passing methods, overloaded sub-programs, generic sub-programs, parameters that are sub-program names, design issues for functions user defined overloaded operators, co-routines.

**UNIT IV**

**(8 Lectures)**

**ABSTRACT DATA TYPES:** Abstractions and encapsulation, introductions to data abstraction, design issues, language examples, C++ parameterized ADT, object oriented programming in small talk, C++, Java, C#, Ada95 Concurrency: Subprogram level concurrency, semaphores, monitors, message passing, Java threads, C# threads.

**UNIT V**

**(10 Lectures)**

**EXCEPTION HANDLING:** Exceptions, exception Propagation, Exception handler in Ada, C++ and Java. Logic Programming Language: Introduction and overview of logic programming, basic elements of prolog, application of logic programming.

**FUNCTIONAL PROGRAMMING LANGUAGES:** Introduction, fundamentals of FPL, LISP, ML, Haskell, application of Functional Programming Languages and comparison of functional and imperative Languages.

**TEXT BOOKS:**

1. Robert .W. Sebesta (2012), *Concepts of Programming Languages* 10<sup>th</sup> Edition, Pearson Education.
2. D. A. Watt (2007), *Programming Language Design Concepts*, Wiley dreamtechrp.

**REFERENCE BOOKS:**

1. A.B. Tucker, R.E. Noonan, *Programming Languages*, 2<sup>nd</sup> Edition, TMH.
2. K. C.Louden (2003), *Programming Languages*, 2<sup>nd</sup> Edition, Thomson.
3. Patric Henry Winston and Paul Horn, *LISP*, Pearson Education.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSEIV Semester

VCE-R15

**FORMAL LANGUAGES AND AUTOMATA THEORY**

Course Code: A3513

L	T	P	C
3	1	0	3

**Course Overview:**

Theory of Computation deals with the concepts of automata, formal languages, grammar, algorithms, computability, decidability, and complexity. The reasons to study Theory of Computation are Automata Theory provides a simple, elegant view of the complex machine that we call a computer. Automata Theory possesses a high degree of permanence and stability, in contrast with the ever-changing paradigms of the technology, development, and management of computer systems. Further, parts of the Automata theory have direct bearing on practice, such as Automata on circuit design, compiler design, and search algorithms; Formal Languages and Grammars on compiler design; and Complexity on cryptography and optimization problems in manufacturing, business, and management.

**Prerequisite(s):** Discrete Mathematical Structures (A3505)  
Data structures (A3503)

**Course Outcomes:**

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

- CO1. Acquire a fundamental understanding of the core concepts in automata theory and formal languages.
- CO2. Design grammars and automata (recognizers) for different language classes.
- CO3. Identify formal language classes and prove language membership properties.
- CO4. Prove and disprove theorems establishing key properties of formal languages and automata.
- CO5. Acquire a fundamental understanding of core concepts relating to the theory of computation and computational models including (but not limited to) decidability and intractability.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSEIV Semester

VCE-R15

**FORMAL LANGUAGES AND AUTOMATA THEORY**

Course Code: A3513

L	T	P	C
3	1	0	3

**SYLLABUS**

**UNIT - I**

**(10 Lectures)**

**FINITE AUTOMATA (FA)** - Introduction, model and behavior, Deterministic Finite Automata (DFA) - Formal definition, simpler notations (state transition diagram, transition table), language of a DFA. Nondeterministic Finite Automata (NFA)- definition of NFA, language of an NFA, Equivalence of Deterministic and Nondeterministic Finite Automata, Applications of Finite Automata, Finite Automata with Epsilon Transitions, Eliminating epsilon transitions, finite automata with output (Moore and Mealy machines).

**UNIT - II**

**(8 Lectures)**

**REGULAR EXPRESSIONS (RE)** - Introduction, algebraic laws for Regular Expressions, Finite Automata and Regular Expressions- from DFA's to Regular Expressions, converting Regular Expressions to Automata, applications of Regular Expressions. Proving languages to be non-regular -Pumping lemma, applications. Closure properties of regular languages.

**UNIT - III**

**(10 Lectures)**

**CONTEXT FREE GRAMMARS (CFG)** - Formal definition, sentential forms, leftmost and rightmost derivations, the language of a CFG. Derivation tree or parse tree, relationship between parse trees and derivations. Applications of Context Free Grammars, Ambiguous Grammar.

**SIMPLIFICATION OF CFG** - Removing useless symbols, Null (epsilon) - productions and unit productions. Normal forms -CNF. Proving that some languages are not context free -Pumping lemma for CFLs, applications. Some closure properties of CFLs, decision properties of CFLs, undecidable CFL problems. Minimization of Deterministic Finite Automata

**UNIT - IV**

**(8 Lectures)**

**PUSHDOWN AUTOMATA (PDA)** - Definition of the Pushdown Automata, the languages of PDA (acceptance by final state and empty stack), Equivalence of PDA's and CFG's, from Grammars to Pushdown Automata, Pushdown Automata to Grammars. Deterministic PDA -definition, DPDAs and regular languages, DPDAs and CFLs. Languages of DPDAs

**UNIT - V**

**(9 Lectures)**

**TURING MACHINES (TM)** - Formal definition and behavior, languages of a TM, TM as accepters, TM as a computer of integer functions, Types of TMs.

**RECURSIVE AND RECURSIVELY ENUMERABLE LANGUAGES (REL)** - Some properties of recursive and recursively enumerable languages, universal Turing machine, the Halting problem, undecidable problems about TMs.

**COMPUTABILITY THEORY** - Context sensitive language and linear bounded automata (LBA), Chomsky hierarchy, The classes P and NP, post's correspondence problem (PCP).

**TEXT BOOK:**

1. John E. Hopcroft, Rajeev Motwani, Jeffrey D. Ullman (2007), *Introduction to Automata Theory Languages and Computation*, 3<sup>rd</sup> Edition, Pearson Education, India.

**REFERENCE BOOKS:**

1. K.L.P Mishra, N. Chandrashekar (2003), *Theory of Computer Science-Automata Languages and Computation*, 2<sup>nd</sup> edition, Prentice Hall of India.
2. John C. Martin (2003), *Introduction to Languages and the Theory of Computation*, 3<sup>rd</sup> Edition, McGraw-Hill, New Delhi.
3. Daniel I.A. Cohen (2007), *Introduction to Computer Theory*, 2<sup>nd</sup> Edition, John Wiley.



**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE IV Semester

VCE-R15

**SOFTWARE ENGINEERING**

Course Code: A3514

L	T	P	C
3	1	0	3

**Course Overview:**

This course acts as a foundation in the field of software engineering and is aimed at helping students develop an understanding of how software systems are developed from scratch, by guiding them through the development process, adopting the fundamental principles of system development. The course will orient the students to the different software process models, software requirements engineering process, systems analysis and design as a problem-solving activity, with focus on quality.

**Prerequisite(s):** Object Oriented Programming (A3509)

**Course Outcomes:**

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

- CO1. Identify the right process model to develop a software system.
- CO2. Gather requirements and analyze them scientifically in order to develop the right product, besides authoring software requirements document.
- CO3. Propose design as per functional and non-functional requirements using design principles.
- CO4. Propose testing strategies for application being developed.
- CO5. Identify right set of umbrella activities for quality management and assurance.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE IV Semester

VCE-R15

**SOFTWARE ENGINEERING**

Course Code: A3514

L T P C  
3 1 0 3

**SYLLABUS**

**UNIT – I**

**(9 Lectures)**

**INTRODUCTION TO SOFTWARE ENGINEERING:** Nature of software, Software engineering, The Software Processes, Software Myths.

**PROCESS MODELS:** A Generic Process Model, Process Assessment and Improvement, Prescriptive Process Models, Specialised Process models, The Unified Process, Personal and Team Process Models. (T1: Ch-1, 2)

**UNIT – II**

**(8 Lectures)**

**AGILE DEVELOPMENT:** What is Agility, Agility and the Cost of Change, Agile Process, Extreme Programming (XP), Other Agile Process Models: Adaptive Software Development (ASD), Scrum, Dynamic System Development Method (DSDM), Crystal. (T1: Ch-3)

**UNIT – III**

**(9 Lectures)**

**REQUIREMENTS ENGINEERING:** Functional and Non-Functional Requirements, The Software requirements Document, Requirements Specification, requirements Engineering, Requirements Elicitation and Analysis, Requirement Validation, Requirement Management.

**REQUIREMENTS MODELLING:** Requirement Analysis, Scenario-Based Modelling, Data Modelling Concepts, Class-Based Modelling. (T2: Ch-4, T1: Ch-6)

**UNIT – IV**

**(10 Lectures)**

**DESIGN CONCEPTS:** The Design Process, Design Concepts, The Design Models, Architectural Design: Software Architecture, Architectural Genres, Architectural Styles. User Interface Design: The Golden Rules, User Interface Analysis and Design, Interface Analysis, Interface Design Steps, Design Evaluation.

**IMPLEMENTATION:** Structured coding Techniques, Coding Styles-Standards and Guidelines, Implementation Issues. (T1: Ch-8, 9 & 11)

**UNIT – V**

**(9 Lectures)**

**SOFTWARE TESTING STRATEGIES:** A Strategic approach to Software Testing, Strategic Issues and Test Strategies for Conventional Software, Validation Testing, System Testing, The Art of Debugging, White-Box Testing, Black Box Testing.

**QUALITY MANAGEMENT & ASSURANCE:** Quality Concepts, Achieving software Quality, Review Techniques, Elements of Software Quality Assurance, the ISO 9000 Quality Standards. (T1: Ch-14, 16 & 17)

**TEXT BOOKS:**

1. Roger S. Pressman (2010), *Software Engineering, A Practitioner's Approach*, 7<sup>th</sup> Edition, McGraw-Hill International Edition, India.
2. Ian Sommerville (2011), *Software Engineering*, 9<sup>th</sup> Edition, Pearson education, India.

**REFERENCES BOOKS:**

1. Pankaj Jalote (2010), *Software Engineering, A Precise Approach*, Wiley India.
2. Waman S. Jawadkar (2008), *Software Engineering: A Primer*, McGraw-Hill, India.
3. Hans Van Vilet (2008), *Software Engineering Principles and Practice*, 3<sup>rd</sup> Edition, John Wiley & Sons Ltd.
4. Rajib Mall (2005), *Fundamental of Software Engineering*, PHI.

5. Deepak Jain, *Software Engineering, Principles and Practices*, Oxford, University Press, india.
6. Yinhxu Wang (2008), *Software Engineering Foundations*, Auerbach Publications.
7. Ronald J. Leach (1999), *Introduction to Software Engineering*, CRC Press.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE IV Semester

VCE-R15

**OPERATING SYSTEMS**

**Course Code: A3515**

L	T	P	C
4	1	0	4

**Course Overview:**

Operating Systems Course is intended as a general introduction to the techniques used to implement operating systems. The topics covered will be functions of operating systems, process management processor scheduling; deadlock prevention, avoidance, and recovery; main-memory management; virtual memory management; control of disks and other input/output devices; file-system structure and implementation; and protection and security. The course also covers the related UNIX commands and system calls.

**Prerequisite(s):** Computer Organization and Microprocessors (A3507)  
Computer Programming (A3501)

**Course Outcomes:**

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

- CO1. Analyze the concept of Process management, Synchronization and Concurrency control.
- CO2. Examine Deadlock handling methods
- CO3. Apply the concepts of Memory management techniques.
- CO4. Use File and Disk Management Schemes for effective Storage.
- CO5. Examine different Protection and Security principles associated with Operating Systems.
- CO6. Use simple utilities and system calls for accessing Operating System Services.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE IV Semester

VCE-R15

**OPERATING SYSTEMS**

Course Code: A3515

L T P C  
4 1 0 4

**SYLLABUS**

**UNIT – I** **(13 Lectures)**

**OPERATING SYSTEMS OVERVIEW:** Introduction, operating system operations, process management, memory management, storage management, protection and security, distributed systems, special purpose systems. Operating system services and systems calls, system programs (T1: Ch-1, 2)

**UNIX ARCHITECTURE:** UNIX commands-ls, cat, mkdir, rm, dir, mv,cp (T2)

**UNIT – II** **(13 Lectures)**

**PROCESS MANAGEMENT:** Process concepts, operations on processes, IPC, Process Scheduling, Multithreaded programming (T1: Ch-3, 4, 5).

UNIX Commands- ps, wait, exec, fork, kill, & (background process), pipe. (T2)

**CONCURRENCY AND SYNCHRONIZATION:** Process synchronization, critical section problem, Peterson's solution, synchronization hardware, semaphores, classic problems of synchronization, readers and writers problem, dining philosopher's problem, monitors (T1: Ch-6).

**UNIX SYSTEM CALLS-**msgget(),msgsnd(), msgrcv(), msgctl(), shmget(), shmat(), shmctl(), semop(), semget(), semctl(). (T2)

**UNIT – III** **(13 Lectures)**

**DEADLOCKS:** System model, deadlock characterization, deadlock prevention, avoidance, detection and recovery from deadlock. (T1: Ch-7)

**MEMORY MANAGEMENT:** Swapping, contiguous memory allocation, paging, structure of the page table, segmentation, virtual memory, demand paging, page-replacement algorithms, allocation of frames, thrashing. (T1: Ch-8, 9)

**UNIT – IV** **(12 Lectures)**

**FILE SYSTEM:** Concept of a file, access methods, directory structure, file system mounting, file sharing, protection. File system implementation: file system structure, file system implementation, directory implementation, allocation methods, free-space management, efficiency and performance (T1: Ch-10, 11)

UNIX commands- grep, head, tail, sort, cut, find, file locking using fcntl. (T2)

**I/O SYSTEM:** Mass storage structure - overview of mass storage structure, disk structure, disk attachment, disk scheduling algorithms, swap space management, stable storage implementation, tertiary storage structure (T1: Ch-12, 13).

UNIX Redirections- >,<,>>,<<, du, df, ulimit. (T2)

**UNIT – V** **(12 Lectures)**

**PROTECTION:** Goals of protection, principles of protection, domain of protection access matrix, implementation of access matrix, access control, revocation of access rights. (T1: Ch-13)

**SECURITY:** The security problem, program threats, system and network threats cryptography as a security tool, user authentication-strengthening of password using salt in UNIX, implementing security defenses, fire walling to protect systems(TB-1, ch 18). UNIX commands-chmod, access (), umask. (T2)

**TEXT BOOKS:**

1. Abraham Silberschatz, Peter Baer Galvin, Greg Gagne (2009), *Operating System Concepts*, 8<sup>th</sup> Edition, Wiley India Private Limited, New Delhi.
2. Sumitabha Das (2006), *UNIX Concepts and Applications*, 4<sup>th</sup> Edition, McGraw-Hill Education.

**REFERENCE BOOKS:**

1. Stallings(2006), *Operating Systems, Internals and Design Principles*, 5<sup>th</sup> Edition, Pearson Education, India.

2. Andrew S. Tanenbaum (2007), *Modern Operating Systems*, 2<sup>nd</sup> Edition, Prentice Hall of India, India.
3. Deitel & Deitel (2008), *Operating systems*, 3<sup>rd</sup> Edition, Pearson Education, India.
4. Dhamdhare (2008), *Operating Systems*, 2<sup>nd</sup> Edition, Tata Mc graw Hill, New Delhi.
5. Paul Love, Joe Merlino, Craig Zimmerman, Jeremy C. Reed, and Paul Weinstein (2005), *Beginning Unix*, Wiley Publishing, Inc.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE IV Semester

VCE-R15

**DATABASE MANAGEMENT SYSTEMS**

Course Code: A3516

L	T	P	C
4	0	0	4

**Course Overview:**

This course introduces the core principles and techniques required in the design and implementation of database systems. This course focus on relational database management systems, including database design theory: E-R modeling, data definition and manipulation languages, database security and administration. It also covers essential DBMS concepts such as: Transaction Processing, Concurrency Control and Recovery and various types of databases like distributed database, and intelligent database, Client/Server. Students undertake a semester project to design and build a simple database system and demonstrate competence with the fundamental tasks involved with modeling, designing, and implementing a DBMS. It also provides students with theoretical knowledge and practical skills in the use of databases and database management systems in information technology applications.

**Prerequisite(s):** Object oriented Programming (A3509)  
Discrete Mathematical Structures (A3505)

**Course Outcomes:**

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

- CO1. Design and implement a database schema for a given problem domain.
- CO2. Construct Queries in Relational algebra, relational calculus and SQL.
- CO3. Apply Normalization techniques to reduce data redundancy in data base.
- CO4. Analyze various transaction control and recovery methods to keep data base consistent.
- CO5. Construct the file of data records by using appropriate storage and access structure.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSEIV Semester

VCE-R15

**DATABASE MANAGEMENT SYSTEMS**

Course Code: A3516

L	T	P	C
4	0	0	4

**SYLLABUS**

**UNIT – I** **(15 Lectures)**

**INTRODUCTION:** History of database systems, introduction to database management systems, database system applications, database systems versus file systems, view of data, data models, database languages- DDL & DML commands and examples of basic SQL queries, database users and administrators, transaction management, database system structure. (T2: Ch-1)

**DATABASE DESIGN:** Introduction to database design and E-R diagrams, entities, attributes and entity sets, relationships and relationship sets, additional features of the E-R model, conceptual design with the E-R model, conceptual design for large enterprises. (T1: Ch-2)

**UNIT – II** **(15 Lectures)**

**THE RELATIONAL MODEL:** Introduction to the relational model, integrity constraints over relations, enforcing integrity constraints, querying relational data, logical database design: E-R to relational, introduction to views, destroying/altering tables and views. (T1: Ch-3)

**RELATIONAL ALGEBRA AND CALCULUS:** Preliminaries, relational algebra operators, relational calculus - tuple and domain relational calculus. (T1: Ch-4)

**SQL:** Overview, the form of a basic SQL query, union, intersect and except operators, nested queries, aggregate operators, null values, complex integrity constraints in SQL, cursors, triggers and active databases, designing active databases. Introduction to PL/SQL. (T1: Ch-5)

**UNIT – III** **(10 Lectures)**

**SCHEMA REFINEMENT AND NORMAL FORMS:** Introduction to schema refinement, functional dependencies, reasoning about FDs. Normal forms: 1NF, 2NF, 3NF, BCNF, properties of decompositions, normalization, schema refinement in database design, other kinds of dependencies: 4NF, 5NF, DKNF, case studies. (T1: Ch-19)

**UNIT – IV** **(12 Lectures)**

**TRANSACTIONS MANAGEMENT:** Transaction concept, transaction state, implementation of atomicity and durability, concurrent executions, Anomalies due to interleaved execution of transactions, serializability, recoverability, implementation of isolation. (T2: Ch-14)

**CONCURRENCY CONTROL AND RECOVERY SYSTEM:** Concurrency control - lock based protocols, time-stamp based protocols, validation based protocols, deadlock handling. (T2: Ch-15)

Recovery system – failure classification, recovery and atomicity, log-based recovery, shadow paging, recovery with concurrent transactions, ARIES algorithm. (T2: Ch-16)

**UNIT – V** **(8 Lectures)**

**OVERVIEW OF STORAGE AND INDEXING:** Data on external storage, file organizations and indexing, index data structures, comparison of file organizations, RAID. (T1: Ch-8, 9)

Tree structured indexing - intuition for tree indexes, indexed sequential access method (ISAM), B+ Trees - a dynamic tree structure. (T1: Ch-10)

**TEXT BOOK(S):**

1. Raghurama Krishnan, Johannes Gehrke (2007), *Database Management Systems*, 3<sup>rd</sup> Edition, Tata McGraw-Hill, New Delhi, India.
2. Abraham Silberschatz, Henry F. Korth, S. Sudarshan (2010), *Database System Concepts*, 6<sup>th</sup> Edition, McGraw- Hill, New Delhi, India.

**REFERENCE BOOK(S):**

1. Elmasri Navate (2014), *Fundamentals of Database Systems*, Pearson Education, India.



**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSEIV Semester

VCE-R15

**OPERATING SYSTEMS LAB**

Course Code: A3517

L	T	P	C
0	0	3	2

**Course Overview:**

This Laboratory covers the major methods of inter process communications (IPC), which is the basis of all client / server applications under UNIX, Linux utilities. There will be extensive Programming exercises in shell scripts. It also emphasizes various programming concepts in IPC, multithreaded programming and socket programming.

**Prerequisite(s):** Object Oriented Programming through Java Lab (A3511)

**Course Outcomes:**

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

CO1. Use file handling utilities / commands of UNIX operating system.

CO2. Apply inter process communication mechanisms of UNIX.

CO3. Compare various CPU scheduling algorithms performance.

CO4. Analyze whether a system is in safe state or not using deadlock avoidance algorithm.

CO5. Apply memory management strategies.

CO6. Use file management system calls to simulate UNIX commands

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSEIV Semester

VCE-R15

**OPERATING SYSTEMS LAB**

Course Code: A3517

L	T	P	C
0	0	3	2

**LIST OF EXPERIMENTS**

**Week – 1 (UNIX Utilities)**

1. a) Study and Practice on various commands like man, cp, mv, ln, rm, unlink, mkdir, rmdir.

**Week-2 (Inter process communication)**

2. a) Implement Two way process communication using pipes  
b) Implement Two way process communication using named pipes

**Week – 3 (Inter process communication)**

3. a) Implement message queue form of IPC.  
b) Implement shared memory and semaphore form of IPC.

**Week – 4 (Process Scheduling)**

4. Simulate the following CPU Scheduling Algorithms using C program:  
a) FCFS  
b) SJF

**Week-5 (Process Scheduling)**

5. Simulate the following CPU Scheduling Algorithms using C program:  
a) Priority.  
b) Round Robin.

**Week-6 (Dead lock Avoidance)**

6. Simulate Bankers algorithm for Deadlock Avoidance using C program.

**Week-7 (Dead lock Detection)**

7. Simulate Bankers Algorithm for deadlock Prevention using C program.

**Week -8 (Memory Management)**

8. Simulate all FIFO Page Replacement Algorithm using C program.

**Week-9 (Memory Management)**

9. Simulate all LRU Page Replacement Algorithms using C program.

**Week 10 (Memory Management)**

10. Simulate Paging Technique of Memory Management using C program.

**Week-11: (Unix Utilities)**

11. Study and Practice on various commands like catnl, uniq, tee, pg, comm, cmp, diff, tr, tar, cpio.

**Week-12: (Unix Utilities)**

12. mount, umount, find, umask, ulimit, , tail, head , sort, grep, egrep, fgrep cut, paste, join, du, df , ps, who, w.

**Week – 13 (Simulation of UNIX commands)**

13. a) Simulate head command.  
b) Simulate tail command.

**REFERENCE:**

2. Sumitabha Das (2007), Your Unix The Ultimate Guide, Tata Mc Graw Hill, New Delhi, India.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSEIV Semester

VCE-R15

**DATABASE MANAGEMENT SYSTEMS LAB**

Course Code: A3518

L	T	P	C
0	0	3	2

**Course Overview:**

This course introduces the core principles and techniques required in the design and implementation of database systems. This course focuses on relational database management systems including data definition language, data manipulating languages. SQL is used to share and manage data, particularly the data that is found in relational database management systems - where the data is organized in tables, and where multiple files, each containing tables of data, may be related together by a common field. This course will cover the Oracle 10g PL/SQL programming language. Student will learn to control data sharing and learn to develop triggers, procedures, functions, cursors.

**Prerequisite(s):**NIL

**Course Outcomes:**

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

- CO1. Design and implement a database schema for a given problem domain.
- CO2. Formulate a query to retrieve information from database.
- CO3. To implement database security and maintenance.
- CO4. Normalize a database.
- CO5. Applying enforce integrity constraints on a database.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSEIV Semester

VCE-R15

**DATABASE MANAGEMENT SYSTEMS LAB**

Course Code: A3518

L	T	P	C
0	0	3	2

**LIST OF EXPERIMENTS**

**1. CASE STUDY: EMPLOYEE AND DEPARTMENT DATABASE:**

The BlueX Company pvt.ltd has maintaining Employee information contains employee details .The company has four departments. Any employee working in the company belongs to any one of the department. An employee joined in company above 25 years only. The company may give commission for every employee if and only if more than 2 years experience. Construct the database design with that there is no redundancy.

**Answer to the following Queries**

1. Select the details of employee to get 3rd Maximum salaries?.
2. Update the employee name = 'clark' to "james" and increase the salary by 10% with shifting him to cse department.
3. List all employees who have a salary greater than 15000 in the order of department number
4. Display first two employee who works in all departments and having salary greater than 30000
5. Display the total salary of a employee in deptno wise where more than 2 employees exist.
6. Display the average salary for each different job type within the department.
7. Display the average salary for all departments employing more than three people.
8. Display employees who earn more than the lowest salary in department with number 30.
9. Find all employees whose department is not in the DEPT table?
10. List employee details who earn a salary greater than the average for their department and sort records with respect to department number?
11. Find employee name employee number, and their salary who were hired after 01/02/97.
12. Deleting duplicate record from a data base using group by clause

**2. CASE STUDY: AIRLINE FLIGHT INFORMATION**

The Employee relation describes pilots and other kinds of employees as well as every pilot certified for some aircraft, and only pilots are certified to fly. Write a CREATE TABLE statement for the FLIGHTStable. Choose data types appropriate for the DBMS used in your course. Flights table have fno, each flight have specific departure place, departure time and arrival place, arrival time. Distance is the numeric data travelled by flight. Price represents cost to travelled on specific flight. The currency symbols are not stored in the database. Write a CREATE TABLE statement for the AIRCRAFTtable .Each aircraft have aid and a name and cruising range. The name column required (not null). Write a CREATE TABLE statement for the CERTIFIED table have employee number and aircraft id. Take appropriate data types for these columns. Write a CREATE TABLE statement for the EMPLOYEEtable have employee number, ename and their salary. Understand above description and create primary key and foreign key for appropriate columns.

**Answer for the following queries**

1. Find the names of aircraft such that all pilots certified to operate them earn more than 80,000
2. For each pilot who is certified for more than three aircraft, find the eid and the maximum cruising range of the aircraft that he (or she) is certified for.
3. Find the names of pilots whose salary is less than the price of the cheapest route from Los Angeles to Honolulu.
4. For all aircraft with cruising range over 1,000 miles, find the name of the aircraft and the average salary of all pilots certified for this aircraft
5. Find the names of pilot's certi\_ed for some Boeing aircraft?

6. Find the aids of all aircraft that can be used on routes from Los Angeles to Chicago.
7. Identify the flights that can be piloted by every pilot who makes more than \$100,000.(Hint: The pilot must be certi\_ed for at least one plane with a su\_ciently large cruising range.)
8. Print the enames of pilots who can operate planes with cruising range greater than 3,000miles, but are not certi\_ed on any Boeing aircraft.
  
9. A customer wants to travel from Madison to New York with no more than two changes of flight. List the choice of departure times from Madison if the customer wants to arrive in New York by 6 p.m
10. Compute the difference between the average salary of a pilot and the average salary of all employees (including pilots)..
11. Print the name and salary of every non pilot whose salary is more than the average salary for pilots

### **CASE STUDY: SAILORS, RESERVES, BOATS DATA BASE**

In Database user has to maintain sailors information with sailors sid, sailor name and every sailor age is more than 25 years and has a rating i.e (rating  $\geq 10$ ),the sailors reserved the boats for shipment of goods. Each boat identified by bid, name, color. Every sailors may reserve more than one boat. Reservation can notice based on the date.

#### **Answer to the following Queries**

1. Find the sid's , names of sailors who have reserved all boats and having age greater than 30.
2. Find the sids ,names of sailors who have reserved a red or a green boat
3. Find the sids of sailors with age over 20 who have not reserved a red boat
4. Compute increments for the rating of sailors who have sailed two different boats on the same day
5. Find the average age of sailors who are of voting age (i.e., at least 18 years old) for each rating level that has at least two sailors.
6. Find those ratings for which the average age of sailors is the minimum overall ratings
7. Find sailors whose rating is better than some sailor called "Horatio"
8. Find sailors whose rating is better than every sailor called "Horatio"
9. Find the names of sailors who are older than the oldest sailor with a rating of 10
10. Find the average age of sailors for each rating level that has at least two sailors

### **3. CASE STUDY :BANK DATABASE**

A bank has many branches and a large number of customers. A customer can open different kinds of accounts with the bank. The bank keeps track of a customer by his SSN, name, address, and phone number. Age is used as a factor to check whether he is a major. There is different type of loans, each identified by a loan number. A customer can take out more than one type of loan, and all branches can give loans. Loans have a duration and interest rate. The account holder can enquire about the balance in his account; create a data base design for the bank. Make any suitable assumptions.

#### **Answer to the following Queries:**

1. Give the name of the customer having maximum deposit among deposits of city "Harrison" for branch "Perry ridge".
2. Give the names of cities in which the maximum number of branches located.
3. Add amount "100" to the account of all those depositors who are having the highest deposit amount in their respective branches.
4. Transfer the amount "1000" from the account of \_\_\_ to the account of \_\_\_ id both is having the same branch.
5. Find the names ,street, addresses and cities of residence of all employees who work for First Bank Corporation and earn more than 10000/-
6. Give all loans numbers for a loan made at the Perryidge branch with loan amount greater than 1200

7. Find customer name, loan number, loan amount branch name for all loans
8. Find customer name, loan number , loan amount branch name for all loans given by "perryridge" branch
9. Find names of all branches that have asserts greater than all branches located in Brooklyn
10. Find names of all branches that have asserts greater than at least one branch located in Brooklyn.
11. Find average balance for each customer who lives in Harrison and has at least 2 accounts
12. Delete borrower of branches having the minimum number of customers.

## 5. CASE STUDY: INVENTORY MANAGEMENT SYSTEM DATA BASE

There are many items in a departmental store, which are sold to customer and purchased from supplier. An order is placed by the customer-required details, which are listed below:

Item number

- Part number
- quantity

The order processing executes, look up the stock of each item (parts) is available or not then order fulfilled by the management of departmental store. The system periodically checks the stock of each item if it is found below the reorder level then purchase order placed to the supplier for that item, if the supplier is not able to supply whole order then rest of quantity supplied by the another supplier. After fulfilled the formalities, bill generated by the system and sent to the customer. Create a database design to maintained by the management for whole process is being done

### Answer to the following Queries

1. Display supplier names for supplier who supply at least one part supplied by supplier s2
2. Get supplier names for supplier who supply all parts
3. Get supplier names for suppliers who do not supply part P2
4. Find supplier numbers for suppliers who supply at least all those parts supplied by supplier S2
5. Get a part numbers for parts that either weight more than 16 pounds, or are supplied by supplier S2, or both.
6. For each part , get the pat number and the total shipment quantity
7. For each supplier , get the supplier number and the total number of parts supplied
8. Get all Paris of supplier numbers such that the who suppliers are located in the same city
9. Get color and city for "non Paris" parts with weight greater than ten
10. Get part number for all parts supplied by more than one supplier
11. Get supplier numbers for supplier with less than the current maximum status in the "s" table
12. Get supplier names for supplier who supply at least one brown part

### PL/SQL PROGRAMS

1. Write the PL/SQL program to retrieve the data from emp table?
2. The L& T Pvt.ltd Company has maintaining Employee information contains employee details .The company has four departments. Any employee working in the company belongs to any one of the department. Write a PL/SQL block to insert a record in emp table and update the salaries of Blake and Clark by 2000 and 1500.Thn check to see that the total salary does not exceed 20000. If total >20000thn undo the updates made to salaries of Blake and clerk?
3. A table Product attributes pno, pname, sales price . A table old price attributes pno, old sales price. If the price of product pool1 is <4000 then change the price to 4000. The price

change is to be recorded in the old price table with product number, date on which the price was last changed?

### **CURSORS**

1. Write a PL/SQL block that will display the name, dept no, salary of fist highest paid employees.
2. Update the balance –stock in the item master table each time a transaction takes place in the item transaction table. The change in item master table depends on the itemID is already present in the item master then update operation is performed to decrease the balance stock by the quantity specified in the item transaction in case the itemid is not present in the item master table then the record is inserted in the item master table.
3. The table trans has the following structure acno, transtype, trans date. The table bank has acno, bal, minbal. Assuming that the same acno exists in both tables update the bank table. If trans.type='d' then Balance=bank.balance + trans.amount. if transtype='w' then balance = bank.balance-trans.amount . Take precaution in case of withdrawals.
4. Write a PL/SQL block that will display the name, dept no ,salary of fist highest paid employees.
5. Display sailors information using cursor. if the sailor is not available insert the sailors details
6. Create pl/sql program to insert and update record in customer table using cursors

### **FUNCTIONS AND PROCEDURES USING CONTROL STRUCTURES**

1. Create a function to find the factorial of a given number and hence find NCR?
2. Write a PL/SQL block to pint prime Fibonacci series using local functions.
3. Create a procedure to find the lucky number of a given birth date?

### **Triggers**

1. PL/SQL program for deletion of row from employee table using Triggers.
2. PL/SQL program to update a row from employee table using Triggers.

### **REFERENCE BOOK(S):**

1. Raghurama Krishnan, Johannes Gehrke (2007), *Database Management Systems*, 3<sup>rd</sup> Edition, Tata McGraw-Hill, New Delhi, India.
2. Abraham Silberschatz, Henry F. Korth, S. Sudarshan (2010), *Database System Concepts*, 6<sup>th</sup> Edition, McGraw- Hill, New Delhi, India.
3. Elmasri Navate (2014), *Fundamentals of Database Systems*, Pearson Education, India.

# **SYLLABI FOR V SEMESTER**



**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE V Semester

VCE-R15

**COMPUTER GRAPHICS**

Course Code: A3602

L	T	P	C
3	1	0	3

**Course Overview:**

This course focuses on giving introduction about computer graphics and its wide range of application areas. It also gives information about the graphics hardware, working of hardware and software which are needed for producing graphics. This course gives information about basic algorithms for drawing basic shapes which includes lines, circles, ellipse, also for filling shapes with colors and applying 2D, 3D transformations on them. Different types of objects which are used for representing 2D-objects, 3D-objects in computer are mentioned here. Viewing mechanism of 2D-objects, 3D-objects is also taught and also focuses on Animation.

**Prerequisite(s):**

- Computer Programming(A3501)
- Mathematics-I (A3001)

**Course Outcomes:**

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

- CO1. Identify computer graphics applications, computer graphics Hardware and software.
- CO2. Extend basic geometric primitives algorithms for producing custom shapes and Compute 2D or 3D transformations for doing manipulations on objects.
- CO3. Combine basic transformations to produce composite transformations and compare the 2D, 3D viewing process and can select the appropriate clipping techniques for producing view of objects.
- CO4. Analyze the curve generation techniques and Illustrate 3D rendering process, various types of projection methods available.
- CO5. Utilize the efficient visible surface detection algorithms, projection concepts in rendering a view of scene of objects.
- CO6. Interpret and Create the animation sequences of motion by using animation techniques like key frame animations, Interpolation techniques etc.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSEV Semester

VCE-R15

**COMPUTER GRAPHICS**

Course Code: A3602

L	T	P	C
3	1	0	3

**SYLLABUS**

**UNIT-I**

**(12 Lectures)**

**INTRODUCTION:** Application areas of computer graphics, overview of graphics systems, video-display devices and raster-scan systems, random scan systems, graphics monitors, work stations and input devices, graphics standards.

**UNIT-II**

**(12 Lectures)**

**OUTPUT PRIMITIVES:** Points and lines, line drawing algorithms, midpoint circle and ellipse algorithms. Filled area primitives - scan line polygon fill algorithm, boundary fill and flood fill algorithms.

**UNIT-III**

**(10 Lectures)**

**2D - GEOMETRICAL TRANSFORMS:** Translation, scaling, rotation, reflection and shear transformations, matrix representations and homogeneous coordinates, composite transforms transformations between coordinate systems.

**2D - VIEWING:** The viewing pipeline, viewing coordinate reference frame, window to view-port coordinate transformation, viewing functions, Cohen-Sutherland and Cyrus-beck line clipping algorithms, Sutherland– Hodgeman polygon clipping algorithm.

**UNIT-IV**

**(10 Lectures)**

**3D - GEOMETRIC TRANSFORMATIONS:** Translation, rotation, scaling, reflection and shear transformations, composite transformations.

**3D - VIEWING:** Viewing pipeline, viewing coordinates, view volume and general projection transforms and clipping.

**3D - OBJECT REPRESENTATION:** Polygon surfaces, quadric surfaces, spline representation, Hermite curve, Bezier curve and B-spline curves, Bezier and B-spline surfaces.

**UNIT-V**

**(11 Lectures)**

**VISIBLE SURFACE DETECTION METHODS:** Classifications, back face detection, depth buffer, scan line and depth sorting.

**COMPUTER ANIMATION:** Design of animation sequence, general computer animation functions, raster animation, computer animation languages, key frame systems, motion specifications.

**TEXT BOOK:**

1. Donald Hearn, M. Pauline Baker (2011), *Computer Graphics with Open GL*, 3rd edition, Pearson Education, India.

**REFERENCE BOOK(S):**

1. David F. Rogers (1998), *Procedural elements for Computer Graphics*, 2nd edition, Tata Mc Graw Hill, New Delhi, India.
2. Steven Harrington (1987), *Computer Graphics*, 2nd edition, Tata Mc Graw Hill, New Delhi, India.
3. Zhigand xiang, Roy Plastock (2000), *Computer Graphics*, 2nd edition, Schaum's outlines, Tata

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE V Semester

VCE-R15

**WEB TECHNOLOGIES**

**Course Code: A3601**

L	T	P	C
4	1	0	4

**Course Overview:**

This course introduces students to fundamental web technologies such as HTTP, CSS, XML, PHP and Server-side scripting. The course teaches students how to use some of these technologies to develop static and dynamic web pages with an emphasis on client-side scripts. The course explains the differences between client-side and server-side Web development, and how to build simple applications using servlets, jsp and JDBC. The course also covers current Web “standards” and future W3C recommendations.

**Prerequisite(s):**

- Computer Programming (A3501)
- Object Oriented Programming (A3509)

**Course Outcomes:**

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

CO1. Apply various HTML tags used to design static web pages.

CO2. Apply CSS and JavaScript Constructs to perform Client side validation and designing of dynamic web pages.

CO3. Apply various PHP construct to develop server side applications and also familiar of transporting data among applications using XML.

CO4. Understand how to configure Web servers and deployment of applications.

CO5. Design server side; Database and MVC based applications using Servlet, JSP and JDBC.

CO6. Understand Handling of asynchronous requests using AJAX programming.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE V Semester

VCE-R15

**WEB TECHNOLOGIES**

Course Code: A3601

L T P C  
4 1 0 4

**SYLLABUS**

**UNIT-I**

**(10 Lectures)**

**INTRODUCTION TO WEB TECHNOLOGY:** Web pages-types, plug-ins, tiers, introduction to HTML, common Tags, Lists, Tables, Images, Forms, Frames, and Cascading Style Sheets. (T1)

**JAVA SCRIPT:** Objects in Java Script, Dynamic HTML with Java Script. (T1)

**UNIT-II**

**(9 Lectures)**

**INTRODUCING PHP:** Creating PHP script- Variables, Constants, Data types, Operators, Control Structures, Arrays, Functions. Working with forms and Database. (T1)

**EXTENSIBLE MARKUP LANGUAGE:** XML-Documents, DTD, XML schema, XSLT, XML parsers-DOM, SAX. (T1)

**UNIT-III**

**(10 Lectures)**

**JAVA BEANS:** Introduction to Java Beans, Advantages of Java Beans, JDK Introspection, Using Bound properties, Bean Info Interface, Constrained properties Persistence, Customizes, and Java Beans API. (T2) **WEB SERVERS AND SERVLETS:** Tomcat web server, Introduction to Servlets: Lifecycle of a Servlet, JSDK, The Servlet API, The javax.servlet Package, Reading Servlet parameters, and Reading Initialization parameters. The javax.servlet, http package, Handling Http Request & Responses, Using Cookies-Session Tracking, Security Issues, Accessing a Database from Servlet. (T2)

**UNIT-IV**

**(11 Lectures)**

**INTRODUCTION TO JSP:** The Problem with Servlet. The Anatomy of a JSP Page, JSP Processing. JSP Application Design with MVC. (T3)

**JSP APPLICATION DEVELOPMENT:** Generating Dynamic Content, Using Scripting Elements Implicit JSP Objects, Declaring Variables and Methods Error Handling and Debugging Sharing Data between JSP pages, Deploying JAVA Beans in a JSP Page, Accessing a Database from a JSP Page. (T3)

**UNIT-V**

**(10 Lectures)**

**DATABASE ACCESS:** Database Programming using JDBC, Studying Javax.sql.\* package, Application – Specific Database Actions. (T2)

**INTRODUCTION TO AJAX:** Improving web page performance using Ajax, Programming in Ajax. (T4)

**TEXT BOOKS:**

1. *Web Technologies – Black Book*, Kogent Learning solutions Inc sol. Dreamtech press.
2. Patrick Naughton and Herbert Schildt, *The complete Reference Java 2*, 7<sup>th</sup> Edition by. TMH
3. Hans Bergsten, *Java Server Pages*, SPD O'Reilly
4. Wang, Katila, *An Introduction to Web Design + Programming*, CENGAGE

**REFERENCE BOOKS:**

1. *Web Technologies*, Uttam K Roy - Oxford
2. *Head first Java* – Kathy seirra -Orielly –
3. *Core SERVLETS ANDJAVASERVER PAGES VOLUME 1: CORE TECHNOLOGIES* By Marty Hall and Larry Brown Pearson
4. *Internet and World Wide Web – How to program* by Dietel and Nieto PHI/Pearson Education Asia.
5. *Murach's beginning JAVA JDK 5*, Murach, SPD
6. *An Introduction to web Design and Programming* –Wang-Thomson

7. Beginning Web Programming-Jon Duckett WROX.
8. Programming the World Wide Web – Robert W Sebesta. Pearson publications. Fourth edition.
9. Web Technologies. TCP/IP Architecture and Java programming- Godbole, Atul Kahate- 2<sup>nd</sup> ed, TMH
10. Web Technologies, A developer's Perspective, N P Gopalan, Akhilandeswari, PHI.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSEV Semester

VCE-R15

**SOFTWARE TESTING METHODOLOGIES**

Course Code: A3612

L	T	P	C
3	0	0	3

**Course Overview:**

This course presents a comprehensive study of software testing and quality control concepts, principles, methodologies, management strategies and techniques. The emphasis here is on understanding software testing process, planning, strategy, criteria, and testing methods, as well as software quality assurance concepts & control process. It covers the various subjects, including test models, test design techniques (black box and white-box testing techniques), integration, regression, and system testing methods.

**Prerequisite(s):**

- Computer Programming (A3501)
- Object Oriented Programming (A3509)
- Software Engineering (A3514)

**Course Outcomes:**

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

- CO1. To understand the purpose of testing, types of errors, fault models and various test process.
- CO2. To understand adequacy assessment using control flow and path testing techniques.
- CO3. Analyze various transactions, data and domain test strategies to work with various functionalities and various paths and path expressions to reduce the computational cost.
- CO4. Analyze various states, transitions and graph matrices regarding to state and graph matrices.
- CO5. Design test cases for the real world problems effectively by following standards.
- CO6. Apply appropriate software testing tools, techniques and methods for more effective systems during test planning and execution phases of software development project and risk analysis.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSEV Semester

VCE-R15

**SOFTWARE TESTING METHODOLOGIES**

Course Code: A3612

L	T	P	C
3	0	0	3

**SYLLABUS**

**UNIT – I** **(12 Lectures)**

**INTRODUCTION AND THE TAXONOMY OF BUGS:** Purpose of testing, some dichotomies, a model for testing, the consequences of bugs, taxonomy for bugs, some bug statistics.

**FLOW GRAPHS AND PATH TESTING:** Path testing basics, predicates, path predicates and achievable paths, pathsensitizing, path instrumentation, implement and application of path testing.

**UNIT – II** **(13 Lectures)**

**TRANSACTION FLOW TESTING AND DATA FLOW TESTING:** Transaction flows, transaction flow testing techniques, dataflow testing basics, data flow testing strategies, application, tools and effectiveness.

**DOMAIN TESTING:** Domains and paths, nice and ugly domains, domain testing, domains and interfaces testing, domains and testability.

**UNIT – III** **(14 Lectures)**

**PATHS, PATH PRODUCTS AND REGULAR EXPRESSIONS:** Path products and path expressions, a reduction procedure, applications, regular expressions and flow anomaly detection.

**LOGIC BASED TESTING:** Motivational overview, decision tables, and path expressions again, KV charts, Specifications.

**UNIT – IV** **(12 Lectures)**

**STATES, STATE GRAPHS AND TRANSITION TESTING:** State graphs, good state graphs and bad, state testing, Testability tips.

**GRAPH MATRICES AND APPLICATIONS:** Motivational overview, the matrix of a graph, relations, the powers of a matrix, node reduction algorithm, building tools

**UNIT – V** **(12 Lectures)**

**DEFECT MANAGEMENT:**

Introduction, Defect classification, Defect Management process (approach), Defect Life Cycle, Defect Template, Management process (Fixing and root cause of defect), Estimate expected impact of defect, why defect management needs a risk discussion, techniques for finding defects, reporting a defect.

**TESTING TOOLS: Introduction,** features of a testing tool, guidelines for selection a tool, tools and skills of a tester, static testing tools, Dynamic testing tools, Advantages of Using testing tool, disadvantages of using testing tools, when to use automated testing tool, Testing using automated testing tools, Difficulties while introducing new tools, Process of procurement of COTS, procurement of tools from contractor, Advantages of the tools developed by external organizations, Contracting software, process of procurement of tools from contractor.

**TEXT BOOK(S):**

1. Boris Beizer (2004), *Software Testing Techniques*, 2nd edition, Dreamtech Press, New Delhi, India.
2. M.G. Limaye (2009), *Software Testing: Principles, Techniques and Tools*, the McGra Hill, New Delhi, India

**REFERENCE BOOK(S):**

1. William E. Perry (2006), *Effective methods of Software Testing*, 3rd edition, John Wiley Edition, US A.
2. Meyers (2004), *Art of Software Testing*, 2nd edition, John Wiley, New Jersey, USA.



**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSEV Semester

VCE-R15

**COMPUTER NETWORKS**

Course Code: A3519

L	T	P	C
4	0	0	4

**Course Overview:**

The growing importance of Internetworking in recent years and their use in every field has made Computer Networks a central issue for modern systems. The course introduces the basic concepts of networks. The main objective of the course is to enable students to know the functions of various layers of a network model. Topics covered in the course include Introduction to networks, Physical layer, Data link layer, Medium access sub layer, Network layer, Transport layer and Application layer.

**Prerequisite(s):**

- Computer Organization and Microprocessors (A3507)
- Operating Systems (A3515)

**Course Outcomes:**

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

- CO1. To understands the terminology and concepts of OSI reference model and the TCP/IP reference model and functions of each layer.
- CO2. To identify the different types of network topologies, protocols, network devices and their functions within a network
- CO3. To master the concepts of protocols, networks interfaces, and design/performance issues in LAN and WAN
- CO4. To understand and building the skills of sub netting and routing mechanisms, familiarity with basic protocols of computer networks and how they can be used to assist in network design and implementation
- CO5. Specify and identify deficiencies in existing protocols, and then go on to formulate new and better protocols

**VARDHAMAN COLLEGE OF ENGINEERING**  
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B. Tech. CSE V Semester

VCE-R15

**COMPUTER NETWORKS**

Course Code: A3519

L	T	P	C
4	0	0	4

**SYLLABUS**

**UNIT-I**

**(9 Lectures)**

**INTRODUCTION:** Network applications, network hardware, network software, reference models: OSI, TCP/IP, Internet, Connection oriented network - X.25, Frame Relay. (T1: Ch-1)

**THE PHYSICAL LAYER:** Theoretical basis for communication, guided transmission media, wireless transmission, mobile telephone system. (T1: Ch-2)

**UNIT-II**

**(11 Lectures)**

**THE DATA LINK LAYER:** Design issues, Error detection and correction, Elementary data link protocols, Sliding window protocols, example data link protocols - HDLC, the data link layer in the internet. (T1: Ch-3)

**THE MEDIUM ACCESS SUBLAYER:** Channel allocations problem, multiple access protocols, Ethernet. (T1Ch-4)

**UNIT-III**

**(14 Lectures)**

**THE NETWORK LAYER:** Network layer design issues, Routing algorithms, Congestion control algorithms, Internetworking, The Network layer in the internet (IPv4 and IPv6), Quality of Service. (T1: Ch-5)

**UNIT-IV**

**(9 Lectures)**

**THE TRANSPORT LAYER:** Transport service, elements of transport protocol, Simple Transport Protocol, Internet transport layer protocols: UDP and TCP. (T1: Ch-6)

**UNIT-V**

**(9 Lectures)**

**THE APPLICATION LAYER:** Domain Name System, Electronic Mail, World Wide Web: Architectural overview, Dynamic web document and http. (T1: Ch-7)

**APPLICATION LAYER PROTOCOLS:** Simple Network Management Protocol, File Transfer Protocol, Simple Mail Transfer Protocol, Telnet. (T1: Ch-7)

**TEXT BOOK(S):**

1. A.S. Tanenbaum (2011), *Computer Networks*, 5<sup>th</sup> Edition, Pearson Education/ PHI. New Delhi, India.
2. Behrouz A. Forouzan (2006), *Data communication and Networking*, Tata McGraw-Hill, India.

**REFERENCE BOOK(S):**

1. Michael A. Gallo, William M. Hancock, (2007), *Computer Communications and Networking Technologies*, Cengage Learning.
2. Thomson Fitz Gerald, Dennis (2009), *Business Data Communications & Networking*, 10<sup>th</sup> Edition, John Willeysons, USA.
3. William Stallings (2006), *Cryptography and Network Security*, 4<sup>th</sup> Edition, Pearson Education, India.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE V Semester

VCE-R15

**COMPILER DESIGN**

Course Code: A3520

L	T	P	C
3	1	0	3

**Course Overview:**

This course deals with the theory and practice of compiler design Introduction to compiling, structure of simple one-step compilers: syntax and lexical analysis, parsing, introduction to type checking, intermediate code generation, introduction to code generation and optimization. Discussion about tools for compilers design (e.g. Lex and Yacc).

**Prerequisite(s):** NIL

**Course Outcomes:**

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

- CO1. Design and implement lexical Analyzer for a simple programming language
- CO2. Design and implement syntax Analyzer using top down or bottom up techniques.
- CO3. Analyze semantic analyzer for a simple programming language.
- CO4. Compare different intermediate code generation forms.
- CO5. Analyze machine dependent and independent code optimizer techniques.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE V Semester

VCE-R15

**COMPILER DESIGN**

Course Code: A3520

L	T	P	C
3	1	0	3

**SYLLABUS**

**UNIT – I**

**(12 Lectures)**

**INTRODUCTION TO COMPILERS:** Definition of compiler, interpreter and its differences, the phases of a compiler, role of lexical analyzer, pass and phases of translation, bootstrapping, LEX-lexical analyzer generator.

**PARSING:** Parsing, role of parser, context free grammar, derivations, parse trees, ambiguity, elimination of left recursion, left factoring, eliminating ambiguity from dangling-else grammar, top-down parsing– backtracking, recursive-descent parsing, predictive parsers, LL(1) grammars.

**UNIT – II**

**(12 Lectures)**

**BOTTOM-UP PARSING:** Definition of bottom-up parsing, handles, handle pruning, stack implementation of shift-reduce parsing, conflicts during shift-reduce parsing, LR grammars, LR parsers-simple LR, canonical LR and Look Ahead LR parsers, error recovery in parsing, parsing ambiguous grammars, YACC-automatic parser generator.

**UNIT – III**

**(12 Lectures)**

**SYNTAX-DIRECTED TRANSLATION:** Syntax directed definition, construction of syntax trees, S-attributed and L-attributed definitions, translation schemes, emitting a translation.

**INTERMEDIATE CODE GENERATION:** Intermediate forms of source programs– abstract syntax tree, polish notation and three address code, types of three address statements and its implementation, syntax directed translation into three-address code, translation of simple statements, Boolean expressions and flow-of-control statements.

**UNIT – IV**

**(12 Lectures)**

**TYPE CHECKING:** Definition of type checking, type expressions, type systems, static and dynamic checking of types, specification of a simple type checker, equivalence of type expressions, type conversions, overloading of functions and operators.

**RUN TIME ENVIRONMENTS:** Source language issues, Storage organization, storage-allocation strategies, access to nonlocal names, parameter passing, symbol tables, and language facilities for dynamic storage allocation.

**UNIT – V**

**(12 Lectures)**

**CODE OPTIMIZATION:** Organization of code optimizer, basic blocks and flow graphs, optimization of basic blocks, the principal sources of optimization, the dag representation of basic block, global data flow analysis.

**CODE GENERATOR:** Machine dependent code generation, object code forms, the target machine, a simple code generator, register allocation and assignment, peephole optimization.

**TEXT BOOK(S):**

1. Alfred V. Aho, Ravi Sethi, Jeffrey D. Ullman (2011), *Compilers–Principles, Techniques and Tools*, Low price edition, Pearson Education.

**REFERENCE BOOK(S):**

1. Alfred V. Aho, Jeffrey D. Ullman (2001), *Principles of compiler design*, Indian student edition, Pearson Education.
2. Kenneth C. Loudon, Thomson (1997), *Compiler Construction– Principles and Practice*, 1<sup>st</sup> edition, PWS Publishing.
3. K.L.P Mishra and N. Chandrashekar (2003), *Theory of computer science- Automata Languages and computation*, 2<sup>nd</sup> edition, PHI.
4. Andrew W. Appel (2004), *Modern Compiler Implementation C*, Cambridge University Press.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE V Semester

VCE-R15

**OBJECT ORIENTED ANALYSIS AND DESIGN**

Course Code: A3607

L	T	P	C
3	1	0	3

**Course Overview:**

This course teaches students the basic principles of object orientation and OO analysis and design. We will use the Unified Process and the Unified Modeling Language (UML) as tools.

**Prerequisite(s):**

- Computer Programming (A3501)
- Object Oriented Programming (A3509)
- Software Engineering (A3514)

**Course Outcomes:**

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

- CO1. Possess an ability to practically apply knowledge software engineering methods, such as object - oriented analysis and design methods with a clear emphasis on UML.
- CO2. Have a working ability and grasping attitude to design and conduct object oriented analysis and design experiments using UML, as well as to analyze and evaluate their models.
- CO3. Have a capacity to analyze and design software systems, components to meet desired needs.
- CO4. Show ability to form and work on multi-disciplinary teams that are able to perform multiple - faceted tasks from domain analysis and understanding to design and develop software systems based on object-oriented thinking. This may also provide an ability to communicate their models and solutions in an effective manner.
- CO5. Display an ability to identify, formulate and solve software development problems: software requirements, specification (problem space), software design, and implementation (solution space).

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE V Semester

VCE-R15

**OBJECT ORIENTED ANALYSIS AND DESIGN**

Course Code: A3607

L	T	P	C
3	1	0	3

**SYLLABUS**

**UNIT – I** **(14 Lectures)**

**INTRODUCTION TO UML:** Importance of modeling, principles of modeling, object oriented modeling, Overview of UML, Conceptual model of the UML, Architecture, Software Development Life Cycle  
**BASIC STRUCTURAL MODELING:** Classes, Relationships, common Mechanisms, Diagrams.

**UNIT – II** **(13 Lectures)**

**ADVANCED STRUCTURAL MODELING:** Advanced classes, advanced relationships, Interfaces, Packages. Class Diagrams: Terms and Concepts, Common modeling techniques, Object Diagrams: Terms, concepts, Common modeling techniques.  
**BASIC BEHAVIORAL MODELING-I:** Interactions, Interaction Diagrams: Terms, Concepts, Common modeling Techniques

**UNIT – III** **(14 Lectures)**

**BASIC BEHAVIORAL MODELING-II:** Use cases, Use case Diagrams: Terms and Concepts, Common Modeling Techniques, Activity Diagrams: Terms and Concepts, Common Modeling Techniques.  
**ADVANCED BEHAVIORAL MODELING:** Events and signals, State machines, Processes and Threads, Time and space, State chart Diagrams: Terms and Concepts, Common Modeling Techniques.

**UNIT – IV** **(12 Lecture)**

**ARCHITECTURAL MODELING:** Components, Terms and Concepts, Common Modeling Techniques, Component Diagrams: Common Modeling Techniques, Deployment, Terms and Concepts, Common Modeling Techniques, Deployment Diagrams: Terms and Concepts, Common Modeling Techniques.

**UNIT – V** **(10 Lectures)**

**SYSTEMS AND MODELS:** Systems, subsystems, models, and views, modeling the architecture of a system, modeling systems of systems.  
**CASE STUDY:** The Unified Library application. Prepare a report on Unified Library Application with the following UML diagrams: Class, Object, Use Case, Interaction, State Chart, Activity, Component, and Deployment diagrams.

**TEXT BOOK(S):**

1. Grady Booch, James Rumbaugh, Ivar Jacobson (1999), *The Unified Modeling Language user guide*, pearson edition.

**REFERENCE BOOK(S):**

1. Atul Kahate (2004), *Object Oriented Analysis and Design*.
2. Hans-Erikson, David Fado Wiley (2009), *UML 2 toolkit*, Wiley Publishing, Inc.
3. Mellir Page-Jone (2004), *Fundamentals of Object Oriented design in UML*.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE V Semester

VCE-R15

**WEB TECHNOLOGIES LAB**

**Course Code: A3603**

L	T	P	C
0	0	3	2

**Course Overview:**

Presenting information over the internet in form of web pages is the best way of reaching to all corners of world. This laboratory aims at giving knowledge about creating web pages and also about different web programming concepts, technologies.

**Prerequisite(s):** NIL

**Course Outcomes:**

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

CO1. Analyze and create web pages using languages like HTML, DHTML, CSS, PHP and JavaScript.

CO2. Design XML Schema and create XML documents and Java Beans.

CO3. Use server side components like Servlets to build dynamic websites.

CO4. Create websites using server-side components using JSP.

CO5. Design and construct various data base tables using JDBC and produce various results based on given query.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSEV Semester

VCE-R15

**WEB TECHNOLOGIES LAB**

Course Code: A3603

L	T	P	C
0	0	3	2

**LIST OF EXPERIMENTS**

**Week-1**

1. Design the following static web pages required for an online book store website
  - a) Home Page
  - b) Login Page
  - c) Catalogue Page

**Week-2**

2. Design the following static web pages required for an online book store website
  - a) Cart Page
  - b) Registration Page

**Week-3**

3. Design a web page using CSS which includes the following styles
  - a) Using different font styles
  - b) Set a background image for both page and single elements on the page
  - c) Control the background repetition of image with background-repeat property
  - d) Define styles for links as visited, active, hover & link
  - e) Work with layers
  - f) Add a customized cursor

**Week-4**

4. Write a JavaScript to validate the fields of registration page.

**Week-5**

5. Create an XML document for maintaining a CD catalog. Display XML data using XSL

**Week-6**

6. Write a program to create a Java Bean for user login management component.

**Week-7**

7. Install Apache Tomcat Server and deploy a static website and access it.

**Week -8**

8. Write a program to create a Servlet to AUTHENTICATE user details.

**Week-9**

9. Write a program to implement session management concept in servlets.

**Week 10**

10. Write a program to access database using JDBC and Servlets.

**Week-11**

11. Write a program to print multiplication table for any number upto required level using JSP.

**Week-12**

12. Write a program to display user credentials using use Bean tag of JSP.

**Week-13**

13. Write a program to validate the user form using PHP and database.

**REFERENCE BOOK(S):**

1. *Web Technologies – Black Book*, Kogent Learning solutions Inc sol. Dreamtech press.



**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSEV Semester

VCE-R15

**CASE TOOLS LAB**

**Course Code: A3609**

L	T	P	C
0	0	3	2

**Course Overview:**

This Laboratory introduces the principles of object oriented design involved in development of Software applications.

**Prerequisite(s):**

1. Computer Programming -A3501
2. Object Oriented Programming-A3509
3. Software Engineering-A3514

**Course Outcomes:**

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

- CO1. Master key principles in OO analysis design and development.
- CO2. Be familiar with the application of the Unified Modeling Language (UML) towards analysis and design
- CO3. Be familiar with alternative development processes.
- CO4. Apply design principles.
- CO5. Identify and apply key principles, rules, and heuristics in OO analysis and design apply UML 2.0.
- CO6. Have a deep knowledge of the principles of object-oriented design.

# VARDHAMAN COLLEGE OF ENGINEERING

## (AUTONOMOUS)

B. Tech. CSEV Semester

VCE-R15

### CASE TOOLS LAB

Course Code: A3609

L	T	P	C
0	0	3	2

#### LIST OF EXPERIMENTS

Students are divided into batches of 4 each and each batch has to draw the following diagrams using UML for the given case studies.

UML diagrams to be developed are:

1. Use Case Diagram.
2. Class Diagram.
3. Sequence Diagram.
4. Collaboration Diagram.
5. State Diagram
6. Activity Diagram.
7. Component Diagram
8. Deployment Diagram.
9. Object Diagram

#### CASE STUDY 1: AUTOMATED TELLER MACHINE (ATM)

##### Description for an ATM System

The software to be designed will control a simulated automated teller machine (ATM) having a magnetic stripe reader for reading an ATM card, a customer console (keyboard and display) for interaction with the customer, a slot for depositing envelopes, a dispenser for cash (in multiples of Rs. 100, Rs. 500 and Rs. 1000), a printer for printing customer receipts, and a key-operated switch to allow an operator to start or stop the machine. The ATM will communicate with the bank's computer over an appropriate communication link. (The software on the latter is not part of the requirements for this problem.)

The ATM will service one customer at a time. A customer will be required to insert an ATM card and enter a personal identification number (PIN) - both of which will be sent to the bank for validation as part of each transaction. The customer will then be able to perform one or more transactions. The card will be retained in the machine until the customer indicates that he/she desires no further transactions, at which point it will be returned - except as noted below.

The ATM must be able to provide the following services to the customer:

1. A customer must be able to make a cash withdrawal from any suitable account linked to the card, in multiples of Rs. 100 or Rs. 500 or Rs. 1000. Approval must be obtained from the bank before cash is dispensed.
2. A customer must be able to make a deposit to any account linked to the card, consisting of cash and/or checks in an envelope. The customer will enter the amount of the deposit into the ATM, subject to manual verification when the envelope is removed from the machine by an operator. Approval must be obtained from the bank before physically accepting the envelope.
3. A customer must be able to make a transfer of money between any two accounts linked to the card.
4. A customer must be able to make a balance inquiry of any account linked to the card.
5. A customer must be able to abort a transaction in progress by pressing the Cancel key instead of responding to a request from the machine.

The ATM will communicate each transaction to the bank and obtain verification that it was allowed by the bank. Ordinarily, a transaction will be considered complete by the bank once it has been approved. In the case of a deposit, a second message will be sent to the bank indicating that the customer has deposited the envelope. (If the customer fails to deposit the envelope within the timeout period, or presses cancel instead, no second message will be sent to the bank and the deposit will not be credited to the customer.)

If the bank determines that the customer's PIN is invalid, the customer will be required to re-enter the PIN before a transaction can proceed. If the customer is unable to successfully enter the PIN after three tries, the card will be permanently retained by the machine, and the customer will have to contact the bank to get it back.

If a transaction fails for any reason other than an invalid PIN, the ATM will display an explanation of the problem, and will then ask the customer whether he/she wants to do another transaction. The ATM will provide the customer with a printed receipt for each successful transaction. The ATM will have a key-operated switch that will allow an operator to start and stop the servicing of customers. After turning the switch to the "on" position, the operator will be required to verify and enter the total cash on hand. The machine can only be turned off when it is not servicing a customer. When the switch is moved to the "off" position, the machine will shut down, so that the operator may remove deposit envelopes and reload the machine with cash, blank receipts, etc.

#### **CASE STUDY 2: ONLINE BUS TICKET RESERVATION SYSTEM**

Our Bus Travel Facility provides Online Bus ticket Reservation System. In our System we can provide different types of buses categories like Express, Volvo, AC or Non AC etc. In our system we can manage all types of Passenger data & bus data. All details that is related to Travelling like fare details, Seat availability, details of Booking, bus details, seating arrangements, inquiry etc.

In our system we can provide the features to the passenger like the passenger could choose the available seats own itself, that is not provided by any other Agency. Our system also provides the facility like the Bus Boarding and the admin has facility to send Email & SMS.

#### **Description for ONLINE BUS TICKET RESERVATION SYSTEM**

Our Travel System provides the transportation facility to the customers based on their requirement. They provide different types of buses like Express, Luxury, and Volvo has two types – A/C and Non A/C. The charges are different for different buses. The charges also depend on the distance the customer wants to travel. They maintain all the records of the bus reservation counter though online service itself but the application is only accessed by the Admin. Until Now they used to issue the tickets in the buses alone it is difficult to track the details of the bookings done as it provides the service all over the State.

Our Travel Agencies manage their data on standalone system that is not enough to track down the information of the all bookings in the state. That we are develop the Online Bus Ticket Reservation System, it is capable to book online ticket. Present system is not capable to maintained data on state side. we have produced the online system that is capable to manage the data of the bus booking details on the state level. User of this system can able to operate this system anywhere in country, and booking of the bus ticket on single click. System has able to manage the bus details and update the information just on click, system does very efficiency manage that type of data. It is also capable to manage the details about fare of the bus, source and destination details. That the system is also able to manage the details of the passenger and their charges details and booking details separately.

Our system also provides the facility like the Bus Boarding and the admin has facility to send Email & SMS. And Also

1. Check the whether of user is valid or invalid?
2. Admin should manage the details of bus.
3. Admin should manage the details of customer.
4. Admin should manage the bus fare and passenger details.
5. Booking process complete by only system user.
6. User should print the booked ticket.

**PROFESSIONAL ETHICS AND HUMAN VALUES**

Course Code: A3012

L	T	P	C
3	0	0	0

**Course Overview:**

This course is the foundation for Human Values and Professional Ethics, is an outcome of the long-drawn search, visualization and extensive experimentation by the authors and their colleagues towards evolving an effective and universally acceptable methodology for introducing value education in the present curricula of technical and other professional institutions. Thus, it is in response to a long-felt and urgent need to integrate value education with professional skills in the present-day education system. This involves the discovery of the inherent harmony and co-existence in the existence through self-exploration, forming the basis of universal human values and facilitating transformation towards a holistic world-view or the 'human consciousness'.

**Prerequisite(s):**

**Course Outcomes:**

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

- CO1. Adapt engineering ethics to overcome various moral dilemmas after choosing engineering as profession.
- CO2. Develop awareness on different human values, such as love, empathy, honesty, etc. to lead a successful life.
- CO3. Know the responsibilities of the engineer towards the society.
- CO4. List out and practice the safety procedures to avert the risks at work place.
- CO5. Determine various roles of engineer and help them to make the world a better place.

**PROFESSIONAL ETHICS AND HUMAN VALUES**

Course Code: A3012

L T P C

3 0 0 0

**SYLLABUS****UNIT – I****(15 Lectures)**

**ETHICS:** Senses of 'Engineering Ethics' -Variety of moral issues - Types of inquiry -Moral dilemmas Moral autonomy -Kohlberg's theory, Gilligan's theory -Consensus and controversy – Models of Professional Roles -Theories about right action- Self interest - Customs and religion -Uses of Ethical theories.

**UNIT – II****(15 Lectures)**

**HUMAN VALUES:** Morals, Values and Ethics – Integrity – Work Ethic – Service Learning - Civic Virtue – Respect for Others – Living Peacefully – Caring – Sharing - Honesty – Courage– Valuing Time - Cooperation – Commitment – Empathy – Self Confidence – Character – Spirituality

**UNIT – III****(10 Lectures)**

**ENGINEERING AS SOCIAL EXPERIMENTATION:** Engineering as experimentation - Engineering Projects VS. Standard Experiments - Engineers as responsible experimenters – Codes of ethics - Industrial Standards - A balanced outlook on law- The challenger case study.

**UNIT – IV****(12 Lectures)**

**SAFETY, RESPONSIBILITIES AND RIGHTS:** Safety and risk- Assessment of safety and risk- Risk benefit analysis and reducing risk- Three Mile Island and Chernobyl case study - Collegiality and loyalty - Respect for authority - Collective bargaining – Confidentiality- Conflicts of interest - Occupational crime - Professional Rights- Employee rights- Intellectual Property Rights (IPR) discrimination.

**UNIT – V****(8 Lectures)**

**GLOBAL ISSUES:** Multinational Corporation's -Environmental ethics-computer ethics -weapons development, Engineers as managers - consulting engineers-engineers as expert witnesses and advisors, Moral leadership - sample code of Ethics (Specific to a particular Engineering Discipline).

**TEXT BOOK(S):**

1. R.S.Nagarajan, a Textbook on "Professional Ethics and Human Values", New Age Publishers – 2006.
2. Mike Martin and Roland Schinzinger, "Ethics in engineering", McGraw Hill, New York 1996.

**REFERENCE BOOK(S):**

1. Elmasri Navate (2014), *Fundamentals of Database Systems*, Pearson Education, India
2. Govindarajan M, Natarajan S, Senthil Kumar V. S, " Engineering Ethics", Prentice Hall of India, New Delhi, 2004.
3. Charles D. Fleddermann, "Engineering Ethics", Pearson Education/ Prentice Hall, New Jersey,2004  
( Indian Reprint now available )
4. Charles E Harris, Michael S. Protchard and Michael J Rabins, "Engineering Ethics – Concepts and Cases", Wadsworth Thompson Leatning, United States, 2000 ( Indian Reprint now available).
5. John R Boatright, "Ethics and the conduct of business", Pearson Education, New Delhi,2003.

# **SYLLABI FOR VI SEMESTER**

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSEVI Semester

VCE-R15

**WIRELESS AND MOBILE COMPUTING**

Course Code: A3521

L	T	P	C
3	1	0	3

**Course Overview:**

This course provides an overview about the wireless IEEE 802 standards for wireless communication and summarizes the state of the art for Wireless LANs, Wireless PANs, and Cellular LTE, sensor networks including new topics such as Wi-Fi mesh networks, cognitive radio, Internet-of-Things, audio communications and visible light communication. These include mobility and service management, data management, routing in mobile ad hoc and sensor networks, and security issues for mobile systems. While mobile computing covers many topics, in this course our main focus will be on mobility, data and service management, and security issues in mobile computing environments.

**Prerequisite(s):**

- Computer Networks (A)
- Database Management Systems (A3516)

**Course Outcomes:**

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

CO1. Demonstrate the basic concepts and principles in mobile computing.

CO2. Distinguish the structure and components for Mobile IP and Mobility Management.

CO3. Compare the positioning techniques and location-based services and applications.

CO4. Analyze the technical challenges posed by current mobile devices and wireless communications.

CO5. Identify software tools and APIs for mobile applications and hence be aware of their scope and limitations.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSEVI Semester

VCE-R15

**WIRELESS AND MOBILE COMPUTING**

Course Code: A3521

L	T	P	C
3	1	0	3

**SYLLABUS**

**UNIT – I**

**(11 Lectures)**

**SATELLITE SYSTEM:** History, GEO, LEO, MEO, Applications, Routing, Localization, Handover.

**WIRELESS LAN:** Infrared vs. radio transmission, infrastructure and ad hoc networks, IEEE 802.11, HIPER LAN: Protocol architecture

**UNIT – II**

**(11 Lectures)**

**MOBILE COMPUTING:** Introduction, history, architecture, devices and applications, limitations, MEDIUM ACCESS CONTROL: Motivation for a specialized MAC (Hidden and exposed terminals, near and far terminals).

**GLOBAL SYSTEM FOR MOBILE COMMUNICATIONS (GSM):** Mobile services, system architecture, radio interface, protocols, localization and calling, handover, security, and new data services.

**UNIT – III**

**(13 Lectures)**

**MOBILE NETWORK LAYER:** Mobile IP (goals, assumptions, entities and terminology, IP packet delivery, agent advertisement and discovery, Registration, tunneling and encapsulation, optimizations), dynamic host configuration protocol (DHCP).

**MOBILE ADHOC NETWORKS (MANETS):** Overview, properties of a MANET, applications, routing algorithms, security in MANETS.

**MOBILE TRANSPORT LAYER:** Traditional TCP, indirect TCP, snooping TCP, mobile TCP, fast retransmit/ fast recovery, transmission /time-out freezing, selective retransmission, and transaction oriented TCP.

**UNIT – IV**

**(13 Lectures)**

**PROTOCOLS AND TOOLS:** Wireless Application Protocol-WAP. (Introduction, protocol architecture, and treatment of protocols of all layers), Bluetooth (user scenarios, physical layer, MAC layer, networking, security, link management) ,COGNITIVE RADIO and J2ME

**Li-Fi(LIGHT FIDELITY):** introduction, need, working ,advantages & disadvantages, applications.

**UNIT – V**

**(07 Lectures)**

**DATA DISSEMINATION:** Push based mechanisms, pull based mechanisms, hybrid mechanisms, selective tuning (indexing) techniques.

**DATABASE ISSUES:** Hoarding techniques, caching invalidation mechanisms, quality of service issues.

**TEXT BOOK(S):**

1. Jochen Schiller (2004), *Mobile Communications*, 2<sup>nd</sup> Edition, Low price edition, Pearson Education, New Delhi.
2. Rajkamal (2007), *Mobile Computing*, 2<sup>nd</sup> Edition, Oxford University Press, USA.
3. Bruce A. Fette, *Cognitive Radio Technology*, 2nd Edition.
4. Svilen Dimitrov , Harald Haas, *Principles of LED Light Communications: Towards Networked Li-fi*.

**REFERENCE BOOK(S):**

1. Stojmenovic, Cacute(2002), *Handbook of Wireless Networks and Mobile Computing*, John Wiley, New York.
2. Hansmann, Merk, Nicklous, Stober(2003), *Principles of Mobile Computing*, 2nd edition, Springer.



**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE VI Semester

VCE-R15

**INFORMATION SECURITY**

Course Code: A3608

L	T	P	C
3	1	0	3

**Course Overview:**

The course Overview is to provide security importance of information systems, and their use to support safety-critical applications, has made information security a central issue for modern systems. This course introduces the technical and policy foundations of information security. The main objective of the course is to enable students to reason about information systems from a security engineering perspective. Topics covered in the course include elementary cryptography; access control; common software vulnerabilities; common network vulnerabilities; digital rights management; policy and export control law; privacy; management and assurance; and special topics in information security. Hackers defense, attacks defense, systems and programs security, network and web security, worms and viruses, and other Internet secure applications.

**Prerequisite(s):**

- Probability Theory and Numerical Methods (A3004)
- Computer Networks (A3519)

**Course Outcomes:**

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

- CO1. Analyze the different Security Attacks, Services, and Mechanisms work security models.
- CO2. Apply classical encryption algorithms (Substitution and Transposition ciphers) and DES algorithms to encrypt plaintext (Apply).
- CO3. Distinguish the modern Cryptography algorithm such as DES, AES, double DES, Triple DES, RC4 algorithm and analyze modern cryptanalysis techniques.
- CO4. Solve the problem on Number theory, public key cryptography techniques (RSA) and key management algorithms (Diffie-Hellman)
- CO5. Compare and contrast message authentication algorithms (SHA-512, MAC, and HMAC), symmetric and asymmetric encryption and authentication standards and protocols

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE VI Semester

VCE-R15

**INFORMATION SECURITY**

Course Code: A3608

L	T	P	C
3	1	0	3

**SYLLABUS**

**UNIT-I**

**(17 Lectures)**

**INTRODUCTION:** computer security concepts, OSI security architecture, security attacks, security services, security mechanisms, a model for network security.

**CLASSICAL ENCRYPTION TECHNIQUES:** Symmetric Cipher Modes, Substitute Techniques, Transposition Techniques, Rotor Machines, Stenography.

**BLOCK CIPHER AND DATA ENCRYPTION STANDARDS:** Block Cipher Principles, Data Encryption Standards, the Strength of DES, Differential and Linear Cryptanalysis.

**UNIT-II**

**(14 Lectures)**

**ADVANCED ENCRYPTION STANDARDS:** Evaluation Criteria for AES, the AES Cipher.

**MORE ON SYMMETRIC CIPHERS:** Triple DES, Block Cipher Modes of Operation, Stream Cipher and RC4.

**INTRODUCTION TO NUMBER THEORY:** Basic concepts, Prime Numbers, Fermat's and Euler's Theorem, Euclid's theorem and The Chinese Remainder Theorem

**UNIT-III**

**(13 Lectures)**

**PUBLIC-KEY CRYPTOGRAPHY AND RSA:** Principles of Public key crypto Systems, RSA algorithm, Key Management, Diffie-Hellman Key Exchange.

**MESSAGE AUTHENTICATION AND HASH FUNCTIONS:** Authentication Requirement, Authentication Function, Message Authentication Code, HMAC, Hash Function, SHA-512.

**UNIT-IV**

**(13 Lectures)**

**DIGITAL SIGNATURE:** Digital Signature, Authentication Protocols, Digital Signature Standard.

**AUTHENTICATION APPLICATIONS:** Kerberos, X.509 Authentication Service, Public Key Infrastructure.

**EMAIL SECURITY:** Pretty Good Privacy (PGP) and S/MIME.

**IP SECURITY:** Overview, IP Security Architecture and Services, Authentication Header, Encapsulating Security Payload.

**UNIT-V**

**(10 Lectures)**

**WEB SECURITY:** Requirements, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET).

**FIREWALLS AND INTRUSION DETECTION:** Firewall design Principles, Trusted Systems.

**TEXT BOOKS:**

1. William Stallings (2006), Cryptography and Network Security: Principles and Practice, 4th edition, Pearson Education, India.
2. Charlie Kaufman (2002), Network Security: Private Communication in a Public World, 2nd edition, Prentice Hall of India, New Delhi.

**REFERENCE BOOKS:**

1. William Stallings (2000), Network Security Essentials (Applications and Standards), Pearson Education, India.
2. Atul Kahate (2008), Cryptography and Network Security, 2nd edition, Tata Mc Grawhill, India.
3. Robert Bragg, Mark Rhodes (2004), Network Security: The complete reference, Tata Mc Grawhill, India.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE VI Semester

VCE-R15

**DATA WAREHOUSING AND DATA MINING**

Course Code: A3522

L	T	P	C
3	1	0	3

**Course Overview:**

The course addresses the concepts, skills, methodologies, and models of data warehousing. The course addresses proper techniques for designing data warehouses for various business domains, and covers concepts for potential uses of the data warehouse and other data repositories in mining opportunities. Data mining, the extraction of hidden predictive information from large databases, is a powerful new technology with great potential to help companies focus on the most important information in their data warehouses. Data mining tools predict future trends and behaviours, allowing businesses to make proactive, knowledge-driven decisions.

**Prerequisite(s):** Database Management Systems (A3516)

**Course Outcomes:**

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

- CO1. Apply preprocessing techniques on various data sets.
- CO2. Develop data warehouse using various schemas for enterprise applications.
- CO3. Apply supervised learning techniques on various data sets.
- CO4. Apply unsupervised techniques on various data type.
- CO5. Analyze various web mining technique.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE VI Semester

VCE-R15

**DATA WAREHOUSING AND DATA MINING**

Course Code: A3522

L	T	P	C
3	1	0	3

**SYLLABUS**

**UNIT – I**

**(15 Lectures)**

**INTRODUCTION TO DATA MINING:** Motivation, Importance, Definition of Data Mining, Kind of Data, Data Mining Functionalities, Kinds of Patterns, Classification of Data Mining Systems, Data Mining Task Primitives, Integration of A Data Mining System with A Database or Data Warehouse System, Major Issues In Data Mining, Types of Data Sets and Attribute Values, Basic Statistical Descriptions of Data, Data Visualization, Measuring Data Similarity.

**PREPROCESSING:** Data Quality, Major Tasks in Data Preprocessing, Data Reduction, Data Transformation and Data Discretization, Data Cleaning and Data Integration.

**UNIT – II**

**(12 Lectures)**

**DATA WAREHOUSING AND ON-LINE ANALYTICAL PROCESSING:** Data Warehouse basic concepts, Data Warehouse Modeling - Data Cube and OLAP, Data Warehouse Design and Usage, Data Warehouse Implementation, Data Generalization by Attribute-Oriented Induction, Data Cube Computation.

**UNIT – III**

**(10 Lectures)**

**MINING FREQUENT PATTERNS, ASSOCIATIONS AND CORRELATIONS:** Basic Concepts, Efficient and Scalable Frequent Itemset Mining Methods, Are All the Pattern Interesting, Pattern Evaluation Methods, Applications of frequent pattern and associations.

**FREQUENT PATTERN AND ASSOCIATION MINING:** A Road Map, Mining Various Kinds of Association Rules, Constraint-Based Frequent Pattern Mining, Extended Applications of Frequent Patterns.

**UNIT – IV**

**(10 Lectures)**

**CLASSIFICATION:** Basic Concepts, Decision Tree Induction, Bayesian Classification Methods, Rule-Based Classification, Model Evaluation and Selection, Techniques to Improve Classification Accuracy: Ensemble Methods, Handling Different Kinds of Cases in Classification, Classification by Neural Networks, Support Vector Machines, Pattern-Based Classification, Lazy Learners (or Learning from Your Neighbors).

**UNIT – V**

**(8 Lectures)**

**CLUSTER ANALYSIS:** Basic Concepts of Cluster Analysis, Clustering Structures, Major Clustering Approaches, Partitioning Methods, Hierarchical Methods, Density-Based Methods, Model-Based Clustering, Why outlier analysis, Identifying and handling of outliers, Outlier Detection Techniques.

**WEB MINING:** Basic concepts of web mining, different types of web mining, PAGE RANK Algorithm, HITS Algorithm.

**TEXT BOOK(S):**

1. Jiawei Han, Micheline Kamber, Jian Pei (2012), *Data Mining: Concepts and Techniques*, 3<sup>rd</sup> Edition, Elsevier, United States of America.India.

**REFERENCE BOOK(S):**

1. Margaret H Dunham (2006), *Data Mining Introductory and Advanced Topics*, 2<sup>nd</sup> Edition, Pearson Education, New Delhi, India.
2. Amitesh Sinha (2007), *Data Warehousing*, Thomson Learning, India.
3. Xingdong Wu, Vipin Kumar (2009), *the Top Ten Algorithms in Data Mining*, CRC Press, UK.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE VI Semester

VCE-R15

**SOFTWARE ARCHITECTURE**  
(Professional Elective - I)

Course Code: A3652

L	T	P	C
4	0	0	4

**Course Overview:**

This course deals with the concepts of architecture of software. The list of topics to study in this course are Introduction to the fundamentals of software architecture, Software architecture and quality requirements of a software system, Fundamental principles and guidelines for software architecture design, architectural styles, patterns, and frameworks, Methods, techniques, and tools for describing software architecture and documenting design rationale, Software architecture design and evaluation processes, Rationale and architectural knowledge management in software architecting, Approaches and tools for designing and evaluating software architectures for the state-of-the-art technologies such as cloud-computing, service-orientation, and mobile computing, Future challenges and emerging trends in software architecture discipline

**Prerequisite(s):**

- Software Engineering (A3514)
- Object Oriented Analysis and Design (3607)

**Course Outcomes:**

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

- CO1. Demonstrate the importance and role of software architecture in large-scale software systems.
- CO2. Design and Integrate software architecture for large-scale software systems.
- CO3. Recognize major software architectural styles, design patterns, and frameworks.
- CO4. Generate architectural alternatives for a problem and selection among them.
- CO5. Identify and assess the quality attributes of a system at the architectural level.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE VI Semester

VCE-R15

**SOFTWARE ARCHITECTURE**  
(Professional Elective - I)

Course Code: A3652

L	T	P	C
4	0	0	4

**SYLLABUS**

**UNIT – I** **(10 Lectures)**

**INTRODUCTION TO SOFTWARE ARCHITECTURE:** Introduction to software architecture, status of software architecture, architecture business cycle, software architectures evolution. Software processes and the architecture business cycle, features of good architecture.

**ARCHITECTURE STYLES:** Pipes and filters, data abstraction and object oriented organization, even-based implicit invocation, layered systems, repositories, interpreters, process control, other familiar architectures, heterogeneous architectures.

**UNIT – II** **(14 Lectures)**

**SHARED INFORMATION SYSTEMS:** Database integration, interpretation in software development environments, architectural structures for shared information systems.

**ARCHITECTURAL DESIGN GUIDANCE:** Guidance for user interface architectures, case study in interoperability: World Wide Web.

**UNIT – III** **(12 Lectures)**

**PATTERN TYPES:** Architectural patterns, structural patterns, patterns for distribution, patterns for interactive systems.

**FORMAL MODELS AND SPECIFICATIONS:** Formalizing the architectural of a specific system, architectural styles, architectural design space, Case study: a product line development.

**UNIT – IV** **(12 Lectures)**

**LINGUISTIC ISSUES:** Requirements for architectural-description languages, first-class connectors, adding implicit invocation to traditional programming languages.

**TOOLS FOR ARCHITECTURAL DESIGN:** *Unicon*: a universal connector language, exploiting style in architectural design environments, beyond definition /use: architectural interconnection

**UNIT – V** **(10 Lectures)**

**CREATING AN ARCHITECTURE:** Understanding quality attributes, achieving qualities, air traffic control, documenting software architectures.

**TEXT BOOK(S):**

1. Mary Shaw, David Garlan (1996), *Software Architecture Perspective: on an Emerging Discipline*, Prentice Hall of India, New Delhi.
2. Len Bass, Paul Elements, Rick Kazman (1998), *Software Architecture in Practice*, Pearson Education Asia, India.

**REFERENCE BOOK(S):**

1. Garmus, Herros(1996), *Measuring the Software Process: A Practical Guide to Functional Measure*, Prentice Hall of India, New Delhi.
2. Peters, Yourdon (1981), *Software Design: Methods and Techniques*, Yourdon Press, New York.
3. Buschmann (1996), *Pattern Oriented Software Architecture*, Wiley, New Delhi.
4. Gamma et al (1995), *Design Patterns*, Pearson Education Asia, New Delhi.
5. Gamma, Shaw(1993), *An Introduction to Software Architecture*, World Scientific Publishing Company,
6. Shaw, Gamma (1996), *Software Architecture*, Prentice Hall of India, New Delhi.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE VI Semester

VCE-R15

**ADVANCED COMPUTER ARCHITECTURE**  
(Professional Elective - I)

Course Code: A3551

L	T	P	C
4	0	0	4

**Course Overview:**

This course is about the principles of computer design; instruction set design concepts, performance enhancements, new and alternative computer architectures, and the design and implementation of high performance computing systems. It equips you with the skills to undertake performance comparisons, improve the performance of applications, and develop applications to solve computationally intensive problems.

**Prerequisite(s):** Computer Organization and Microprocessors(A3507)

**Course Outcomes:**

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

- CO1. Describe the principles of computer design.
- CO2. Classify instruction set architectures
- CO3. Analyze the operation of performance enhancements such as pipelines, caches, shared memory.
- CO4. Describe modern architectures such as RISC, VLIW (very large instruction word) and multi-cpu systems.
- CO5. Compare the performance of different architectures

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE VI Semester

VCE-R15

**ADVANCED COMPUTER ARCHITECTURE**  
(Professional Elective - I)

Course Code: A3551

L	T	P	C
4	0	0	4

**SYLLABUS**

**UNIT – I** **(12 Lectures)**

Modern computers- Elements of modern Computers-Evolution of computer Architecture – Fundamentals of Computer design- Technology trends- cost- measuring performance-system attributes to performance- quantitative principles of computer design.

**UNIT – II** **(10 Lectures)**

Multiprocessors- Multiprocessor Interconnects-Cache coherence and Synchronization mechanism Multivector and SIMD computers- vector processing principles- SIMD computer organization

**UNIT – III** **(12 Lectures)**

Memory and Input-Output subsystems- Hierarchical memory architecture- Virtual memory system- Memory allocation and management- Cache memories and management- Input-Output subsystems.

**UNIT – IV** **(14 Lectures)**

Principles of Pipelining- An overlapped parallelism- Instruction and Arithmetic pipelines, Principles of designing pipelined processor

**UNIT – V** **(12 Lectures)**

Multiprocessors Architecture and Programming-Functional structures- Interconnection Networks- Parallel memory organization- Multiprocessor operating system-Exploiting concurrency per multiprocessing

**TEXT BOOK(S):**

1. Computer Architecture and parallel Processing, Kai Hwang and A.Briggs International Edition McGraw-Hill
2. Advanced Computer Architecture: Parallelism Scalability Programmability” Kai Hwang International Edition McGraw-Hill

**REFERENCE BOOK(S):**

1. *Computer Architecture A quantitative approach* 3rd edition John L. Hennessy & David A. Patterson Morgan Kufmann (An Imprint of Elsevier)
2. *Advanced Computer Architectures*, Dezso Sima, Terence Fountain, Peter Kacsuk, and Pearson.
3. *Parallel Computer Architecture, A Hardware / Software Approach*, David E. Culler, Jaswinder Pal singh with Anoop Gupta, Elsevier



**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE VI Semester

VCE-R15

**DISTRIBUTED DATABASES**  
(Professional Elective - I)

Course Code: A3552

L	T	P	C
4	0	0	4

**Course Overview:**

A Database is a collection of data describing the activities of one or more related organizations with a specific well defined structure and purpose. A Database is controlled by Database Management System (DBMS) by maintaining and utilizing large collections of data. A Distributed System is the one in which hardware and software components at networked computers communicate and coordinate their activity only by passing messages. In short a Distributed database is a collection of databases that can be stored at different computer network sites. It also provides various aspects like replication, fragmentation and various problems that can be faced in distributed database systems.

**Prerequisite(s):** Database Management Systems (A3516)

**Course Outcomes:**

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

- CO1. Apply Top-Down Design Process, Distributed Database Design Issues, Fragmentation, Allocation, and Database Integration-Bottom-up approach.
- CO2. Analysis of Query Decomposition Normalization, Primary Horizontal, Vertical, derived and Hybrid Fragmentation.
- CO3. Examine of Query optimization, Concurrency Control and Deadlock Management.
- CO4. Use Query Parallelism, Parallel Query Optimization and Load Balancing.
- CO5. Interpret Distributed Object Storage, Object Query Processing and Transaction Management.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE VI Semester

VCE-R15

**DISTRIBUTED DATABASES**  
(Professional Elective - I)

Course Code: A3552

L	T	P	C
4	0	0	4

**SYLLABUS**

**UNIT – I**

**(12 Lectures)**

**INTRODUCTION:** Introduction to Distributed Database Systems, features of distributed versus centralized databases, Distributed Database System Architecture. (T1: Chapter-1)

**DISTRIBUTED DATABASE DESIGN:** Top-Down Design Process, Distributed Database Design Issues, Fragmentation, Allocation, Database Integration-Bottom-up approach, Schema Matching, Schema Integration, and Schema Mapping. (T1: Chapter-3)

**UNIT – II**

**(13 Lectures)**

**QUERY PROCESSING:** Query Processing Problem, Objectives of Query processing, Complexity of Relational Algebra Operations, Characterization of Query Processors. (T1: Chapter-6)

**LAYERS OF QUERY PROCESSING:** Query Decomposition and Data Localization, Query Decomposition: Normalization, Analysis, Elimination of Redundancy and Rewriting. Localization of Distributed Data: Reduction for primary Horizontal, Vertical, derived and Hybrid Fragmentation. (T1: Chapter-6)

**UNIT – III**

**(13 Lectures)**

**OPTIMIZATION OF DISTRIBUTED QUERIES:** Query optimization, Centralized Query Optimization, Join Ordering, Distributed Query Optimization: Dynamic, Static, Semijoin-based and Hybrid Approach. (T1: Chapter-8)

**DISTRIBUTED CONCURRENCY CONTROL:** Serializability Theory, Taxonomy of Concurrency Control Mechanisms, Locking-Based Concurrency Control Algorithms, Timestamp-Based Concurrency Control Algorithms, Optimistic Concurrency Control Algorithms, Deadlock Management. (T1: Chapter-11)

**UNIT – IV**

**(10 Lectures)**

**PARALLEL DATABASE SYSTEMS:** Parallel Database System Architectures, Parallel Data Placement, Parallel Query Processing: Query Parallelism; Parallel Query Optimization, Load Balancing. (T1: Chapter-14)

**UNIT – V**

**(10 Lectures)**

**DISTRIBUTED OBJECT DATABASE MANAGEMENT:** Fundamental Object Concepts and Object Models, Object Distribution Design, Architectural Issues, Object Management: Object Identifier Management, Pointer Swizzling, Object Migration, Distributed Object Storage, Object Query Processing, Transaction Management. (T1: Chapter-15)

**TEXT BOOK(S):**

1. M T Ozsü, Patrick Valduriez (2011), Principles of Distributed Database Systems, 3<sup>rd</sup> Edition, Springer, India.

**REFERENCE BOOK(S):**

1. Stefano Ceri, Giuseppe Pelagatti (2008), Distributed Databases: Principles and Systems, McGraw Hill Education, India.
2. Chanda Ray (2012), Distributed Database Systems, 1<sup>st</sup> Edition, Pearson Education India.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE VI Semester

VCE-R15

**ARTIFICIAL INTELLIGENCE AND NEURAL NETWORKS**  
(Professional Elective - I)

Course Code: A3553

L	T	P	C
4	0	0	4

**Course Overview:**

This course will introduce the basic principles in artificial intelligence and neural networks research. It will cover simple representation schemes, problem-solving paradigms, constraint propagation, and search strategies and also covers the basic neural network architectures and learning as well as reasoning algorithms for applications in pattern recognition, image processing, and computer vision. The students will have a chance to try out several of these models on practical problems and develop expert systems.

**Prerequisite(s):** NIL

**Course Outcomes:**

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

- CO1. Analyze and apply the basic the concepts of artificial intelligence and the use of agents into the real world scenario.
- CO2. Identify, analyze, formulate and solve complex problems by using various search techniques.
- CO3. Explore with a better understanding of logic programming skills and resolve problems related to reasoning.
- CO4. Design, construct and evaluate a neural network based system, with various learning process models.
- CO5. Plan and design an expert system.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE VI Semester

VCE-R15

**ARTIFICIAL INTELLIGENCE AND NEURAL NETWORKS**  
(Professional Elective - I)

Course Code: A3553

L	T	P	C
4	0	0	4

**SYLLABUS**

**UNIT- I**

**(12 Lectures)**

**INTRODUCTION TO ARTIFICIAL INTELLIGENCE:** Problem and search- what is AI technique, criteria for success. (T1, Ch-1)

**PROBLEM SPACE AND SEARCH:** Defining the problem as a state space search, production systems problem characteristics. (T1, Ch-2)

**HEURISTIC SEARCH TECHNIQUES:** Generate test, Hill Climbing, BFS, Problem Reduction Constraint Satisfaction. (T1, Ch-3)

**UNIT- II**

**(12 Lectures)**

**KNOWLEDGE REPRESENTATION ISSUES:** Representation and mapping, Issues in knowledge Representation. (T1, Ch-4)

**REPRESENTING KNOWLEDGE USING RULES:** Procedural verses Declarative knowledge, logic programming, Forward and backward, Matching, Control Knowledge. (T1, Ch-6)

**SYMBOLIC REASONING UNDER UNCERTAINTY:** Introduction to non-monotonic reasoning, Logic for non-monotonic Reasoning. Implementation Issue, Implementation of DFS, Implementation of BFS(T1, Ch-7), The min-max search Procedure, Adding alpha-beta Cutoffs(T1, Ch-12), Connectionist AI and Symbolic AI (T1, Ch-18).

**UNIT – III**

**(12 Lectures)**

**BASICS OF ARTIFICIAL NEURAL NETWORK:** Characteristics of Neural Networks, artificial neural network: terminology, models of neurons: McCulloch Pitts model, Perceptron model, Adaline model (T3, Ch-1).

**FUNCTIONAL UNITS FOR ANN FOR PATTERN RECOGNITION TASK:** Pattern recognition problem, Basic functional units, PR by functional units. (T3, Ch-3)

**FEEDFORWARD NEURAL NETWORKS: SUPERVISED LEARNING - I:** Perceptrons - Learning and memory (T4, Ch-5, 5.1), Learning algorithms (T4, Ch-5, 5.3), Error correction and gradient decent rules (T4, Ch-5,5.4), Perceptron learning algorithms (T4, Ch-5,5.7).

**UNIT – IV**

**(13 Lectures)**

**SUPERVISED LEARNING – II :Back propagation and Beyond:** Multilayered network architectures(T4, Ch-6,6.1), Back propagation learning algorithm(T4, Ch-6,6.2), Example applications of feed forward neural networks. (T4, Ch-6,6.3)

**ATTRACTOR NEURAL NETWORKS:** Introduction(T4, Ch-10,10.1), Associative learning(T4, Ch-10,10.2), Hopfield network(T4, Ch-10,10.5), Error performance in Hopfield networks(T4, Ch-10,10.11), simulated annealing(T4, Ch-10,10.14), Boltzmann machine (T4, Ch-10,10.15), bidirectional associative memory(T4, Ch-10,10.16), bam stability analysis(T4, Ch-10,10.18), error correction in bams (T4, Ch-10,10.19).

**UNIT – V**

**(6 Lectures)**

**PLANNING:** The Blocks World, Components of a Planning System, Goal Stack Planning, Nonlinear Planning Using Constraint Posting, Hierarchical Planning, Reactive Systems, Other Planning Techniques(T1, Ch-13).

**EXPERT SYSTEMS:** An introduction to Expert System, Architecture of Expert System, Knowledge Acquisition, Application Area of Expert System (T6).

**TEXT BOOK(S):**

1. Rich knight (2002), *Artificial Intelligence*, 2nd edition, Tata McGraw-Hill, New Delhi.

2. B. Yegnanarayana (2001), *Artificial Neural Networks*, Prentice Hall of India, New Delhi.
3. Satish Kumar (2004), *Neural Networks A classroom Approach*, Tata McGraw Hill Publication, New Delhi.
4. Peter Jackson(1999), *Introduction to Expert Systems*, 3<sup>rd</sup> Edition, Pearson Education Private Limited, India.

**REFERENCE BOOK(S):**

1. S.N. SIVANANDAM, S SUMATHI, S N DEEPA,(2006), Introduction to Neural networks using Matlab-6. Tata McGraw-Hill, New Delhi.
2. Patrick Henry Winston (2001), *Artificial Intelligence*, 3rd edition, Pearson Education Private Limited, India.
3. P. H. Winston, *Artificial Intelligence*, Third Edition, Pearson Education.
4. G.F. Luger, *Artificial Intelligence*, Fourth Edition, Pearson Education.
5. P. Jackson, *Introduction to Expert Systems*, Third Edition, Pearson Education
6. N. J. Nilsson, *Principles of Artificial Intelligence*, First Edition, Springer-Verlag
7. N.P. Padhy, *Artificial Intelligence and Intelligent Systems*, First Edition, Oxford Univ. Press
8. Robert J. Schalkof, *Artificial Intelligence: an Engineering approach*, 1990, McGraw Hill

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE VI Semester

VCE-R15

**IMAGE PROCESSING**  
(Professional Elective - II)

Course Code: A3554

L	T	P	C
4	0	0	4

**Course Overview:**

Visual information plays an important role in almost all areas of our life. Today, much of this information is represented and processed digitally. Digital image processing is ubiquitous, with applications ranging from television to tomography, from photography to printing, from robotics to remote sensing.

**Prerequisite(s):**

- Mathematics – I (A3001)
- Computer Graphics (A3602)

**Course Outcomes:**

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

- CO1. Know and understand the basics and fundamentals of digital signal and image processing, such as digitization, sampling, quantization, and 2D-transforms.
- CO2. Operate on images using the processing techniques of smoothing, sharpening, enhancing, reconstructing geometrical alterations, filtering, restoration, segmentation, features extraction, compression, encoding and color /multichannel.
- CO3. Manipulate images using the computer: reading, writing, printing, and operating on them.
- CO4. Apply and relate the basic imaging techniques to practical cases, such as, multimedia, videoconferencing, pattern and object recognition.
- CO5. Aware of the ethical and legal issues related to image processing, such as, copyright, security, privacy, pornography, electronic distribution, etc.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE VI Semester

VCE-R15

**IMAGE PROCESSING**  
(Professional Elective - II)

Course Code: A3554

L	T	P	C
4	0	0	4

**SYLLABUS**

**UNIT – I** **(10 Lectures)**

**FUNDAMENTALS OF IMAGE PROCESSING:** Image acquisition, image model, sampling, quantization, relationship between pixels, distance measures, connectivity, and image geometry. (T1: Chapter1)

**UNIT – II** **(08 Lectures)**

**IMAGE TRANSFORMS:** Fourier transform, DFT, DFT-properties, FFT, WALSH transform, HADAMARD transform, DCT. (T1, R2: Chapter2)

**UNIT – III** **(11 Lectures)**

**IMAGE ENHANCEMENT (SPATIAL DOMAIN METHODS):** Histogram Processing - definition, equalization, matching, local enhancement, use of histogram statics for image enhancement, Arithmetic and logical operations, pixel or point operations, size operations, Smoothing filters-mean, median, mode filters, sharpening spatial filtering. (T1: Chapter3)

**UNIT – IV** **(09 Lectures)**

**IMAGE ENHANCEMENT (FREQUENCY DOMAIN METHODS):** Design of low pass, high pass, edge enhancement, smoothening filters in frequency domain. Butter worth filter, sharpening frequency domain filters, homomorphic filters in frequency domain. (T1, R1: Chapter4)

**UNIT – V** **(13 Lectures)**

**IMAGE SEGMENTATION:** Detection of discontinuities, edge linking and boundary detection, thresholding, region based segmentation, use of motion in segmentation. (T1: Chapter5)

**COLOR IMAGE PROCESSING:** Fundamentals, models, pseudo color image, color transformation, Fundamentals of image compression, image compression models, and color image compression. (T1, R1: Chapter5)

**TEXT BOOK(S):**

1. Rafael C. Gonzalez, Richard E. Woods (2008), *Digital Image Processing*, Low Price Edition, Pearson Education, New Delhi, India.

**REFERENCE BOOK(S):**

1. Rafael C. Gonzalez, Richard E. Woods, *Digital Image Processing*, Second Edition, Prentice Hall.
2. Anil K. Jain, *Fundamentals of Digital Image Processing* Low Price Edition, Pearson Education.
3. Arthur R. Weeks (1996), *Fundamentals of Electronic Image Processing*, Prentice Hall of India, New Delhi.
4. Milan Sonka, Vaclav Hlavac, Roger Boyle (2008), *Image processing, Analysis and Machine vision*, Thomson Publications, India.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE VI Semester

VCE-R15

**STRUTS AND SPRING FRAMEWORK**  
(Professional Elective - II)

Course Code: A3555

L	T	P	C
4	0	0	4

**Course Overview:**

This course covers basics and architecture of struts. Building struts frame work applications is also covered in this course. This course also gives introduction to spring frame work architecture covering IOC Container, dependence injection, spring JDBC. Web MVC framework is also covered in this course

**Prerequisite(s):** NIL

**Course Outcomes:**

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

- CO1. Build struts frame work and struts2 XML based validation application
- CO2. Develop spring applications using IDE, IOC Container.
- CO3. Develop spring applications using JDBC.
- CO4. Develop web applications using MVC architecture
- CO5. Use DAO design patterns in developing applications.



**VARDHAMAN COLLEGE OF ENGINEERING**  
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B. Tech. CSE VI Semester

VCE-R15

**STRUTS AND SPRING FRAMEWORK**  
(Professional Elective - II)

Course Code: A3555

L	T	P	C
4	0	0	4

**SYLLABUS**

**UNIT – I** **(15 Lectures)**

**STRUTS FRAMEWORK:** Struts Basics & Architecture, Struts Request Handling Life Cycle, Struts Configuration, Struts Actions, Struts Interceptors, Struts Results, Practical (Building Struts Framework Application), Struts2 Tag Libraries, Struts2 XML Based Validations, Practical (Building Struts2 XML based Validation Application), Struts2 Database Access.

**UNIT – II** **(15 Lectures)**

**SPRINGS:** Introduction to Spring Framework Architecture, spring modules and spring applications. Spring with IDE, Bean Definition, Bean Scopes & Bean Definition Inheritance.

**IOC CONTAINER:** Spring IOC Containers, Understanding inversion of control (IOC), Spring Setter Injection, Spring Constructor Injection, IOC in action.

**UNIT – III** **(10 Lectures)**

**DEPENDENCY INJECTION (DI):** Constructor Injection, CI Dependent Object, CI with collection, CI with Map, CI Inheriting Bean, Setter Injection, SI Dependent Object, SI with Collection, SI with Map, CI verses SI, Auto wiring, Factory Method.

**UNIT – IV** **(12 Lectures)**

**SPRING JDBC:** JDBC Template Example, Prepared Statement, Result Set Extractor, Row Mapper, Named Parameter, Simple JDBC Template.

**UNIT – V** **(8 Lectures)**

**WEB MVC FRAMEWORK:** Architecture of Spring Web MVC Framework, Spring MVC Getting Started – constructing web MVC application using Spring Framework, Abstract Controller in Spring MVC, Spring MVC Controllers hierarchy, Simple form controller, Spring DAO design pattern. Building Spring MVC Framework Applications by using Eclipse.

**TEXT BOOK(S):**

1. Professional Java Development with the Spring Framework 1st Edition

**REFERENCE BOOK(S):**

1. Head First Java, 2nd Edition by Kathy Sierra and Bert Bates.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE VI Semester

VCE-R15

**HUMAN COMPUTER INTERACTION**  
(Professional Elective - II)

Course Code: A3556

L	T	P	C
4	0	0	4

**Course Overview:**

A basic precept of HCI is that users should be able to focus on solving problems, rather than dealing with the intricacies of complex software. Interfaces must be accessible, meaningful, visually consistent, comprehensive, accurate, and oriented around the tasks that users tend to perform. The course will provide a balance of practical and theoretical knowledge, giving students experience ordinarily not provided by other courses in computer science.

This course will introduce computer science students to the theory and practice of developing user interfaces. Students will also participate in group projects to design, implement, and evaluate user interfaces.

**Prerequisite(s):**

- Distributed Operating Systems (A2527)
- Object Oriented Analysis and Design (A2520)
- Design patterns (A3655)

**Course Outcomes:**

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

- CO1. Identify the elements of good user interface design and effective GUI.
- CO2. Identify the importance of human characteristics and understanding business functions.
- CO3. "Analyze screen design principles for making good decisions based on technological Considerations in interface design."
- CO4. Select the window, device and screen based controls through navigation schemes.
- CO5. Identify the basic components and interaction devices to interact with the computers.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE VI Semester

VCE-R15

**HUMAN COMPUTER INTERACTION**  
(Professional Elective - II)

Course Code: A3556

L	T	P	C
4	0	0	4

**SYLLABUS**

**UNIT – I**

**(15 Lectures)**

**INTRODUCTION:** Importance of user Interface – definition, importance of good design, Benefits of good design. A brief history of Screen design. (T1:chapter1)

**THE GRAPHICAL USER INTERFACE** – popularity of graphics, the concept of direct manipulation, graphical system, Characteristics, Web user – Interface popularity, characteristics- Principles of user interface. (T1:chapter2)

**UNIT – II**

**(15 Lectures)**

**DESIGN PROCESS:** Human interaction with computers, importance of human characteristics human consideration, Human interaction speeds, and understanding business junctions. (T1: Ch-2, step1)

**UNIT – III**

**(10 Lectures)**

**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. (T1: Ch-2, step3)

**UNIT – IV**

**(12 Lectures)**

**WINDOWS:** New and Navigation schemes selection of window, selection of devices based and screen based controls. Components – text and messages, Icons and increases – Multimedia, colors, uses problems, choosing colors. (R1: chapter12)

**UNIT – V**

**(8 Lectures)**

**SOFTWARE TOOLS:** Specification methods, interface – Building Tools, Interaction Devices – Keyboard and function keys – pointing devices – speech recognition digitization and generation – image and video displays – drivers. (R1: chapter5)

**TEXT BOOK(S):**

1. Wilbert O Galitz, *The essential guide to user interface design*, 3<sup>rd</sup> Edition. Wiley DreamaTech. India
2. Alan Dix, Janet Finca, Gregory D.Abowd, Russell Beal, *Human – Computer Interaction*, 3<sup>rd</sup> Edition

**REFERENCE BOOK(S):**

1. Ben Shneidermann, *Designing the user interface*, 3<sup>rd</sup> Edition, Pearson Education Asia.
2. Rogers, Sharps, Preece (2013), *Interaction Design* 3<sup>rd</sup> Edition, Wiley, India.
3. Soren Lauesen (2005), *User Interface Design*, Pearson Education.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE VI Semester

VCE-R15

**SEMANTIC WEB AND SOCIAL NETWORKS**  
(Professional Elective - II)

Course Code: A3557

L	T	P	C
4	0	0	4

**Course Overview:**

Semantic Web and Social Networks combines the concepts and the methods of two fields of investigation, which together have the power to aid in the analysis of the social Web and the design of a new class of applications that combine human intelligence with machine processing. Social Network Analysis and the emerging Semantic Web are also the fields that stand to gain most from the new Web in achieving their full potential. On the one hand, the social Web delivers social network data at an extraordinary scale, with a dynamics and precision that has been outside of reach for more traditional methods of observing social structure and behavior. In realizing this potential, the technology of the Semantic Web provides the key in aggregating information across heterogeneous sources. The Semantic Web itself benefits by incorporating user-generated metadata and other clues left behind by users.

**Prerequisite(s):**Basics of Web Technologies, Computer Networks

**Course Outcomes:**

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

- CO1. Able to understand the basics of Intelligent Web Applications and limitations.
- CO2. Able to be proficient with Ontology's and their role in the semantic web and Ontology Languages like Resource Description Framework, RDF schema, Ontology Web Language (OWL)XML schema.
- CO3. Able to understand and design current Semantic Web Applications, Services and Technologies to meet desired needs within realistic constraints.
- CO4. Able to analyze and identify web searching problems and apply the semantic searching techniques and applications for obtaining its solution.
- CO5. Demonstrate knowledge of professional, ethical, legal, security and social issues and responsibilities in designing Semantic web and social Networks.
- CO6. To understand and analyze social networks and design solutions for web based social networks like Blogs and Online Communities and their impact on the individuals, organizations, and society.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE VI Semester

VCE-R15

**SEMANTIC WEB AND SOCIAL NETWORKS**  
(Professional Elective - II)

Course Code: A3557

L	T	P	C
4	0	0	4

**SYLLABUS**

**UNIT – I** **(10 Lectures)**

**WEB INTELLIGENCE:** Thinking and Intelligent Web Applications, The Information Age, The World Wide Web, Limitations of today's Web, The Next Generation Web, Artificial Intelligence, Machine Intelligence, Ontology, Inference engines, Software Agents, Berners-Lee WWW, Semantic Road Map, Logic on the semantic Web. (T1: Ch-1,3,4)

**UNIT – II** **(10 Lectures)**

**KNOWLEDGE REPRESENTATION FOR THE SEMANTIC WEB:** Ontologies and their role in the semantic web, Ontologies Languages for the Semantic Web -Resource Description Framework(RDF) / RDF Schema, Ontology Web Language (OWL), UML, XML/XML Schema. (T2: Ch-4)

**UNIT – III** **(14 Lectures)**

**ONTOLOGY ENGINEERING:** Ontology Engineering, Constructing Ontology, Ontology Development Tools, Ontology Methods, Ontology Sharing and Merging, Ontology Libraries and Ontology Mapping. (T1: Ch-7)

**LOGIC, RULE AND INFERENCE:** Logic and inference, Monotonic and Non monotonic rules, Description logic, Inference engines, RDF Inference engine. (T1: Ch-8)

**UNIT – IV** **(10 Lectures)**

**SEMANTIC WEB APPLICATIONS, SERVICES AND TECHNOLOGY:** Semantic Web applications and services, Semantic Search, e-learning, Semantic Bioinformatics, Knowledge Base, XML Based Web Services, Creating an OWL-S Ontology for Web Services, Semantic Search Technology, Web Search Agents and Semantic Methods. (T1: Ch 10,11,12)

**UNIT – V** **(9 Lectures)**

**SOCIAL NETWORK ANALYSIS AND SEMANTIC WEB:** What is social Networks analysis, development of the social networks analysis, Electronic Sources for Network Analysis - Electronic Discussion networks, Blogs and Online Communities, Web Based Networks. Building Semantic Web Applications with social network features. (T2: Ch 2, 3, 6)

**TEXT BOOK(S):**

1. Berners Lee, Godel, Turing, H. Peter Alesso Craig F. Smith (2009), *Thinking on the Web*, Wiley interscience.
2. Peter Mika (2007), *Social Networks and the Semantic Web*, Springer, USA.

**REFERENCE BOOK(S):**

1. J. Davies, Rudi Studer, Paul Warren (2006), *Semantic Web Technologies, Trends and Research in Ontology Based Systems*, John Wiley & Sons, England.
2. Liyang Yu (2007), *Introduction to the Semantic Web and Semantic Web Services*, Chapman & Hall / CRC , USA.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE VI Semester

VCE-R15

**NETWORK SIMULATION LAB**

Course Code: A3523

L	T	P	C
0	0	3	2

**Course Overview:**

The goal of the course is to acquire a deeper understanding of various types of complex computer networks through constructing models in a simulation tool as well as acquire and understand the limitations and possibilities afforded by various simulation methods. Various computer networks will be analyzed from the perspective of network, topology, communication protocols and performance. This course provides in-depth knowledge about the Network Simulation components and analyzes the Network simulation equipment. The laboratory exercises are intended to give students ability to design, build, and analyze the components.

**Prerequisite(s):** Computer Networks (A3519)

**Course Outcomes:**

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

- CO1. Develop their own commands and systems calls in UNIX.
- CO2. Use modeling and simulation as a tool for the evaluation of communication protocols and networks.
- CO3. Build various simulation models.
- CO4. Create and analyze the network traffic between two systems.
- CO5. Become proficient in network simulation tools.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE VI Semester

VCE-R15

**NETWORK SIMULATION LAB**

Course Code: A3523

L	T	P	C
0	0	3	2

**LIST OF EXPERIMENTS**

**Experiment Software**

- 'C' library - Programming interface to the NIU.
- Network stimulator ns-2
- Visual C++ compiler: Version 5.0 or above

**Week-1**

1. Implementation of bit stuffing and character stuffing.

**Week-2**

2. Implementation of hamming code.

**Week-3**

3. Implementation of data encryption and decryption.

**Week-4**

4. Simulate the following CPU Scheduling Algorithms using C program: Create scenarios, simulate, and study the evolution of contention-oriented protocols (Aloha, Slotted Aloha)

**Week-5**

5. Create scenarios and study the difference in performance (with respect to throughput and delay) between token ring and token bus protocols.

**Week-6**

6. Create scenario, simulate, and study the evolution the Stop and Wait Protocol.

**Week-7**

7. Create scenario, simulate, and study the evolution of Go Back N protocol.

**Week-8**

8. Create scenario, simulate, and study the evolution of Selective Repeat Protocol.

**Week-9**

9. Create scenario, simulate, and study the evolution of Djakarta's routing algorithm

**Week-10**

10. Create scenario, simulate, and study the evolution of Distance vector routing algorithm.

**Week-11**

11. Create scenario, simulate, and study the evolution of Link State routing algorithm.

**Week-12**

12. Implement, and verify through a simulator, a program to create sub-network and assign addresses based on the number of hosts connected to the network.

**Week-13**

13. Create a scenario, simulate, and study the performance of the different congestion control algorithms.

**Week-14**

14. Create a simulator to transfer of files from PC to PC using Windows/ UNIX socket processing

**REFERENCE BOOKS:**

1. Mohsen Guizanj Ammar Rayes , Bilal Khan, Ala Al-Fuqaha (2010)., *Network modeling and simulation, a practical perspective*, Wiley,
2. Teerawat Issariyakul, Ekram Hossain (2012), *Introduction to Network Simulator: NS2*, Springer, Second Edition.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE VI Semester

VCE-R15

**DATA WAREHOUSING AND DATA MINING LAB**

Course Code: A3524

L	T	P	C
0	0	3	2

**Course Overview:**

The goal of this Laboratory is to help students learn working with WEKA tool for data mining techniques and kettle Pentaho for data Integration and develop data cubes and perform OLAP operations. Students will be able to perform data preprocessing, classification, clustering, association, attribute selection, and visualization using WEKA tool. Students will be able to perform various data transformations using kettle Pentaho data integration tool and interpret received results.

**Prerequisite(s):** Data Base Management Systems Lab (A3518)

**Course Outcomes:**

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

- CO1. Apply various preprocessing Techniques using WEKA tool for the given datasets.
- CO2. Develop various data integration and transformations using Kettle Pentaho tool.
- CO3. Build data Cubes and perform OLAP Operations.
- CO4. Apply appropriate association and classification techniques to interpret data and provide valid conclusions
- CO5. Apply clustering techniques, compare the results and write effective reports.



**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE VI Semester

VCE-R15

**DATA WAREHOUSING AND DATA MINING LAB**

Course Code: A3524

L T P C  
0 0 3 2

**LIST OF EXPERIMENTS**

**Week-1 (Introduction -Weka)**

1. a) Installation and Introduction to Weka Tool

**Week-2 (Preprocessing -Weka)**

2. a) Preprocessing Data Using Weka Tool. File conversion from Excel to ARFF  
b) Opening File from Local file system.  
c) Opening File from website.

**Week-3 (Integration -Kettle Pentaho)**

3. a) Installation, Introduction to Kettle Pentaho data Integration Tool.  
b) Opening the Pentaho data Integration IDE and create a New repository.  
c) Connect to the Created Repository.  
d) createan ODBC CONNECTION.

**Week-4 (Transformations - Kettle Pentaho)**

4. Developing transformations Using Kettle Pentaho data Integration Tool.  
a) Transform CSV file input into XML file output  
b) Transform CSV file Input into excel file output.  
c) Transform Access to Excel.  
d) Transform Excel file input into MS-Access file output.  
e) Transform Sql server input to MS-ACCESS/MS-Excel.

**Week-5 (Transformations - Kettle Pentaho)**

5. Developing Flow control Transformation using kettle Pentaho  
a) Transform Access file/sql server file into excel file by control data flow.

**Week-6 (Sql Server Analysis)**

6. Sql server Analysis service for Data Analytics  
a) Create data source connection.  
b) Create data source view.  
c) CreateOLAP Cube in SQL Server Analysis Server.

**Week-7 (Sql Server Analysis)**

7. Sql server Analysis service for Data Analytics  
a) PerformOLAP operations on DATACUBE.

**Week -8 (Association Rule Mining)**

8. Use Apriori - Trace the results of using the Apriori algorithm on the grocery store example with support threshold  $s=33.34\%$  and confidence threshold  $c=60\%$ . Show the candidate and frequent item-sets for each database scan. Enumerate all the final frequent item-sets. Also indicate the association rules that are generated and highlight the strong ones, sort them by confidence.

Transaction ID	Items
T1	HotDogs, Buns, Ketchup
T2	HotDogs, Buns
T3	HotDogs, Coke, Chips
T4	Chips, Coke
T5	Chips, Ketchup
T6	HotDogs, Coke, Chips

**Week-9 (Association Rule Mining)**

9. a) **FP-tree and FP-Growth**
  - i) Use the transactional database from the previous exercise with same support threshold and build a frequent pattern tree (FP-Tree). Show for each transaction how the tree evolves.
  - ii) Use Fp-Growth to discover the frequent item-sets from this FP-tree.

- b) **Using WEKA**, Load a dataset described with nominal attributes, e.g. weather.nominal. Run the Apriori algorithm to generate association rules.
- c) **Apriori and FP-Growth (Additional program)**  
 Giving the following database with 5 transactions and a minimum support threshold of 60% and a minimum confidence threshold of 80%, Find all frequent item-sets using:
- Apriori and
  - FP-Growth.
  - Compare the efficiency of both processes.
  - List all strong association rules that contain "A" in the antecedent (Constraint).
  - Can we use this constraint in the frequent item-set generation phase?

TID	Transaction
T1	{A, B, C, D, E, F}
T2	{B, C, D, E, F, G}
T3	{A, D, E, H}
T4	{A, D, F, I, J}
T5	{B, D, E, K}

### Week 10 (Classification)

- Build Base line classification models using Zero R and One R
- Generate Decision Tree using J48, Use *credit.arff* database.

### Week-11: (Clustering)

- Being given the following relation: Student (Name, grade Math, grade Programming, grade Physics, grade English, grade Overall), create an .arff file containing at least 15 instances, load it into Weka, and apply k-Means clustering to it. Also cluster the instances without Weka, and compare the results. Pick different initial cluster centroids and compare the results.

### Week-12 & Week-13: (Additional Programs)

- Integrated project:** Analyze the scores and percentages of the trainees in various modules. The analysis for scores and percentages has to be done in various assessments such as Test, Retest, Hands on, and/or Comprehensive Examination. Use the project specification document provided.
  - Perform (extraction Transformation Loading) ETL
  - Create a new database with the name "Integrated Assignment. This database will include the following tables. (You are free to make the table names more meaningful by prefixing them with "Dim or "Fact.)
    - Time (no need to create; load directly from the data provided).
    - Assessment (to be created)
    - Modules (to be created)
    - Trainees (to be created)
    - Score (to be created)
  - Perform (Multi Dimensional data Modeling) MDDM
  - Create the cube for analysis.
    - Identify four dimensions for the cube.
    - One of the dimensions is Time.
    - Consider only calendar related attributes and create a calendar hierarchy
    - Identify one measure group for the cube.
    - Identify three measures for the cube.

### REFERENCE BOOK(S):

- Jiawei Han, Micheline Kamber, Jian Pei (2012), *Data Mining: Concepts and Techniques*, 3rd edition, Elsevier, United States of America.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE VI Semester

VCE-R15

**INTELLECTUAL PROPERTY RIGHTS**

Course Code: A3013

L	T	P	C
3	0	0	0

**Course Overview:**

The course on Intellectual Property Rights covers all aspects of creations of the intellect: Images, names, inventions, literary works, artistic works etc. It also addresses new and upcoming areas of Intellectual Property (IP) like Biotechnology, Domain Names, Creative Commons, etc. This course has been designed to give the students a holistic understanding of the subject. What is IP? How is it created? How is it protected? - are a few of the key questions which will be discussed during this course. The course is designed to introduce fundamental aspects of Intellectual Property Rights to students who are going to play a major role in development and management of innovative projects in industries. The course introduces all aspects of the IPR Acts. The course is designed for raising awareness of a multidisciplinary audience and has been categorized under 'General'.

**Prerequisite(s): NIL**

**Course Outcomes:**

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

- CO1. Enumerate the basics of the four primary forms of intellectual property rights.
- CO2. Infer the basic principles and sources of intellectual property rights as well as examine how these have changed and are changing as a result of globalization.
- CO3. Explain the different forms of intellectual property protection in terms of their key differences and similarities.
- CO4. Sketch the process to acquire different intellectual property rights i.e., trademarks, copy rights, patents, and trade secrets.
- CO5. Examine the new developments in IPR.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE VI Semester

VCE-R15

**INTELLECTUAL PROPERTY RIGHTS**

Course Code: A3013

L	T	P	C
3	0	0	0

**SYLLABUS**

**UNIT – I**

**(15 Lectures)**

**INTRODUCTION TO INTELLECTUAL PROPERTY:** Introduction, types of intellectual property, international organizations, agencies and treaties, importance of intellectual property rights.

**UNIT – II**

**(15 Lectures)**

**TRADE MARKS:** Purpose and function of trademarks, acquisition of trade mark rights, protectable matter, selecting and evaluating trademarks, trade mark registration process.

**UNIT – III**

**(10 Lectures)**

**LAW OF COPY RIGHTS:** Fundamental of copy right law, originality of material, rights of reproduction, rights to perform the work publicly, copy right ownership issues, copy right registration, notice of copy right, international copy right law.

**LAW OF PATENTS:** Foundation of patent law, patent searching process, ownership rights and transfer.

**UNIT – IV**

**(12 Lectures)**

**TRADE SECRETS:** Trade secret law, determination of trade secret status, liability for misappropriations of trade secrets, protection for submission, and trade secret litigation.

**UNFAIR COMPETITION:** Misappropriation right of publicity, false advertising.

**UNIT – V**

**(8 Lectures)**

**NEW DEVELOPMENT OF IPR:** Geographical indication, Geographical indication protection, Importance to protect geographical indications, Biotechnology Research and Intellectual Property Rights Management, Intellectual property audits.

**TEXT BOOK(S):**

1. Deborah. E. Bouchoux 4<sup>th</sup> Edition (2012), *Intellectual property*, Cengage learning, India.
2. T. M Murray and M.J. Mehlman, *Encyclopedia of Ethical, Legal and Policy issues in Biotechnology*, John Wiley & Sons 2000

**REFERENCE BOOK(S):**

1. Prabudda ganguli (2003), *Intellectual property right*, Tata McGraw Hill Publishing company Ltd., India.
2. P.N. Cheremisinoff, R.P. Ouellette and R.M. Bartholomew, *Biotechnology Applications and Research*, Technomic Publishing Co., Inc. USA, 1985.
3. P. Narayanan; *Law of Copyright and Industrial Designs*; Eastern law House, Delhi, 2010

**SYLLABI FOR  
VII SEMESTER**

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE VII Semester

VCE-R15

**OPEN SOURCE TECHNOLOGIES**

Course Code: A3604

L	T	P	C
3	1	0	3

**Course Overview:**

This course will address the need for vertical open standards, domain knowledge and open source software skills for various industry verticals and drive to reduce the gap between industry requirement and availability of technical professionals for the same. This course provides the student with the insights into the world of open source software. Student will learn the Open source technologies like PHP, JQuery, Python, MySQL technologies which helps him in developing applications (software) as part of project work and makes him industry ready.

**Prerequisite(s):**

Object Oriented Programming (A3509)

Web Technologies (A3601)

Database Management Systems (A3516)

**Course Outcomes:**

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

- CO1. Solve computer software problems by using PHP and MySQL.
- CO2. Familiarize and define the programming syntax and constructs of different open source programming languages
- CO3. Analyze and implement Scripting applications using Python.
- CO4. Demonstrate ability to exhibit knowledge of developing applications using Python.
- CO5. Ability to write scripts using AngularJS and JQuery.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE VII Semester

VCE-R15

**OPEN SOURCE TECHNOLOGIES**

Course Code: A3604

L	T	P	C
3	1	0	3

**SYLLABUS**

**UNIT-I**

**(12 Lectures)**

**INTRODUCTION:** Introduction to Open sources, Need for open Sources, Advantages of Open Sources, Applications of Open sources.

**MySQL:** Introduction, Setting up an account, Starting, Terminating and writing your own MySQL Programs, Data types in MySQL ,Record Selection Technology, Set operations and joins, Sorting Query Results, Generating Summary, Working with Strings, Date and Time, Working with Metadata, Using Sequences.

**UNIT-II**

**(15 Lectures)**

**PHP:**BasicOOP concepts,String Manipulation and Regular Expressions, Form Validation.

**Advanced Concepts:** Include vs. Require, File Handling, Date and Time, Filters, Error Handling, Exception Handling, File Uploading, Sessions and Cookies, Sending and receiving emails, Constant arrays, Anonymous classes.

**UNIT-III**

**(10 Lectures)**

**PHP and MySQL database:** PHP Connectivity ; Retrieving data from MySQL,Manipulating data in MySQL using PHP,MySQL Prepared Statement, calling stored procedures, Image uploading into MySQL database, Pagination PHP-AJAX: Retrieving from MySQL database.

**UNIT-IV**

**(13 Lectures)**

**PYTHON:** Introduction, variables, operators, Control structures, Strings, Lists and Tuples, Dictionaries, Functions, File Handling, Exception Handling, Python GUI programming using Tkinter, Python and MySQL DB access.

**UNIT-V**

**(10 Lectures)**

**JQuery:** Introduction to JQuery, Events, Effects, and Functions related to HTML/CSS.

**AngularJS:** Introduction, Expressions, Directives, Controllers, Modules, Filters, tables, Forms, Form validations, Animations.

**TEXT BOOKS:**

1. Steve Surching , “MySQL Bible” , John Wiley, 2002
2. Steven Holzner, “PHP: The Complete Reference”, 2<sup>nd</sup> Edition, Tata McGraw-Hill Publishing Company Limited, Indian Reprint 2009.

**REFERENCE BOOKS:**

1. Rasmus Lerdorf and Levin Tatroe, “ Programming PHP”, O’Reilly, 2002
2. Wesley J. Chun , “ Core Python Programming”, Prentice Hall, 2001
3. Vikram Vaswani, “MYSQL: The Complete Reference”, 2<sup>nd</sup> Edition, Tata McGraw-Hill Publishing Company Limited, Indian Reprint 2009.
4. jQuery Community Experts,"jQuery CookBbook", 1st Edition, O'Reilly Media, Inc.,2010.
5. Brad Green & Shyam Seshadri, "AngularJS", O'Reilly Media, Inc

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE VII Semester

VCE-R15

**CLOUD COMPUTING**

Course Code: A3525

L	T	P	C
3	1	0	3

**Course Overview:**

Cloud computing is a computing paradigm, where a large pool of systems are connected in private or public networks, to provide dynamically scalable infrastructure for application, data and file storage. With the advent of this technology, the cost of computation, application hosting, content storage and delivery is reduced significantly. This course covers all the above topics.

**Prerequisite(s):** NIL

**Course Outcomes:**

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

- CO1. Know and understand the basic ideas of Cloud Computing.
- CO2. Understand the architecture, deployment models, and infrastructure models of Cloud Computing.
- CO3. Ability to understand distributed storage and performance.
- CO4. Familiarity with the cloud computing security, federation, presence, identity, and privacy.
- CO5. Be familiar with disaster recovery in cloud computing.
- CO6. Be familiar with open source cloud computing software, and free/commercial cloud services.



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(AUTONOMOUS)

B. Tech. CSE VII Semester

VCE-R15

**CLOUD COMPUTING**

Course Code: A3525

L T P C  
3 1 0 3

**SYLLABUS**

**UNIT-I**

**(12 Lectures)**

**Introduction to Cloud Computing:** Cloud Computing in a Nutshell, Roots of Cloud Computing, Layers and Types of Cloud, Features of a cloud, Software-as-a-Service, Platform-as-a-Service, Infrastructure-as-a-Service, Challenges and Risks.

**Cloud computing platforms:** Infrastructure as service: Amazon EC2, Platform as Service: Google App Engine, Microsoft Azure, Utility Computing, Elastic Computing.

**UNIT-II**

**(10 Lectures)**

**Introduction:** The promise of the cloud, the cloud service offerings and Deployment model, Challenges in the cloud,

**Broad Approaches to Migrating into Cloud:** Why Migrate? Deciding on cloud migration.

**The seven step model of Migration into Cloud:** Migration Risks and Mitigation.

**Managing Cloud Services:** Organizational Issues

**Administering Cloud Services:** Service Level Agreements (SLA) and Monitoring Support, Billing and Accounting, Technical Interface, Managing Cloud Resources, Maintaining Connections.

**UNIT-III**

**(12 Lectures)**

**Web services:** SOAP/WSDL web services, REST web services, SOAP v/s REST

**AJAX:** Asynchronous 'rich' interfaces

**Mashups:** user interface services

**Cloud Technologies:** Study of Hypervisor

**Virtualization Technology:** Virtual machine technology, virtualization applications in enterprises, Pitfalls of virtualization

**Multitenant software:** Multi-entity support, Multi-schema approach, Multitenance using cloud data stores, Data access control for enterprise applications.

**UNIT-IV**

**(11 Lectures)**

**Cloud security fundamentals:** Vulnerability assessment tool for cloud, Privacy and Security in cloud

**Cloud computing security architecture:** Architectural Considerations- General Issues, Trusted Cloud computing, Secure Execution Environments and Communications, Micro-architectures; Identity Management and Access control Identity management, Access control, Autonomic Security

**Cloud computing security challenges:** Virtualization security management virtual threats, VM Security Recommendations, VM-Specific Security techniques.

**UNIT-V**

**(11 Lectures)**

**Enterprise Cloud Computing Ecosystem:** Introduction, Public Cloud Providers, Cloud Management Platforms and Tools, Tools for **Building** Private Cloud: IaaS using Eucalyptus, PaaS on IaaS –AppScale.

**Roadmap for Enterprise Cloud Computing:** Introduction, Quick wins using Public Clouds, Future of Enterprise Cloud Computing: Commoditization of the data center, Inter-operating Virtualized Data Centers, Convergence of private and public clouds, Generalized 'cloud' services.

**TEXT BOOKS**

1. Rajkumar Buyya, Cloud Computing: Principles and Paradigms, John Wiley & Sons, First Edition
2. Gautam Shroff, Enterprise Cloud Computing: Technology, Architecture, Applications, Cambridge University Press, First Edition
3. Judith Hurwitz, R Bloor, M. Kanfman, F. Halper, Cloud Computing for Dummies, Wiley India Edition, First Edition.

4. Anthony T Velte, Cloud Computing : A Practical Approach, McGraw-Hill Osborne, First Edition
5. Ronald Krutz and Russell Dean Vines, Cloud Security, Wiley-India, First Edition

**REFERENCE BOOKS:**

1. Barrie Sosinsky, Cloud Computing Bible, Wiley India, First Edition
2. Tim Malhar, S.Kumaraswamy, S.Latif, Cloud Security & Privacy, O'Really Publications, First Edition
3. Scott Granneman, Google Apps, Pearson, First Edition.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE VII Semester

VCE-R15

**MOBILE APPLICATION DEVELOPMENT**

Course Code: A3611

L	T	P	C
3	1	0	3

**Course Overview:**

The latest mobile devices and applications are changing the way we communicate, do business, and access news and entertainment. Businesses, consumers and programmers have embraced this innovative medium, making mobile application developer one of the most demanded and fastest growing IT career paths. This course teaches students how to build mobile apps for Android mobile operating platform. Students learn to write native apps for Android based devices using Eclipse and the Android SDK. Students are expected to work on a project that produces a professional-quality mobile application. Projects will be deployed in real-world applications.

**Prerequisite(s):**

Object Oriented Programming (A3509), Web Technologies (A3601)

**Course Outcomes:**

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

- CO1. Analyze architecture, the ecosystem, features and tools to design mobile applications.
- CO2. Create effective user interfaces that leverage evolving mobile device capabilities.
- CO3. Design, customize and enhance mobile applications with various widgets.
- CO4. Experiment with different application components to design various user friendly mobile applications
- CO5. Build database and server-side applications to provide complete mobile development solutions.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE VII Semester

VCE-R15

**MOBILE APPLICATION DEVELOPMENT**

Course Code: A3611

L	T	P	C
3	1	0	3

**SYLLABUS**

**UNIT - I**

**(10 Lectures)**

A brief history of Mobile, Types of mobile phone generations, The Mobile Ecosystem, Types of Mobile Applications, Mobile Information Architecture Android Versions, Features of Android, Android Architecture, Installing Android SDK Tools, Configuring Android in Eclipse IDE, Android Development Tools (ADT), Creating Android Virtual Devices (AVD)

**UNIT - II**

**(10 Lectures)**

Creating first android application, Anatomy of android application, Deploying Android app on USB connected Android device, Android application components, Activity life cycle, Understanding activities, Exploring Intent objects, Intent Types, Linking activities using intents

**UNIT - III**

**(12 Lectures)**

Fragments life cycle, Interaction between fragments, Understanding the components of a screen (Layouts), Adapting to display orientation, Managing changes to screen orientation, Utilizing the Action Bar, Working with Views(UI Widgets)-Button, Toast, ToggleButton, CheckBox, RadioButton, Spinner, WebView, EditText, DatePicker, TimePicker, ListView, ProgressBar, Analog and Digital clock, Handling UI events, List fragment, Dialog fragment

**UNIT - IV**

**(12 Lectures)**

Working with Menus-Option menu, Context menu, Popup menu, Working with images-ImageView, ImageSwitcher, AlertDialog, Alarm manager, SMS messaging, Sending E-mail, Media Player, Using camera for taking pictures, recording video, Handling Telephony Manager

**UNIT - V**

**(12 Lectures)**

Storing the data persistently-Introducing the Data Storage Options: The preferences, The Internal Storage, The External Storage, The Content Provider, The SQLite database, Connecting with the SQLite database and operations-Insert, Delete, Update, Fetch, Publishing android applications-preparing for publishing, Deploying APK files

**TEXT BOOKS:**

1. Wei-Meng Lee(2011),Beginning Android 4 Application Development, Wiley Publishing, Inc.
2. Pradeep Kothari(2014), "Android Application Development(with KitKat support) Black Book", DreamTech Press

**REFERENCE BOOKS:**

1. James C.Sheusi(2013), "Android Application Development for Java Programmers", Cengage Learning
2. Mark L Murphy(2009), "Beginning Android", Wiley India Pvt Ltd
3. Sayed Y Hashimi and Satya Komatineni(2009), "Pro Android", Wiley India Pvt Ltd
4. Reto Meier, Professional Android 4 Application Development, Wiley India Pvt Ltd

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE VII Semester

VCE-R15

**DESIGN PATTERNS**  
(Professional Elective - III)

Course Code: A3655

L	T	P	C
4	0	0	4

**Course Overview:**

This course deals with the concepts that can speed up the development process by providing tested, proven development paradigms. Effective software design requires considering issues that may not become visible until later in the implementation. Reusing design patterns helps to prevent subtle issues that can cause major problems and improves code readability for coders and architects familiar with the patterns. Often, people only understand how to apply certain software design techniques to certain problems. These techniques are difficult to apply to a broader range of problems. Design patterns provide general solutions, documented in a format that doesn't require specifics tied to a particular problem.

**Prerequisite(s):**

- Software Engineering (A3514)
- Software Architecture (A3652)
- Object Oriented Analysis and Design (A3607)

**Course Outcomes:**

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

CO1. Identify the appropriate design patterns to solve object oriented design problems.

CO2. Apply design solutions using creational patterns.

CO3. Apply structural patterns to solve design problems.

CO4. Apply design solutions by using behavioural patterns.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE VII Semester

VCE-R15

**DESIGN PATTERNS**  
(Professional Elective - III)

Course Code: A3655

L	T	P	C
4	0	0	4

**SYLLABUS**

**UNIT-I**

**(11 Lectures)**

**Introduction:** What is a Design Pattern? Design Patterns in Smalltalk MVC, Describing Design Patterns, The Catalog of Design patterns, Organizing the Catalog, How Design patterns solve Design problems, How to select a Design Pattern, How to use a Design Pattern.

**UNIT-II**

**(14 Lectures)**

**A Case Study:** Designing a Document Editor, Design Problems, Document Structure, Formatting Embellishing the User Interface, Supporting Multiple Look and Feel Standards, Supporting Multiple Window systems, User Operations Spelling Checking and Hyphenation, Summary.  
Creational Patterns: Abstract Factory, Builder, Factory Method, Prototype, Singleton, Discussion of Creational Patterns.

**UNIT-III**

**(10 Lectures)**

**Structural Pattern Part – I:** Adaptor, Bridge, and Composite.  
**Structural Pattern Part – II:** Decorator, Acade, flyweight, proxy.

**UNIT- IV**

**(12 Lectures)**

**Behavior Patterns Part – I:** Chain of Responsibility, Command, Interpreter, and Iterator.  
**Behavior Patterns Part – II:** Mediator, Memento, Observer.

**UNIT- V**

**(13 Lectures)**

**Behavior Patterns Part – II:** (cont'd) State, strategy, Template Method, Visitor, Discussion of Behavioral Patterns. What to Expect from Design Patterns, A brief History, and The Pattern Community an Invitation, A Parting Thought.

**TEXT BOOKS**

1. Design Patterns by Erich Gamma, Pearson Education.

**REFERENCE BOOKS**

1. Pattern's in JAVA Vol-I by Mark Grand, Wiley Dream Tech.
2. Pattern's in JAVA Vol – II BY Mark Grand, Wiley Dream Tech.
3. JAVA Enterprise Design Patterns Vol – III by Mark Grand, Wiley Dream TECH.
4. Head First Design Patterns By Eric Freeman – Oreilly – spd.
5. Peeling Design Patterns, Prof MedaSrinivasa Rao, NarsimhaKarumanchi, Career Monk Publication.
6. Design Patterns Explained By Alan Shallowy, Pearson Education.

**DISTRIBUTED OPERATING SYSTEMS**  
**(Professional Elective - III)**

**Course Code: A3558**

L	T	P	C
4	0	0	4

**Course Overview:**

This Course examines fundamental principles of distributed systems. It discusses issues in distributed operating system with emphasis on communication, process naming synchronization consistence and replication.

**Prerequisite(s):** NIL

**Course Outcomes:**

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

- CO1. Comprehend the issues of terms of scheduling for user level processes/threads.
- CO2. Understand the concepts of deadlock in operating systems and how they can be managed / avoided. Design and implement network computational techniques using distributed operating system.
- CO3. Classify the types of security problems faced by operating systems and how to minimize these problems.
- CO4. Understand the organization and synchronization of distributed operating systems.
- CO5. Apply the knowledge of communication in distributed systems and how it can be used in remote procedure calls, remote objects and message-oriented communication.
- CO6. Understand organizing principles for distributed systems through selection algorithms.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSEVII Semester

VCE-R15

**DISTRIBUTED OPERATING SYSTEMS**  
(Professional Elective - III)

Course Code: A3558

L	T	P	C
4	0	0	4

**SYLLABUS**

**UNIT –I** (12 Lectures)

**Introduction to Distributed Systems:** What is a Distributed System? Goals, Hardware concepts, software concepts, design issues.

**UNIT –II** (12 Lectures)

Communication in Distributed Systems, Layered Protocols, ATM networks, The client –server model, remote procedure call, group communication.

**UNIT –III** (13 Lectures)

**Synchronization in Distributed System:** Clock synchronization, mutual exclusion, election algorithms, atomic transactions, deadlocks in distributed systems.

**UNIT –IV** (13 Lectures)

**Process and processors in Distributed System:** Threads, system models, processors allocation, scheduling in distributed system, fault tolerance, real time distributed system

**Distributed File Systems:** Distributed file system design, distributed file system implementation, trends in distributed file system.

**UNIT –V** (13 Lectures)

**Distributed Shared Memory:** Introduction, What is Shared memory? Consistency models, page based distributed shared memory, shared – variable distributed shared memory, object based distributed shared memory.

**TEXT BOOKS:**

1. Distributed Operating Systems (2007), Andrew S. Tanenbanm, Pearson Education, Inc.

**REFERENCE BOOKS:**

1. Advanced Concepts in Operating Systems, Makes Singhal and Niranjana G. Shivaratna.



**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSEVII Semester

VCE-R15

**INFORMATION RETRIEVAL SYSTEMS**  
(Professional Elective - III)

Course Code: A3559

L	T	P	C
4	0	0	4

**Course Overview:**

These course fundamentals of information retrieval systems focus on indexing searching, classification, storage, browsing, and also on computer algorithms and methods using in this field.

**Prerequisite(s):** NIL

**Course Outcomes:**

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

- CO1. Implements algorithms like clustering, pattern searching, stemming algorithms and etc.
- CO2. Understand the internal architecture of search engine.
- CO3. Generate classification among the web pages using clustering techniques.
- CO4. Help the student to understand the challenges over information retrieval systems by exploring functional difficulties over multimedia search and based rapid growing web content.
- CO5. Design new algorithms based on existing challenges over web search and can able to develop modern digital libraries.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE VII Semester

VCE-R15

**INFORMATION RETRIEVAL SYSTEMS**  
(Professional Elective - III)

Course Code: A3559

L	T	P	C
4	0	0	4

**SYLLABUS**

**UNIT - I** **(10 Lectures)**

**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** **(12 Lectures)**

**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.

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

**UNIT - III** **(14 Lectures)**

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

**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.

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

**UNIT - IV** **(12 Lectures)**

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

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

**UNIT - V** **(10 Lectures)**

**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 , 2<sup>nd</sup> 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)

B. Tech. CSEVII Semester

VCE-R15

**AD-HOC AND SENSOR NETWORKS**  
(Professional Elective - III)

Course Code: A3560

L	T	P	C
4	0	0	4

**Course Overview:**

This course gives an overview of network architecture and applications of ad-hoc and wireless sensor networks. Also discusses protocol design issues and evaluation of QoS performance measurement.

**Prerequisite(s):**NIL

**Course Outcomes:**

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

- CO1. Explain the concepts, network architectures and applications of ad hoc and wireless Sensor networks
- CO2. Analyze the protocol design issues of ad hoc and sensor networks
- CO3. Design routing protocols for ad hoc and wireless sensor networks with respect to some protocol design issues
- CO4. Evaluate the QoS related performance measurements of ad hoc and sensor networks

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSEVII Semester

VCE-R15

**AD-HOC AND SENSOR NETWORKS**  
(Professional Elective - III)

Course Code: A3560

L	T	P	C
4	0	0	4

**SYLLABUS**

**UNIT-I**

**INTRODUCTION:** Fundamentals of Wireless Communication Technology – The Electromagnetic Spectrum – Radio propagation Mechanisms – Characteristics of the Wireless Channel -mobile ad hoc networks (MANETs) and wireless sensor networks (WSNs): concepts and architectures. Applications of Ad Hoc and Sensor networks. Design Challenges in Ad hoc and Sensor Networks.

**UNIT- II**

**MAC PROTOCOLS FOR AD HOC WIRELESS NETWORKS:** Issues in designing a MAC Protocol- Classification of MAC Protocols- Contention based protocols- Contention based protocols with Reservation Mechanisms- Contention based protocols with Scheduling Mechanisms – Multi channel MAC-IEEE 802.11

**UNIT-III**

**ROUTING PROTOCOLS AND TRANSPORT LAYER IN AD HOC WIRELESS NETWORKS:** Issues in designing a routing and Transport Layer protocol for Ad hoc networks- proactive routing, reactive routing (on-demand), hybrid routing- Classification of Transport Layer solutions-TCP over Ad hoc wireless Networks.

**UNIT-IV**

**WIRELESS SENSOR NETWORKS (WSNS) AND MAC PROTOCOLS:** Single node architecture: hardware and software components of a sensor node – WSN Network architecture: typical network architectures-data relaying and aggregation strategies -MAC layer protocols: self-organizing, Hybrid TDMA/FDMA and CSMA based MAC- IEEE 802.15.4.

**UNIT-V**

**WSN ROUTING, LOCALIZATION & QOS:** Issues in WSN routing – OLSR- Localization – Indoor and Sensor Network Localization-absolute and relative localization, triangulation-QOS in WSN-Energy Efficient Design-Synchronization-Transport Layer issues.

**REFERENCES:**

1. Carlos De Moraes Cordeiro, Dharma Prakash Agrawal “Ad Hoc & Sensor Networks: Theory and Applications”, World Scientific Publishing Company, 2006.
2. Feng Zhao and Leonides Guibas, “Wireless Sensor Networks”, Elsevier Publication – 2002
3. Holger Karl and Andreas Willig “Protocols and Architectures for Wireless Sensor Networks”, Wiley, 2005
4. Kazem Sohraby, Daniel Minoli, & Taieb Znati, “Wireless Sensor Networks-Technology, Protocols, and Applications”, John Wiley, 2007.
5. Anna Hac, “Wireless Sensor Network Designs”, John Wiley, 2003.

**TEXT BOOK:**

1. C. Siva Ram Murthy, and B. S. Manoj, “Ad Hoc Wireless Networks: Architectures and Protocols”, Prentice Hall Professional Technical Reference, 2008.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSEVII Semester

VCE-R15

**COMPUTER VISION**  
(Professional Elective - IV)

Course Code: A3561

L	T	P	C
4	0	0	4

**Course Overview:**

The course start with fundamentals of image processing techniques for computer vision covering shape analysis, boundary tracking techniques, rejoin descriptors, chain codes, Hough transformation.

**Prerequisite(s):** NIL

**Course Outcomes:**

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

- CO1. Implement fundamental image processing techniques required for computer vision
- CO2. Perform shape analysis and implement boundary tracking techniques
- CO3. Chain codes and other region descriptors
- CO4. Apply Hough Transform for line, circle, and ellipse detections
- CO5. Adopt 3D vision techniques and implement motion related techniques
- CO6. Develop applications using computer vision techniques

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSEVII Semester

VCE-R15

**COMPUTER VISION**  
(Professional Elective - IV)

Course Code: A3561

L	T	P	C
4	0	0	4

**SYLLABUS**

**UNIT-I**

**IMAGE PROCESSING FOUNDATIONS:** Review of image processing techniques – classical filtering operations – thresholding techniques – edge detection techniques – corner and interest point detection – mathematical morphology – texture

**UNIT-II**

**SHAPES AND REGIONS:** Binary shape analysis – connectedness – object labeling and counting – size filtering – distance functions – skeletons and thinning – deformable shape analysis – boundary tracking procedures – active contours – shape models and shape recognition – centroidal profiles – handling occlusion – boundary length measures – boundary descriptors – chain codes – Fourier descriptors – region descriptors – moments

**UNIT-III**

**HOUGH TRANSFORM:** Line detection – Hough Transform (HT) for line detection – foot-of-normal method – line localization – line fitting – RANSAC for straight line detection – HT based circular object detection – accurate center location – speed problem – ellipse detection – Case study: Human Iris location – hole detection – generalized Hough Transform – spatial matched filtering – GHT for ellipse detection – object location – GHT for feature collation

**UNIT-IV**

**3D VISION AND MOTION:** Methods for 3D vision – projection schemes – shape from shading – photometric stereo – shape from texture – shape from focus – active range finding – surface representations – point-based representation – volumetric representations – 3D object recognition – 3D reconstruction – introduction to motion – triangulation – bundle adjustment – translational alignment – parametric motion – splinebased motion – optical flow – layered motion

**UNIT-V**

**APPLICATIONS:** Application: Photo album – Face detection – Face recognition – Eigen faces – Active appearance and 3D shape models of faces Application: Surveillance – foreground-background separation – particle filters – Chamfer matching, tracking, and occlusion – combining views from multiple cameras – human gait analysis Application: In-vehicle vision system: locating roadway – road markings – identifying road signs – locating pedestrians

**REFERENCES:**

1. E. R. Davies, "Computer & Machine Vision", Fourth Edition, Academic Press, 2012.
2. R. Szeliski, "Computer Vision: Algorithms and Applications", Springer 2011.
3. Simon J. D. Prince, "Computer Vision: Models, Learning, and Inference", Cambridge University Press, 2012.
4. Mark Nixon and Alberto S. Aquado, "Feature Extraction & Image Processing for Computer Vision", Third Edition, Academic Press, 2012.
5. D. L. Baggio et al., "Mastering OpenCV with Practical Computer Vision Projects", Packt Publishing, 2012.
6. Jan Erik Solem, "Programming Computer Vision with Python: Tools and algorithms for analyzing images", O'Reilly Media, 2012.

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(AUTONOMOUS)

B. Tech. CSEVII Semester

VCE-R15

**HIBERNATE FRAMEWORK**  
(Professional Elective - IV)

Course Code: A3562

L	T	P	C
4	0	0	4

**Course Overview:**

Hibernate, the most popular Java persistence tool, offers automatic and transparent object/relational mapping, making it a snap to work with SQL databases in Java applications.

**Prerequisite(s):**

The pre-requisites for learning Hibernate is the basic knowledge of RDBMS, SQL, Java and JDBC

**Course Outcomes:**

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

- CO1. Object-relational mapping concepts and the various issues and options available in Java to address Object persistence.
- CO2. Details of Hibernate mapping, queries, transactions, and concurrency.
- CO3. Problem of storing and retrieving objects to a relational database has its own name – impedance mismatch.
- CO4. To build faster, more flexible and easier to maintain application persistence layers.

**VARDHAMAN COLLEGE OF ENGINEERING**  
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B. Tech. CSE VII Semester

VCE-R15

**HIBERNATE FRAMEWORK**  
(Professional Elective - IV)

Course Code: A3562

L	T	P	C
4	0	0	4

**SYLLABUS**

**UNIT-I**

**(11 Lectures)**

**Understanding object/relational persistence:** What is persistence, the paradigm mismatch, ORM and JPA.

**Starting a project:** Introducing Hibernate, "Hello World" with JPA, Native Hibernate configuration.

**UNIT-II**

**(15 Lectures)**

**Domain models and metadata:**

**Mapping strategies:** mapping persistent classes, mapping value types, mapping inheritance, mapping collections and entity associations, advanced entity association mappings, complex and legacy schemas.

**UNIT-III**

**(12 Lectures)**

**Transactional data processing:** managing data, transactions and concurrency, fetch plans, strategies, and profiles.

**UNIT-IV**

**(13 Lectures)**

**Writing queries:** creating and executing queries, the query languages, advanced query options, customizing sql, a look at HQL.

**UNIT-V**

**(10 Lectures)**

**Building applications:** Designing client/server applications, building web applications, scaling hibernate.

**TEXT BOOKS:**

1. Java Persistence with Hibernate, Second Edition (2015), Christian Bauer, Gavin King, and Gary Gregory

**REFERENCE BOOKS:**

1. Harnessing Hibernate Step-by-step Guide to Java Persistence By James Elliott, Timothy M. O'Brien, Ryan Fowler.



**VARDHAMAN COLLEGE OF ENGINEERING**  
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B. Tech. CSE VII Semester

VCE-R15

**USER EXPERIENCE ENGINEERING**  
(Professional Elective - IV)

Course Code: A3563

L	T	P	C
4	0	0	4

**Course Overview:**

User experience engineering (UXE) - describe a structured research, design, and evaluation process whose goal is to make user interactions with a product or service easy, efficient, and enjoyable. It evolved from usability engineering and applies psychological principles and methodologies.

**Prerequisite(s):**

Web Technologies, Software Engineering, Human Computer Interaction.

**Course Outcomes:**

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

- CO1. Understand importance of User Experience (UX).
- CO2. Gain and apply knowledge of the theoretical frameworks, methodological approaches, and problems solving techniques related to user experience design.
- CO3. Criticize existing interface designs, and improve them.
- CO4. Design complete application with end-to-end understanding of current UXE best practices and processes.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSEVII Semester

VCE-R15

**USER EXPERIENCE ENGINEERING**  
(Professional Elective - IV)

Course Code: A3563

L	T	P	C
4	0	0	4

**SYLLABUS**

**UNIT-I**

**INTRODUCTION:** What is UX, Ubiquitous interaction, Emerging desire for usability, From usability to user experience, Emotional impact as part of the user experience, User experience needs a business case, Roots of usability.

**UNIT-II**

**THE WHEEL:** Introduction: A life cycle Template: A UX process lifecycle template, choosing a process instance for your project, the system complexity space, Meet the user interface team, Scope of UX presence within the team, More about UX lifecycles.

**UNIT-III**

**CONTEXTUAL INQUIRY:** Introduction, The system concept statement, User workactivity gathering, Look for emotional aspects of work practice, Abridged contextual inquiry process, Data-driven vs. Model-driven inquiry, History. , Contextual Analysis, Extracting Interaction Design Requirements, Constructing Design-Information Models.

**UNIT-IV**

**DESIGN THINKING, SKETCHING AND PROTOTYPING:** Introduction, Design paradigms, Design thinking, Design perspectives, User personas, Ideation, Sketching, More about phenomenology, Mental Models and Conceptual Design, Wireframe, Prototyping

**UNIT-V**

**UX-EVALUATION:**UX Goals, Metrics and Targets, UX Evaluation Techniques.-Formative vs summative, Analysis.

**TEXT BOOKS:**

1. Rex Hartson and Pardha Pyla(2012), The UX Book, Morgan Kaufmann.
2. Jesmond Allen and James Chudley (2012), Smashing UX Design, John Wiley & Sons,2<sup>nd</sup> edition, India.

**REFERENCE BOOKS:**

1. Jeff Gothelf and Josh Seiden, (2013), Applying Lean Principles to Improve User Experience, Oreille, publications
2. Jesse James Garrett (2013), The Elements of User Experience, 2<sup>nd</sup> edition, India.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSEVII Semester

VCE-R15

**WEB SERVICES**  
(Professional Elective - IV)

Course Code: A3654

L	T	P	C
4	0	0	4

**Course Overview:**

As XML and Web Services are the core technologies of modern software development, the knowledge about this technology certainly will prepare students well in working in software industry. This course teaches you about XML and the important technologies related to XML. It explains how to create well-formed XML documents. It also teaches you how to build, deploy, and call Web Services using Java.

**Prerequisite(s):**

- Software Engineering (A3514)
- Web Technologies (A3601)

**Course Outcomes:**

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

- CO1. Understand and write well-formed xml documents
- CO2. Format xml data to the desired format
- CO3. Develop web service enabled applications using soap, wsdl & uddi
- CO4. Create, deploy, and call web services using java.
- CO5. Understand the importance of distributed client-server applications.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE VII Semester

VCE-R15

**WEB SERVICES**  
(Professional Elective - IV)

Course Code: A3654

L	T	P	C
4	0	0	4

**SYLLABUS**

**UNIT I** **(12 Lectures)**

Evolution and Emergence of Web Services: Evolution of distributed computing, Core distributed computing technologies, client/server, CORBA, JAVA RMI, Micro Soft DCOM, MOM, Challenges in Distributed Computing, role of J2EE and XML in distributed computing, emergence of Web Services

**UNIT II** **(12 Lectures)**

**Introduction to Web Services:** The definition of web services, motivation and characteristics, core web services standards, other industry standards supporting web services, Tools and technologies enabling web services, benefits and challenges of using web services.

Web Services Architecture and core building blocks, web services communication models, basic steps of implementing web services, developing web services enabled applications.

**UNIT III** **(12 Lectures)**

**Developing web services using SOAP, Anatomy of a SOAP message:** SOAP Encoding, SOAP message exchange models, SOAP communication and messaging, SOAP security, Building SOAP web services, Developing SOAP Web Services using Java, limitations of SOAP

**UNIT IV** **(12 Lectures)**

**Describing Web Services:** WSDL, WSDL in the world of Web Services, Web Services life cycle, Anatomy of WSDL definition document, WSDL bindings, WSDL Tools, Future of WSDL, limitations of WSDL

Discovering Web Services: Service discovery, role of service discovery in a SOA, service discovery mechanisms

**UNIT V** **(12 Lectures)**

**UDDI:** UDDI Registries, uses of UDDI Registry, Programming with UDDI, UDDI data structures, support for categorization in UDDI Registries, Publishing API, Publishing information to a UDDI Registry, searching information in a UDDI Registry, deleting information in a UDDI Registry, limitations of UDDI.

Web Services Interoperability: Means of ensuring Interoperability, Overview of .NET and J2EE. Web Services Security: XML security frame work, XML encryption, XML digital signature, XKMS structure, Guidelines for signing XML documents

**TEXT BOOKS:**

1. Developing Java Web Services, R. Nagappan, R. Skoczylas, R.P.Sriganesh, Wiley India, rp – 2008.
2. Developing Enterprise Web Services, S. Chatterjee, J. Webber, Pearson Education, 2008.
3. XML, Web Services, and the Data Revolution, F.P.Coyle, Pearson Education.

**REFERENCES:**

1. Building Web Services with Java, Second Edition, S. Graham and others, Pearson Edition., 2008.
2. Java Web Services, D.A. Chappell and T. Jewell, O'Reilly, SPD.
3. Java Web Services Architecture, McGovern, et al., Morgan Kaufmann Publishers, 2005.
4. J2EE Web Services, Richard Monson-Haefel, Pearson Education.
5. Web Services, G. Alonso, F. Casati and others, Springer, 2005.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE VII Semester

VCE-R15

**MOBILE APPLICATION DEVELOPMENT LAB**

Course Code: A3614

L	T	P	C
0	0	2	1

**Course Overview:**

This subject covers building mobile applications using android application development tools. It includes developing simple applications that could run on android mobile devices. It covers designing mobile apps for various requirements like connecting to the databases, working with telephony manager, media player, camera, sending mail, working with SQLite database etc.

**Prerequisite(s):**

Object Oriented Programming (A3509)

Web Technologies (A3601)

**Course Outcomes:**

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

- CO1. Install and configure Android application development tools, Apply Java programming concepts to Android application development
- CO2. Design and develop user Interfaces for the Android platform
- CO3. Understand the technical challenges posed by current mobile devices and wireless communications; be able to evaluate and select appropriate solutions
- CO4. Select and evaluate suitable software tools and APIs for the development of a particular mobile application and understand their strengths, scope and limitations
- CO5. The students will be able to develop mobile applications with underlying database supports
- CO6. Develop and apply current standard-compliant scripting/programming techniques for the successful deployment of mobile applications targeting a variety of android supported devices

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSEVII Semester

VCE-R15

**MOBILE APPLICATION DEVELOPMENT LAB**

Course Code: A3614

L	T	P	C
0	0	2	1

**LIST OF EXPERIMENTS**

**WEEK-1**

- a) Create an android app to illustrate activity life cycle
- b) Create an android app to visit a specified webpage (Use Implicit Intent)
- c) Create an android app to navigate between activities (Use Explicit Intent)

**WEEK-2**

- a) Create an android app to perform mathematical operations(+,-,\*,/,%). (Use buttons, edittext, toast controls)
- b) Create an android app to display text in bold, italic, normal style with left, right, center alignments (use RadioButton, CheckBox controls)

**WEEK-3**

- a) Create an android app to display name of the country from the list(Use spinner control)
- b) Create an android app to calculate age of a person (Use DatePicker control)

**WEEK-4**

Create an android app for login control and validate login details

**WEEK-5**

- a) Create an android app to demonstrate AlertDialog
- b) Create an android app to demonstrate WebView control

**WEEK-6**

- a) Create an android app to show Analog and Digital clocks
- b) Create an android app to illustrate a progressbar

**WEEK-7**

- a) Create an android app to demonstrate list fragment
- b) Create an android app to demonstrate dialog fragment

**WEEK-8**

Create an android app to demonstrate option menu with handling listeners

**WEEK-9**

Create an android app to scroll list of images and display details of images (name, size etc) using ImageSwitcher control

**WEEK-10**

- a) Create an android app to demonstrate mediaplayer
- b) Create an android app to show details of phone contacts and implement calling, receiving features

**WEEK-11**

Create an android app to demonstrate camera

**WEEK-12**

- a) Create an android app to demonstrate sending e-mail
- b) Create an android app to demonstrate sending SMS

**WEEK-13**

- a) Create an android app to store details of students in SQLite and display the details
- b) Create an android app to perform insert, update, delete operations on student database

**Text Books:**

1. Wei-Meng Lee(2011),Beginning Android 4 Application Development, Wiley Publishing, Inc.
2. Pradeep Kothari(2014), "Android Application Developmentwith KitKat support) Black Book", Drea mTech Press

**Reference Books:**

1. James C.Sheusi(2013), "Android Application Development for Java Programmers", Cengage Learning

2. Lucas Jordan, Pieter Greyling, Practical Android Projects, Apress
3. John Horton, Android Programming for Beginners, PACKT Publishing
4. Chris Haseman, Kevin Grant, and Beginning Android Programming: Develop and Design, Peachpit press.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE VII Semester

VCE-R15

**OPEN SOURCE TECHNOLOGIES LAB**

Course Code: A3606

L	T	P	C
0	0	2	1

**Course Overview:**

This Laboratory is meant to make the students to learn efficient open source programming languages. Open Source Technologies is a subject of primary importance to the discipline of Information Technology. Comprehensive hands on exercises are integrated throughout to reinforce learning and develop real competency. Students are introduced to all major Open Source Programming languages to develop various applications

**Prerequisite(s):**

- Object Oriented Programming (A3509)
- Web Technologies (A3601)
- Database Management Systems (A3516)

**Course Outcomes:**

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

- CO1. Demonstrate an ability to design and develop Web based programs, analyze, and interpret object oriented data and report results.
- CO2. Develop confidence for self-education and ability for life-long learning needed for other open source languages and can participate and succeed in competitive examinations like Engineering services, exit interviews etc.
- CO3. Solve computer software problems by writing customized programs in an efficient way using python Language
- CO4. Demonstrate an ability to design and develop PHP based novel products
- CO5. Exhibit profound knowledge to create, debug, and execute scripting programs using JQuery, AngularJS.



**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE VII Semester

VCE-R15

**OPEN SOURCE TECHNOLOGIES LAB**

Course Code: A3606

L	T	P	C
0	0	2	1

**LIST OF EXPERIMENTS**

**MySQL:**

Week 1:

1. Installing MySQL and establishing connection with PHP
2. Performing basic DML, DDL commands using MySQL

Week 2:

1. Performing different queries in MySQL
2. Build a small user interface consisting of name, rollnum, marks of 6 subjects for 5 students and display the topper among the 5 students using PHP, MySQL

**PHP:**

Week 3:

1. Write a program to list files in a directory using PHP
2. Write a program to upload image to MySQL database with PHP
3. Write a program to create a ZIP file using PHP

Week 4:

1. Write a program for PHP Pagination
2. Write a program for File download counter

Week 5:

1. Write a program for verifying Email address using MySQL database with PHP
2. Write a program to Validate a PHP Form

**PYTHON:**

Week 6:

1. Write a Program to Print the Fibonacci sequence using python
2. Write a program to Multiply Two Matrices using python
3. Write a Program to Display Powers of 2 Using Anonymous Function using python

Week 7:

1. Write a Program to Make a Simple Calculator using python
2. Write a Program to recursively calculate the sum of natural numbers using python
3. Write a Program to Sort Words in Alphabetic Order using python

Week 8:

1. Write a Program to Handle Exceptions using python
2. Write a program to Find the sum of list elements using python
3. Write a Program to read from a file and write into a file using python

**PERL:**

Week 9:

1. Write a Program to calculate the sum of array elements using subroutines in Perl.
2. Write a program for displaying list of prime numbers using Perl
3. Write a program for opening, reading, writing, closing files using Perl

Week 10:

1. Write a program for copying files using Perl
2. Write a program for string manipulation using Perl
3. Write a program to print the Matrix multiplication using Perl

**TEXT BOOKS:**

1. Rasmus Lerdorf and Levin Tatroe, " Programming PHP", O'Reilly, 2002
2. Vikram Vaswani, "MYSQL: The Complete Reference", 2<sup>nd</sup> Edition, Tata McGraw-Hill Publishing Company Limited, Indian Reprint 2009

**REFERENCE BOOKS:**

1. Wesley J. Chun , “ Core Python Programming” , Prentice Hall, 2001.
2. Martin C.Brown, “Perl: The Complete Reference”, 2<sup>nd</sup> Edition , Tata McGraw-Hill Publishing Company Limited, Indian Reprint 2009.

**SYLLABI FOR  
VIII SEMESTER**

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSEVIII Semester

VCE-R15

**MANAGEMENT SCIENCE**

Course Code: A3014

L	T	P	C
3	1	0	3

**Course Overview:**

This course covers basic concepts of management, organizational structures and operations management and its application to business. The topics include right from revolutions of management such as Taylor's, Fayol's, Mayo, and Maslow's for balancing smooth functioning of operations. This course also focus on quality control, materials management and basic functions of human resources management for a wise decision making process. It provides a basis for students to estimate the optimum time and cost for completion of a project as per given specifications.

**Prerequisite(s):** NIL

**Course Outcomes:**

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

- CO1. Explain and infer the concepts and aspects of management
- CO2. Analyze the different organizational structures, plant layouts, work study tools for enhancement of productivity in an organization.
- CO3. Apply the project management techniques to decide the optimum time and cost for completion of a project.
- CO4. Apply statistical quality control techniques to know quality of product with in control limits
- CO5. Use Human resource management techniques for better people management.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSEVIII Semester

VCE-R15

**MANAGEMENT SCIENCE**

Course Code: A3014

L	T	P	C
3	1	0	3

**SYLLABUS**

**UNIT- I**

**(11 Lectures)**

**INTRODUCTION:** Management - Definition, Nature, Importance of management, Functions of Management - Taylor's scientific management theory, Fayol's principles of management, Contribution of Elton Mayo, Maslow, Herzberg, Douglas MC Gregor. Basic concepts of Organisation- Authority, Responsibility, Delegation of Authority, Span of control, Departmentation and Decentralization - Organisation structures (Line organization, Line and staff organization, Functional organization, Committee organization, Matrix organization)

**UNIT-II**

**(11 Lectures)**

**OPERATIONS MANAGEMENT:** Plant location, Factors influencing location, Principles and types of plant layouts - Methods of production (job, batch and mass production), Work study - Basic procedure involved in method study and Work measurement.

**UNIT-III**

**(11 Lectures)**

**QUALITY CONTROL AND MATERIALS MANAGEMENT:** Statistical quality control – Meaning- Variables and attributes - X chart, R Chart, C Chart, P Chart, (simple Problems) Acceptance sampling, Sampling plans, Deming's contribution to quality. Materials management – objectives, Need for inventory control, Purchase procedure, Store records, EOQ, ABC analysis, Stock levels.

**UNIT-IV**

**(11 Lectures)**

**HUMAN RESOURCE MANAGEMENT (HRM):** Concepts of HRM, Basic functions of HR manager: Man power planning, Recruitment, Selection, Training and development, Placement, Wage and salary administration, Promotion, Transfers, Separation, performance appraisal, Job evaluation and Merit rating.

**UNIT-V**

**(11 Lectures)**

**PROJECT MANAGEMENT:** Early techniques in project management - Network analysis: Programme evaluation and review technique (PERT), Critical path method (CPM), Identifying critical path, Probability of completing project within given time, Project cost analysis, project crashing (simple problems)

**TEXT BOOKS:**

1. Dr. A.R.Aryasri, Management Science, TMH, 4<sup>th</sup> edition, 2009

**REFERENCES:**

1. Koontz & wehrich – Essentials of management, TMH, 8<sup>th</sup> edition, 2010
2. Stoner, Freeman, Gilbert, Management, 6<sup>th</sup> edition Pearson education, New Delhi, 2004.
3. O.P. Khana, Industrial engineering and Management L.S.Srinath, PERT & CPM .

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSEVIII Semester

VCE-R15

**SOFTWARE PROJECT MANAGEMENT**  
(Professional Elective - V)

Course Code: A3661

L	T	P	C
4	0	0	4

**Course Overview:**

The conventional model performance and pitfalls, Software economic parameters, Software development lifecycle stages and phases, Artifacts and work flows of the process, check points of the process(Milestones), Roles and Responsibilities of Management and Technical people, Tailoring of the project, Monitoring and controlling of process status using Metrics, Future software project management.

**Prerequisite(s):**

- Software Engineering (A3514)
- Software Testing Methodology (A3612)

**Course Outcomes:**

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

- CO1. Develop Strategy to achieve the concurrence among stakeholders at every stage in the life cycle known by the student.
- CO2. Capability to reach company goals and customer strategic objectives in every possible way.
- CO3. Ability to approval the necessary management and executive review and approval points and practices per type of project.
- CO4. Ability to organize the software lifecycle such that it will assure the predictability of the project.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSEVIII Semester

VCE-R15

**SOFTWARE PROJECT MANAGEMENT**  
(Professional Elective - V)

Course Code: A3661

L	T	P	C
4	0	0	4

**SYLLABUS**

**UNIT-I** **(15 Lectures)**

**Conventional Software Management:** The waterfall model, conventional software Management performance. **Evolution of Software Economics:** Software economics, pragmatic software cost estimation.

**Improving Software Economics:** Reducing Software product size, improving software processes, improving team effectiveness, improving automation, Achieving required quality, peer inspections.

**The old way and the new:** The principles of conventional software Engineering, principles of modern software management, transitioning to an iterative process.

**UNIT-II** **(9 Lectures)**

**Life cycle phases:** Engineering and production stages, inception, Elaboration, construction, transition phases. **Artifacts of the process:** The artifact sets, Management artifacts, Engineering artifacts, programmatic artifacts. **Model based software architectures:** A Management perspective and technical perspective.

**UNIT-III** **(13 Lectures)**

**Checkpoints of the process:** Major milestones, Minor Milestones, Periodic status assessments. **Iterative Process Planning:** work breakdown structures, planning guidelines, cost and schedule estimating, Iteration planning process, Pragmatic planning.

**Work Flows of the process:** Software process workflows, Iteration workflows.

**UNIT-IV** **(11 Lectures)**

**Project Control and Process instrumentation:** The seven core Metrics, Management indicators, quality indicators, life cycle expectations, pragmatic Software Metrics, Metrics automation. **Tailoring the Process:** Process discriminates.

**UNIT-V** **(15 Lectures)**

**Future Software Project Management:** modern Project Profiles, Next generation Software economics, modern process transitions. **Case Study:** The command Center Processing and Display system- Replacement (CCPDSR).

**TEXT BOOKS:**

1. Software Project Management, Walker Royce: Pearson Education, 2005.

**REFERENCE BOOKS:**

1. Software Project Management, Bob Hughes and Mike Cottere II: Tata McGraw-Hill Edition.
2. Software Project Management, Joel Henry, Pearson Education.
3. Software Project Management in practice, Pankaj Jalote, Pearson Education.2005.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSEVIII Semester

VCE-R15

**BIG DATA ANALYTICS**  
(Professional Elective - V)

Course Code: A3564

L	T	P	C
4	0	0	4

**Course Overview:**

This course covers statistical analysis methods, soft computing frame works, design of distributed files systems besides covering visualization techniques and stream data models

**Prerequisite(s):** NIL

**Course Outcomes:**

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

CO1. Apply the statistical analysis methods.

CO2. Compare and contrast various soft computing frameworks.

CO3. Design distributed file systems.

CO4. Apply Stream data model.

CO5. Use visualization techniques.



**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSEVIII Semester

VCE-R15

**BIG DATA ANALYTICS**  
(Professional Elective - IV)

Course Code: A3564

L	T	P	C
4	0	0	4

**SYLLABUS**

**UNIT-I**

**INTRODUCTION TO BIG DATA:** Introduction to Big Data Platform – Challenges of conventional systems – Web data – Evolution of Analytic scalability, analytic processes and tools, Analysis vs reporting – Modern data analytic tools, Stastical concepts: Sampling distributions, resampling, statistical inference, prediction error.

**UNIT-II**

**DATA ANALYSIS:** Regression modeling, Multivariate analysis, Bayesian modeling, inference and Bayesian networks, Support vector and kernel methods, Analysis of time series: linear systems analysis, nonlinear dynamics – Rule induction – Neural networks: learning and generalization, competitive learning, principal component analysis and neural networks; Fuzzy logic: extracting fuzzy models from data, fuzzy decision trees, Stochastic search methods.

**UNIT-III**

**MINING DATA STREAMS:** Introduction to Streams Concepts – Stream data model and architecture – Stream Computing, Sampling data in a stream – Filtering streams – Counting distinct elements in a stream – Estimating moments – Counting oneness in a window – Decaying window – Realtime Analytics Platform(RTAP) applications – case studies – real time sentiment analysis, stock market predictions.

**UNIT-IV**

**FREQUENT ITEMSETS AND CLUSTERING:** Mining Frequent itemsets – Market based model – Apriori Algorithm – Handling large data sets in Main memory – Limited Pass algorithm – Counting frequent itemsets in a stream – Clustering Techniques – Hierarchical – K- Means – Clustering high dimensional data – CLIQUE and PROCLUS – Frequent pattern based clustering methods – Clustering in non-euclidean space – Clustering for streams and Parallelism.

**UNIT-V**

**FRAMEWORKS AND VISUALIZATION:** MapReduce – Hadoop, Hive, MapR – Sharding – NoSQL Databases – S3 – Hadoop Distributed file systems – Visualizations – Visual data analysis techniques, interaction techniques; Systems and applications:

**TEXT BOOKS:**

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

**REFERENCES:**

1. Bill Franks, Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with advanced analytics, John Wiley & sons, 2012.
2. Glenn J. Myatt, Making Sense of Data, John Wiley & Sons, 2007 Pete Warden, Big Data Glossary, O'Reilly, 2011.
3. Jiawei Han, Micheline Kamber "Data Mining Concepts and Techniques", Second Edition, Elsevier, Reprinted 2008.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSEVIII Semester

VCE-R15

**CYBER SECURITY**  
(Professional Elective - IV)

Course Code: A3656

L	T	P	C
4	0	0	4

**Course Overview:**

This course drawing upon a wealth of experience from academia, industry, and government service, *Cyber Security* details and dissects, in current organizational cyber security policy issues on a global scale—taking great care to educate students on the history and current approaches to the security of cyberspace. It includes thorough descriptions—as well as the pros and cons—of an excess of issues, and document policy alternatives for the sake of clarity with respect to policy alone. It also delves into organizational implementation issues, and equips students with descriptions of the positive and negative impact of specific policy choices.

**Prerequisite(s):**

Computer Networks (A3519), Information Security (A3608), E-Commerce (A3605)

**Course Outcomes:**

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

- CO1. Analyze cyber-attack on different online web applications.
- CO2. Apply different techniques to classify different types of cybercrimes.
- CO3. Get an understanding over different government cyber laws and cyber for ensics techniques.
- CO4. Understand how to protect them self and ultimately society from cyber-attacks.
- CO5. Understanding cybercrime investigating methods using previous case studies.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSEVIII Semester

VCE-R15

**CYBER SECURITY**  
(Professional Elective - V)

Course Code: A3656

L	T	P	C
4	0	0	4

**SYLLABUS**

**UNIT I** **(10 Lectures)**

**INTRODUCTION:** Cyber Security, Cyber Security policy, Domain of Cyber Security Policy, Laws and Regulations, Enterprise Policy, Technology Operations, Technology Configuration, Strategy Versus Policy, **CYBER SECURITY EVOLUTION:** Productivity, Internet, E-commerce, Counter Measures and Challenges.

**UNIT II** **(11 Lectures)**

**CYBER SECURITY OBJECTIVES AND GUIDANCE:** Cyber Security Metrics, Security Management Goals, Counting Vulnerabilities, Security Frameworks, E-Commerce Systems, Industrial Control Systems, Personal Mobile Devices, Security Policy Objectives.

**GUIDANCE FOR DECISION MAKERS:** Tone at the Top, Policy as a Project, Cyber Security Management, Arriving at Goals, Cyber Security Documentation.

**THE CATALOG APPROACH:** Catalog Format, Cyber Security Policy Taxonomy.

**UNIT III** **(12 Lectures)**

**CYBER SECURITY POLICY CATALOG:** Cyber Governance Issues, Net Neutrality, Internet Names and Numbers, Copyright and Trademarks, Email and Messaging, Cyber User Issues, Malvertising, Impersonation, Appropriate Use, Cyber Crime, Geolocation, Privacy, Cyber Conflict Issues, Intellectual property Theft, Cyber Espionage, Cyber Sabotage, Cyber Welfare.

**UNIT IV** **(10 Lectures)**

**CYBER MANGEMENT ISSUES:** Fiduciary Responsibility, Risk Management, Professional Certification, Supply Chain, Security Principles, Research and Development, Cyber Infrastructure Issue, Banking and finance, Health care, Industrial Control systems.

**UNIT V** **(10 Lectures)**

**CASE STUDY:** A Government's Approach to Cyber Security Policy

**TEXTBOOKS:**

1. Jennifer L. Bayuk , J. Healey , P. Rohmeyer , Marcus Sachs , Jeffrey Schmidt , Joseph Weiss “ Cyber Security Policy Guidebook” John Wiley & Sons 2012.

**REFERENCE BOOKS:**

1. Richard A. Clarke, Robert Knake “ Cyberwar: The Next Threat to National Security & What to Do About It” Ecco 2010
2. Dan Shoemaker Cyber security The Essential Body Of Knowledge, 1st ed. Cengage Learning 2011
3. Anti-Hacker Tool Kit (Indian Edition) by Mike Shema, Publication Mc Graw Hill.
4. Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives by Nina Godbole and Sunit Belpure, Publication Wiley.
5. Rick Howard “Cyber Security Essentials” Auerbach Publications 2011.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSEVIII Semester

VCE-R15

**PATTERN RECOGNITION**  
(Professional Elective - V)

Course Code: A3565

L	T	P	C
4	0	0	4

**Course Overview:**

This course focuses on classification of data, identification of feature extraction set. Fuzzy pattern classifiers and perception.

**Prerequisite(s):**NIL

**Course Outcomes:**

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

CO1.Classify the data and identify the patterns.

CO2.Extract feature set and select the features from given data set.

CO3.Explore different classification models

CO4.Use concepts fuzzy pattern classifiers and perception.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSEVIII Semester

VCE-R15

**PATTERN RECOGNITION**  
(Professional Elective - V)

Course Code: A3565

L	T	P	C
4	0	0	4

**SYLLABUS**

**UNIT- I**

PATTERN CLASSIFIER: Overview of Pattern recognition–Discriminant functions–Supervised learning–Parametric estimation–Maximum Likelihood Estimation–Bayesian parameter Estimation–Problems with Bayes approach–Pattern classification by distance functions– Minimum distance pattern classifier.

**UNIT- II**

CLUSTERING: Clustering for unsupervised learning and classification–Clustering concept –C Means algorithm–Hierarchical clustering–Graph theoretic approach to pattern Clustering –Validity of Clusters.

**UNIT- III**

FEATURE EXTRACTION AND STRUCTURAL PATTERN RECOGNITION: KL Transforms –Feature selection through functional approximation–Binary selection-Elements of formal grammars-Syntactic description-Stochastic grammars-Structural representation.

**UNIT- IV**

HIDDEN MARKOV MODELS AND SUPPORT VECTOR MACHINE: State Machines–Hidden Markov Models–Training–Classification–Support vector Machine–Feature Selection.

**UNIT-V**

RECENT ADVANCES: Fuzzylogic–Fuzzy Pattern Classifiers–Pattern Classification using Genetic Algorithms–CaseStudy Using Fuzzy Pattern Classifiers and Perception.

**REFERENCES:**

1. M. Narasimha Murthy and V. Susheela Devi, "Pattern Recognition", Springer 2011.
2. S.Theodoridis and K.Koutroumbas, "Pattern Recognition", 4th Ed., Academic Press,2009.
3. Robert J.Schalkoff, "Pattern Recognition Statistical, Structural and Neural Approaches", John Wiley & Sons Inc., New York, 1992.
4. C.M.Bishop, "Pattern Recognition and Machine Learning", Springer, 2006.
5. R.O.Duda, P.E.Hart and D.G.Stork, "Pattern Classification", John Wiley, 2001
6. Andrew Webb, "Stastical Pattern Recognition", Arnold publishers, London,1999.

# VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CSEVI/VII/VIII Semester

VCE-R15

## FUNDAMENTALS OF DATABASE MANAGEMENT SYSTEMS

(Open Elective)

Course Code: A3576

L	T	P	C
3	0	0	3

### Course Overview:

This course introduces to understand techniques to the design the database systems. This course consists of E-R modeling, data definition and manipulation languages, database security and administration. It also covers essential DBMS concepts such as: Transaction Processing, Concurrency Control and Recovery and various types of database and uses Indexing concepts for faster retrieval of data in database.

**Prerequisite(s):**NIL

### Course Outcomes:

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

- CO1. Design a model for database base on given problem.
- CO2. Formulate a query to retrieve information from database.
- CO3. Implement security and maintenance using consistency and recovery mechanism.
- CO4. Normalize a database.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE VI/VII/VIII Semester

VCE-R15

**FUNDAMENTALS OF DATABASE MANAGEMENT SYSTEMS**  
(Open Elective)

Course Code: A3576

L	T	P	C
3	0	0	3

**SYLLABUS**

**UNIT – I**

**(13 Lectures)**

**INTRODUCTION:** History of database systems, introduction to database management systems, database system applications, database systems versus file systems, view of data, data models, database languages- DDL & DML commands and examples of basic SQL queries, database users and administrators, transaction management. (T2: Ch-1)

**DATABASE DESIGN:** Introduction to database design and E-R diagrams, entities, attributes and entity sets, relationships and relationship sets, conceptual design for large enterprises. (T1: Ch-2)

**UNIT – II**

**13 Lectures)**

**THE RELATIONAL MODEL:** Introduction to the relational model, integrity constraints over relations, enforcing integrity constraints, querying relational data. (T1: Ch-3)

**RELATIONAL ALGEBRA AND CALCULUS:** Preliminaries, relational algebra operators, relational calculus - tuple and domain relational calculus. (T1: Ch-4)

**SQL:** Overview, the form of a basic SQL query, union, intersect and except operators, nested queries, aggregate operators, null values, complex integrity constraints in SQL, cursors, triggers (T1: Ch-5)

**UNIT – III**

**(9 Lectures)**

**SCHEMA REFINEMENT AND NORMAL FORMS:** Functional dependencies, reasoning about FDs. Normal forms: 1NF, 2NF, 3NF, BCNF, properties of decompositions, normalization, schema refinement in database design, other kinds of dependencies: 4NF, 5NF. (T1: Ch-19)

**UNIT – IV**

**(10 Lectures)**

**TRANSACTIONS MANAGEMENT:** Transaction concept, transaction state, implementation of atomicity and durability, concurrent executions, Anomalies due to interleaved execution of transactions, serializability, recoverability. (T2: Ch-14)

**CONCURRENCY CONTROL AND RECOVERY SYSTEM:** Concurrency control - lock based protocols, time-stamp based protocols, validation based protocols, deadlock handling. (T2: Ch-16)

**UNIT – V**

**(8 Lectures)**

**OVERVIEW OF STORAGE AND INDEXING:** RAID levels, Index data structures, Tree structured indexing - intuition for tree indexes, indexed sequential access method (ISAM), B+ Trees - a dynamic tree structure. (T1: Ch-9,10)

**TEXT BOOK(S):**

1. Raghurama Krishnan, Johannes Gehrke (2007), *Database Management Systems*, 3<sup>rd</sup> Edition, Tata McGraw-Hill, New Delhi, India.
2. Abraham Silberschatz, Henry F. Korth, S. Sudarshan (2010), *Database System Concepts*, 6<sup>th</sup> Edition, McGraw- Hill, New Delhi, India.

**REFERENCE BOOK(S):**

1. Elmasri Navate (2014), *Fundamentals of Database Systems*, Pearson Education, India.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE VI/VII/VIII Semester

VCE-R15

**FUNDAMENTALS OF IMAGE PROCESSING**  
(Open Elective)

Course Code: A3577

L	T	P	C
3	0	0	3

**Course Overview:**

Visual information plays an important role in many aspects of our life. Much of this information is represented by digital images and videos. Extracting such information from the digital images and videos has numerous applications in computer vision, robotics, remote sensing, medical imaging, etc. This course gives the students the ability to understand and apply the principles of digital image processing and pattern recognition and develop some applications by following the team based learning principles.

**Prerequisite(s):** NIL

**Course Outcomes:**

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

- CO1. Have an appreciation of the fundamentals of digital image processing and pattern recognition including the topics such as filtering, transforms, morphology, image analysis, compression, clustering, etc.
- CO2. Be able to implement basic image processing algorithms in MATLAB and/or OpenCV (Python).
- CO3. Have the skill base necessary to further explore advanced topics of digital image processing and pattern recognition.
- CO4. Be in a position to make a positive professional contribution in the field of digital image processing and pattern recognition



**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE VI/VII/VIII Semester

VCE-R15

**FUNDAMENTALS OF IMAGE PROCESSING**  
(Open Elective)

Course Code: A3577

L	T	P	C
3	0	0	3

**SYLLABUS**

**UNIT - I**

(Lectures 10)

**FUNDAMENTALS OF IMAGE PROCESSING:**

Image acquisition, image model, sampling, quantization, relationship between pixels, distance measures, connectivity, and image geometry.

**UNIT – II**

(Lectures 8)

**IMAGE TRANSFORMS:**

Fourier transform, DFT, DFT-properties , FFT, WALSH transform, HADAMARD transform, DCT.

**UNIT – III**

(Lectures 11)

**IMAGE ENHANCEMENT (SPATIAL Domain Methods):**

Histogram Processing - definition, equalization, matching, local enhancement, use of histogram statistics for image enhancement, Arithmetic and logical operations, pixel or point operations, size operations, Smoothing filters-mean, median, mode filters, sharpening spatial filtering.

**UNIT – IV**

(Lectures 9)

**IMAGE ENHANCEMENT (FREQUENCY Domain Methods):**

Design of low pass, high pass, edge enhancement, smoothening filters in frequency domain. Butter worth filter, sharpening frequency domain filters, homomorphic filters in frequency domain.

**UNIT – V**

(Lectures 13)

**IMAGE SEGMENTATION:**

Detection of discontinuities, edge linking and boundary detection, thresholding, region based segmentation, use of motion in segmentation.

**COLOR IMAGE PROCESSING:**

Fundamentals, models, pseudo color image, color transformation, Fundamentals of image compression, image compression models, and color image compression.

**TEXT BOOK(S):**

1. Rafael C. Gonzalez, Richard E. Woods (2008), Digital Image Processing, Low Price Edition, Pearson Education, New Delhi, India.

**REFERENCE BOOK(S):**

1. Rafael C. Gonzalez, Richard E. Woods, Digital Image Processing, Second Edition, Prentice Hall.
2. Fundamentals of digital image processing by Anil K. Jain, Low Price Edition, Pearson Education.
3. Arthur R. Weeks (1996), Fundamentals of Electronic Image Processing, Prentice Hall of India, New Delhi.
4. Milan Sonka, Vaclav Hlavac, Roger Boyle (2008), Image processing, Analysis and Machine vision, Thomson Publications, India.

# VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CSE VI/VII/VIII Semester

VCE-R15

## OPERATING SYSTEM FUNDAMENTALS

(Open Elective)

Course Code: A3578

L	T	P	C
3	0	0	3

### Course Overview:

Operating Systems Course is intended as a general introduction to the services provided by it. The course will give idea of various Operating system structures and types. The topics include process management and synchronization, handling of deadlocks, memory and storage management. The course also provides how Input-Output communicates with the system. The file, directory and disk management information can be understood. It compares different operating systems how they manage resources and services. Provides basic information related to protection and security.

**Prerequisite(s):** NIL

Course Outcomes:

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

- CO1. Understand the basic concepts of operating systems, Process Management and Synchronization.
- CO2. Use Deadlock handling methods.
- CO3. Understand the concepts of Memory and Storage management.
- CO4. Apply File, Directory and disk management methods
- CO5. Understand Protection and Security principles and methods to handle.

# VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CSE VI/VII/VIII Semester

VCE-R15

## OPERATING SYSTEM FUNDAMENTALS

(Open Elective)

Course Code: A3578

L	T	P	C
3	0	0	3

### SYLLABUS

#### UNIT – I

(11 Lectures)

**OPERATING SYSTEMS OVERVIEW:** Introduction-operating system operations, process management, memory management, storage management, protection and security, System structures-Operating system services, systems calls, Types of system calls, system programs

#### UNIT – II

(12 Lectures)

**PROCESS MANAGEMENT:** Process concepts- Operations on processes, IPC, Process Scheduling.

**PROCESS COORDINATION:** Process synchronization- critical section problem, Peterson's solution, synchronization hardware, semaphores, classic problems of synchronization, readers and writers problem, dining philosopher's problem, monitors.

#### UNIT – III

(11 Lectures)

**DEADLOCKS:** System model, deadlock characterization, deadlock prevention, avoidance, detection and recovery from deadlock.

**MEMORY MANAGEMENT:** Memory management strategies-Swapping, contiguous memory allocation, paging, structure of the page table, segmentation, virtual-memory management- demand paging, page-replacement algorithms, allocation of frames, thrashing.

#### UNIT – IV

(10 Lectures)

**STORAGE MANAGEMENT:** File system-Concept of a file, access methods, directory structure, file system mounting, file sharing, protection.

**SECONDARY-STORAGE STRUCTURE:** Overview of mass storage structure, disk structure, disk attachment, disk scheduling algorithms, swap space management, stable storage implementation, and tertiary storage structure.

#### UNIT – V

(11 Lectures)

**PROTECTION:** System protection-Goals of protection, principles of protection, domain of protection access matrix, implementation of access matrix, access control, revocation of access rights.

**SECURITY:** System security-The security problem, program threats, system and network threats, implementing security defenses, firewalling to protect systems.

#### TEXT BOOKS:

1. Abraham Silberschatz, Peter Baer Galvin, Greg Gagne (2009), Operating System Concepts, 8<sup>th</sup> Edition, Wiley India Private Limited, New Delhi.

#### REFERENCE BOOKS:

1. Stallings(2006), Operating Systems, Internals and Design Principles, 5<sup>th</sup> Edition, Pearson Education, India.
2. Andrew S. Tanenbaum (2007), Modern Operating Systems, 2<sup>nd</sup> Edition, Prentice Hall of India.
3. Deitel & Deitel (2008), Operating systems, 3<sup>rd</sup> Edition, Pearson Education, India.
4. Dhamdhare (2008), Operating Systems, 2<sup>nd</sup> Edition, Tata Mc graw Hill, New Delhi.
5. Paul Love, Joe Merlino, Craig Zimmerman, Jeremy C. Reed, and Paul Weinstein (2005), Beginning Unix, Wiley Publishing, Inc.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE VI/VII/VIII Semester

VCE-R15

**JAVA PROGRAMMING**  
(Open Elective)

Course Code: A3579

L	T	P	C
3	0	0	3

**Course Overview:**

The Course provides a comprehensive coverage of conceptual and practical Java language, describing its syntax, keywords, and fundamental programming principles to become a proficient Java Programmer. The course is divided into five units, each focusing on a different aspect of core Java Environment suitable to write efficient, maintainable, and portable code. At the outset, the course ignites Object Oriented thinking and explores with the evolution of Java and its basics. It gives strong foundation on Inheritance, Packages and Interfaces and also discusses Exception Handling and Multithreaded mechanisms. The course examines java concepts such as Applets and Event handling. The course end up with nourishing AWT Controls and Swing concepts used for GUI applications. Overall, the knowledge of this course is essential to learn advanced Java and other OOP based languages and hence, stands as a pre-requisite for few fore coming courses like Struts and Spring Framework, Hibernate Framework. The course also plays a vital role in building front-end applications for Mini and Major Project Works in the final year.

**Prerequisite(s):** NIL

**Course Outcomes:**

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

- CO1. Use various programming constructs of object oriented language.
- CO2. Apply principles of object oriented programming to model/design real world problems.
- CO3. Use exception handling mechanism to develop fault tolerant applications.
- CO4. Analyze the concepts of multi-threaded programming and synchronization.
- CO5. Use GUI controls and event handling mechanism to develop interactive window/desktop applications.
- CO6. Analyze need of applets, swings to develop simple web application.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE VI/VII/VIII Semester

VCE-R15

**JAVA PROGRAMMING**  
(Open Elective)

Course Code: A3579

L	T	P	C
3	0	0	3

**SYLLABUS**

**UNIT – I** **(15 Lectures)**

**EVOLUTION OF JAVA:** Object-Oriented Programming Introduction, Two Paradigms, The Three OOP Principles, Evolution of Java, Java Buzzwords, Java Program Structure, Implementing a Java Program, JVM Architecture, Data Types, Variables, Constants, Type Conversion and Casting, I/O Basics, Operators, and Control Statements.

**CLASS, METHODS, OBJECTS AND CONSTRUCTORS:** Introducing Classes, Objects, Methods, Constructors, Garbage Collection, finalize, Overloading Methods and Constructors, Argument Passing, Recursion, static and final Keywords.

**ARRAYS:** One dimensional and two dimensional arrays with sample examples.

**STRINGS:** Exploring String and String Buffer class and Methods.

**UNIT – II** **(10 Lectures)**

**INHERITANCE:** Inheritance Basics, Member Access and Inheritance, this and super Keywords, Creating Multilevel Hierarchy, Method Overriding, Dynamic Method Dispatch, Abstract Classes ,inheritance with final keyword.

**PACKAGES AND INTERFACES:** Defining a Package, Finding Packages and CLASSPATH, Access Protection, Importing Packages, Defining an Interface, and Implementing Interfaces.

**UNIT – III** **(10 Lectures)**

**EXCEPTION HANDLING:** Exception-Handling Fundamentals, Exception Types, Uncaught Exceptions, Using try, catch, throw, throws and finally Keywords, Built-in Exceptions, Creating Own Exception.

**MULTITHREADED PROGRAMMING:** Thread Life Cycle, Creating a Thread - Extending Thread Class and Implementing Runnable Interface, Creating Multiple Threads, Thread Priorities, Synchronization.

**UNIT – IV** **(10 Lectures)**

**AWT CONTROLS:** AWT Classes, Window Fundamentals, Working with Frame Windows, Working with Graphics, Color, Fonts, Control Fundamentals, Labels, Buttons, Check Boxes, Checkbox Group, Choice Controls, Lists, Scroll Bars, TextArea, and Layout Managers.

**SWINGS:** Swings Introduction, Features, Hierarchy of Swing, Top Level Containers - JFrame, JWindow, JApplet, Light Weight Containers - JPanel, Create a Swing Applet, Swing Components - JLabel and Image Icon, JTextField, JButton, JCheckBox, JRadioButton, and JComboBox.

**EVENT HANDLING:** Delegation Event Model, Event Classes, Sources of Events, Event Listener Interfaces, Handling Mouse and Keyboard Events, Adapter Classes.

**UNIT – V** **10 Lectures)**

**FILE I/O:** Streams, Stream Classes- Byte and Character, File Operations – Reading, Writing and Closing, **EXPLORING JAVA.UTIL:** Array List, Vector, Hash table, String Tokenizer, and Date.

**APPLETS:** Applet Basics, Applet Lifecycle, Applet Skeleton, Simple Applet Display Methods, the HTML APPLET Tag, Passing Parameters to Applets.

**TEXT BOOK:**

1. Herbert Schildt (2011), *Java: The Complete Reference*, 8<sup>th</sup> Edition, Tata McGraw-Hill Education, New Delhi.

**REFERENCE BOOKS:**

1. Michael Ernest (2013), *Java SE 7 Programming Essentials*, John Wiley & Sons Inc.

2. Y. Daniel Liang (2014), *Introduction to Java Programming, Comprehensive Version*, 10<sup>th</sup> Edition, Pearson Education, India.
3. Kathy Sierra, Bert Bates (2014), *OCA/OCP Java SE 7 Programmer I & II Study Guide* (Exams 1Z0-803 & 1Z0-804), 1<sup>st</sup> Edition, McGraw-Hill Education Publisher, USA.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE VI/VII/VIII Semester

VCE-R15

**CYBER LAWS**  
(Open Elective)

Course Code: A3676

L	T	P	C
3	0	0	3

**Course Overview:**

This course drawing upon a wealth of experience from academia, industry, and government service, Cyber Security details and dissects, in current organizational cyber security policy issues on a global scale—taking great care to educate students on the history and current approaches to the security of cyberspace. It includes thorough descriptions—as well as the pros and cons—of an excess of issues, and document policy alternatives for the sake of clarity with respect to policy alone. It also delves into organizational implementation issues, and equips students with descriptions of the positive and negative impact of specific policy choices.

**Prerequisite(s):**NIL

**Course Outcomes:**

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

- CO1. Analyze cyber-attack on different online web applications
- CO2. Apply different techniques to classify different types of cybercrimes.
- CO3. Understand different government cyber laws and cyber forensics techniques and how to protect themselves and society from cyber-attacks.
- CO4. Describe and analyze the hardware, software, components of a network and the interrelations.
- CO5. Illustrate the concepts of confidentiality, availability and integrity in Information Assurance, including physical, software, devices, policies and people.

# VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CSE VI/VII/VIII Semester

VCE-R15

**CYBER LAWS**  
**(Open Elective)**

Course Code: A3676

L T P C  
3 0 0 3

## SYLLABUS

### UNIT-I (10 Lectures)

**INTRODUCTION:** Cyber Security– Cyber Security policy – Domain of Cyber Security Policy – Laws and Regulations – Enterprise Policy – Technology Operations – Technology Configuration - Strategy Versus Policy – Cyber security Evolution – Productivity – Internet – E commerce – Counter Measures Challenges.

### UNIT-II (11 Lectures)

**CYBER SECURITY OBJECTIVES AND GUIDANCE:** Cyber Security Metrics – Security Management Goals – Counting Vulnerabilities – Security Frameworks – E Commerce Systems – Industrial Control Systems – Personal Mobile Devices – Security Policy Objectives – Guidance for Decision Makers – Tone at the Top – Policy as a Project – Cyber Security Management – Arriving at Goals – Cyber Security Documentation – The Catalog Approach – Catalog Format – Cyber Security Policy Taxonomy.

### UNIT-III (10 Lectures)

**CYBER SECURITY POLICY CATALOG:** Cyber Governance Issues – Net Neutrality – Internet Names and Numbers – Copyright and Trademarks – Email and Messaging - Cyber User Issues – Malvertising – Impersonation – Appropriate Use – Cyber Crime – Geo location – Privacy - Cyber Conflict Issues – Intellectual property Theft – Cyber Espionage – Cyber Sabotage – Cyber Welfare.

### UNIT-IV (10 Lectures)

**CYBER MANGEMENT ISSUES:** Fiduciary Responsibility – Risk Management – Professional Certification – Supply Chain – Security Principles – Research and Development – Cyber Infrastructure Issue – Banking and finance – Health care – Industrial Control systems.

### UNIT V (10Lectures)

**CASE STUDY:** A Government’s Approach to Cyber Security Policy

### TEXTBOOKS:

1. Jennifer L. Bayuk , J. Healey , P. Rohmeyer , Marcus Sachs , Jeffrey Schmidt , Joseph Weiss “ Cyber Security Policy Guidebook” John Wiley & Sons2012.
2. Rick Howard “Cyber Security Essentials” Auerbach Publications2011

### REFERENCE BOOKS:

1. Richard A. Clarke, Robert Knake “ Cyberwar: The Next Threat to National Security & What to Do About It” Ecco2010
2. Dan Shoemaker Cyber security The Essential Body Of Knowledge, 1st ed. Cengage Learning2011
3. Anti-Hacker Tool Kit (Indian Edition) by Mike Shema, Publication Mc GrawHill.
4. Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives by Nina Godbole and Sunit Belpure, PublicationWiley



# VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CSE VI/VII/VIII Semester

VCE-R15

## E-COMMERCE TRENDS

(Open Elective)

Course Code: A3677

L	T	P	C
3	0	0	3

### Course Overview:

The tremendous growth of the Internet and World Wide Web is having great impact on businesses, governments and individuals throughout the world. In this course, we will attempt to understand the phenomena, technological, economic and social, behind these rapid changes, and how organizations successfully conduct Internet-based activities. We will also study some of the technology of the Internet. This course provides an overview of e-commerce from both technological and managerial perspectives. It introduces e-commerce frameworks, and technological foundations; and examines basic concepts such as strategic formulation for e-commerce enterprises, management of their capital structures and public policy. It is particularly important that the student place a great deal of emphasis in understanding the different E-Commerce system design principles.

**Prerequisite(s):**NIL

### Course Outcomes:

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

CO1.Elaborate the components and roles of the E-Commerceedenvironment.

CO2.Explain how to sell products and services on the web as well as to meet the needs of web site visitors.

CO3.Analyze e-commerce payment systems.

CO4.Identify and reach customers on theweb.

CO5.Understand legal and ethical issues related to E-Commerce and web marketingapproaches.

# VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CSE VI/VII/VIII Semester

VCE-R15

## E-COMMERCE TRENDS

(Open Elective)

Course Code: A3677

L	T	P	C
3	0	0	3

### SYLLABUS

#### UNIT-I

(10Lectures)

**INTRODUCTION TO E-BUSINESS AND E-COMMERCE:** What is the difference between e-commerce and e-business, E-business risks and barriers to business adoption, Management responses to e-commerce and e-business

**E-COMMERCE FUNDAMENTALS-** Location of trading in the marketplace, Business models for e-commerce,

*Focus on* auction business models, *Focus on* Internet start-up companies.

#### UNIT – II

(10

Lectures)

**E-BUSINESS INFRASTRUCTURE-** Introduction, Internet technology, Web technology, Internet-access software applications, Managing e-business infrastructure, *Focus on* web services, SaaS and service-oriented Architecture (SOA), *Focus on* mobile commerce.

#### UNIT – III

(10

Lectures)

**E-ENVIRONMENT-** Social and legal factors, Environmental and green issues related to Internet Usage, *Focus on* e-commerce and globalization, Political factors.

**E-BUSINESS STRATEGY-** What is e-business strategy, Strategic analysis, Strategic objectives, Strategy definition, Strategy implementation, *Focus on* information systems strategy and e-business strategy.

#### UNIT-IV

(10Lectures)

**SUPPLY CHAIN MANAGEMENT-** What is supply chain management?,*Focus on* the value chain, Using e- business to restructure the supply chain, Supply chain management implementation

**E-procurement-** What is e-procurement, Drivers of e-procurement, *Focus on* estimating e-procurement cost, implementing e-procurement, *Focus on* electronic B2B marketplaces.

#### UNIT – V

(12

Lectures)

**E-MARKETING-** What is e-marketing?, E-marketing planning, Situation analysis, Objective setting, Strategy, Tactics, *Focus on* online branding.

**CUSTOMER RELATIONSHIP MANAGEMENT-** What is e-CRM, The online buying process, *Focus on* marketing communications for customer Acquisition, Customer retention management and Technology solutions for CRM.

#### TEXT BOOK:

1. E-Business and E-Commerce Management , strategy, Implementation and practice, Dave Chaffey, Fourth Edition, Prentice Hall

#### REFERENCE BOOKS:

- 1.Frontiers of electronic commerce – Kalakata, Whinston,Pearson.
- 2.E-Commerce fundamentals and applications Hendry Chan, Raymond Lee, Tharam Dillon, Ellizabeth

Chang, JohnWiley.  
3.E-Commerce, S.Jaiswal –Galgotia.  
4.E-Commerce, Efrain Turbon, Jae Lee, David King, H.MichaelChang.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE VI/VII/VIII Semester

VCE-R15

**PRINCIPLES OF SOFTWARE ENGINEERING**  
(Open Elective)

Course Code: A3678

L	T	P	C
3	0	0	3

**Course Overview:**

This course acts as a foundation in the field of software engineering and is aimed at helping students develop an understanding of how software systems are developed from scratch, by guiding them through the development process, adopting the fundamental principles of system development. The course will orient the students to the different software process models, software requirements engineering process, systems analysis and design as a problem-solving activity, with focus on quality.

**Prerequisite(s):** NIL

**Course Outcomes:**

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

- CO1. Identify the right process model to develop the right softwaresystem.
- CO2. Gather requirements and analyze them scientifically in order to develop the right product, besides authoring software requirementsdocument.
- CO3. Propose design as per functional and non-functional requirements using designprinciples.
- CO4. Apply testing strategies for application beingdeveloped.
- CO5. Find right set of umbrella activities for quality management andassurance.
- CO6. Understand metrics in the process and projects domains.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE VI/VII/VIII Semester

VCE-R15

**PRINCIPLES OF SOFTWARE ENGINEERING**  
(Open Elective)

Course Code: A3678

L	T	P	C
3	0	0	3

**SYLLABUS**

**UNIT I**

**(13**

**Lectures)**

**INTRODUCTION TO SOFTWARE ENGINEERING:** The Evolving nature of software engineering, Changing nature of software engineering, Software engineering Layers, The Software Processes, Software Myths.

**PROCESS MODELS:** A Generic Process Model, Waterfall Model, Incremental Process Models, Evolutionary Process Models, Spiral Model, the Unified Process, the Capability Maturity Model Integration (CMMI).

**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 II**

**(11**

**Lectures)**

**REQUIREMENTS ENGINEERING:** Functional and Non-Functional Requirements, The Software requirements Document, Requirements Specification, requirements Engineering, Requirements Elicitation and Analysis, Requirement Validation, Requirement Management, System Modeling: Context Models, Interaction Models, Structural Models, Behavioral Model, Model-Driven Engineering.

**DESIGN CONCEPTS:** The Design Process, Design Concepts, The Design Models and Architectural Design: Software Architecture, Architectural Genres and Architectural Styles.

**UNIT III**

**(12**

**Lectures)**

**DESIGN AND IMPLEMENTATION:** The Object Oriented Design with UML, Design Patterns, Implementation Issues, Open Source development. User Interface Design: The Golden Rules, User Interface Analysis and Design, Interface Analysis, Interface Design Steps, Design Evaluation.

**SOFTWARE TESTING STRATEGIES:** A Strategic approach to Software Testing, Strategic Issues and Test Strategies for Conventional Software, Validation Testing, System Testing, The Art of Debugging, White-Box

Testing, Black Box Testing.

**UNIT IV**

**(12**

**Lectures)**

**PRODUCT METRICS:** A Frame Work for Product Metrics, Metrics for the Requirements Model, Metrics for Design Model, Metrics for Source Code, Metrics for Testing

**PROCESS AND PROJECT METRICS:** Metrics in the Process and Project Domains, Software Measurements, Metrics for Software Quality, Risk Management: Risk verses Proactive Risk

Strategies, Software Risks, Risk Identification, Risk Projection, Risk Refinements, Risk Mitigation Monitoring and Management (RMMM), The RMMM Plan.

## UNIT V

(12

### Lectures)

**QUALITY MANAGEMENT:** Quality Concepts, Software Quality, Software Quality Dilemma, Achieving Software Quality, Review Techniques, Reviews: A Formal spectrum, Informal Reviews, Formal Technical Reviews.

**SOFTWARE QUALITY ASSURANCE:** Background Issues, Elements of Software Quality Assurance, Tasks, Goals and Metrics, Software Reliability, the ISO 9000 Quality Standards.

### TEXT BOOK:

1. Roger S. Pressman (2011), Software Engineering, A Practitioner's approach, 7<sup>th</sup> edition, McGraw Hill International Edition, New Delhi.
2. Sommerville (2001), Software Engineering, 9<sup>th</sup> edition, Pearson education, India.

### REFERENCE BOOKS:

1. K. K. Agarwal, Yogesh Singh (2007), Software Engineering, 3rd edition, New Age International publishers, India.
2. Lames F. Peters, Witold Pedrycz (2000), Software Engineering an Engineering approach, John Wiley & Sons, New Delhi, India.
3. Shely Cashman Rosenblatt (2006), Systems Analysis and Design, 6th edition, Thomson Publications, India.

## VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CSE VI/VII/VIII Semester

VCE-R15

### SCRIPTING LANGUAGES

(Open Elective)

Course Code: A3679

L	T	P	C
3	0	0	3

### Course Overview:

This course will address the need for vertical open standards, domain knowledge and open source software skills for various industry verticals and drive to reduce the gap between industry requirement and availability of technical professionals for the same. This course provides the student with the insights into the world of open source software. Student will learn the Open source technologies like PHP, Perl, Python, MySQL technologies which helps him in developing applications (software) as part of project work and makes him industry ready.

**Prerequisite(s):** NIL

### Course Outcomes:

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

CO1. Demonstrate knowledge about the advanced concepts of Linux OS like scheduling, cloning, signals.

CO2. Show skills to write PHP based GUI applications connecting to MySQL.

CO3. Familiarize and define the programming syntax and constructs of LDAP connectivity in MySQL.

CO4. Analyze and implement Scripting applications using tuples, dictionaries and lists using Python.

CO5. Develop the ability to exhibit knowledge of writing packages and modules using Perl.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE VI/VII/VIII Semester

VCE-R15

**SCRIPTING LANGUAGES**  
(Open Elective)

Course Code: A3679

L	T	P	C
3	0	0	3

**SYLLABUS**

**UNIT 1**

**(13 Lectures)**

**INTRODUCTION:** Introduction to Open sources – Need of open Sources – Advantages of Open Sources – Applications of Open sources. Open Source operating systems: Linux: Introduction – General Overview – Kernel Mode and user mode **LINUX:** Process – Advanced Concepts – Scheduling – Personalities – Cloning – Signals – Development with Linux

**UNIT 2**

**(14 Lectures)**

**PHP:** What is PHP? - Basic Syntax of PHP – programming in web environment - Common PHP Script Elements - Using Variables - Constants – Data types - Operators; Statements - Working with Arrays - Using Functions – OOP - String Manipulation and Regular Expression

**FILE AND DIRECTORY HANDLING** - Including Files - File Access

**WORKING WITH FORMS** -Processing Forms -Form Validation – Introduction to advanced PHP concepts

**UNIT 3**

**(12 Lectures)**

**MySQL:** Introduction - Setting up an account - Starting, Terminating and writing your own MySQL Programs Record Selection Technology - Working with Strings - Date and Time - Sorting Query Results module - Generating Summary - Working with Metadata - Using Sequences – MySQL-and-Web

**PHP AND SQL DATABASE:** PHP and LDAP ; PHP Connectivity ; Sending and receiving emails - Retrieving data from MySQL - Manipulating data in MySQL using PHP

**UNIT 4**

**(13 Lectures)**

**PYTHON: Syntax and style – Python Objects – Numbers \_ Sequences – Strings – Lists and Tuples – Dictionaries – Conditionals and loops** - Functions - File Handling – Exception – Handling Exception-Execution Environment

**UNIT 5**

**(13 Lectures)**

**PERL:** Perl back grounder- Perl overview-Perl parsing rules- Variables and Data – Statements and control structures – Subroutines, Packages, and Modules- Working with Files – Data Manipulation

**TEXT BOOKS:**

- 1.Remy Card, Eric Dumas and Frank Mevel, “ The Linux Kernel Book “, Wiley Publications, 2003
- 2.Steve Surching , “MySQL Bible” , John Wiley, 2002

**REFERENCE BOOKS:**

- 1.Rasmus Lerdorf and Levin Tatroe, “ Programming PHP”, O’Reilly, 2002
- 2.Wesley J. Chun , “ Core Python Programming”, Prentice Hall, 2001
- 3.Martin C.Brown, “Perl: The Complete Reference”, 2<sup>nd</sup> Edition, Tata McGraw-Hill Publishing Company Limited, Indian Reprint 2009.
- 4.Steven Holzner, “PHP: The Complete Reference”, 2<sup>nd</sup> Edition, Tata McGraw-Hill Publishing Company Limited, Indian Reprint 2009.
- 5.Vikram Vaswani, “MYSQL: The Complete Reference”, 2<sup>nd</sup> Edition, Tata McGraw-Hill Publishing Company Limited, Indian Reprint 2009.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE VI/VII/VIII Semester

VCE-R15

**DIGITAL ELECTRONICS**  
(Open Elective)

Course Code: A3476

L	T	P	C
3	0	0	3

**Course Overview:**

This course provides a modern introduction to logic design and the basic building blocks used in digital systems, in particular digital computers. It starts with a discussion of information representation and number systems, Boolean algebra, logic gates and minimization techniques. The second part of the course deals with combinational and sequential logic, where in the procedures to analyze and design the same will be discussed. Moreover, this course forms the basis for the study of advanced subjects like Computer Architecture and Organization, Microprocessors and Interfacing and Embedded systems.

**Prerequisite(s):**NIL

**Course Outcomes:**

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

- CO1. Perform arithmetic operations on different number systems and to apply the principles of Boolean algebra to minimize logic expressions.
- CO2. Use K-map and Tabulation method to minimize and optimize two-level logic functions up to five variables.
- CO3. Analyze some basic components used in digital systems such as adder and subtractor, decoder, encoder, multiplexer, flip-flops.
- CO4. Design various combinational PLDs such as ROMs, PALs, PALs and PROMs.
- CO5. Develop digital systems using registers and counters such as shift registers, Ripple counters, synchronous counters.

# VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CSE VI/VII/VIII Semester

VCE-R15

## DIGITAL ELECTRONICS

(Open Elective)

Course Code: A3476

L	T	P	C
3	0	0	3

### SYLLABUS

#### UNIT-I

(11 Lectures)

**DIGITAL SYSTEMS AND BINARY NUMBERS:** Digital systems, binary numbers, number base conversions, octal and hexadecimal numbers, complements, signed binary numbers, binary codes.

**BOOLEAN ALGEBRA AND LOGIC GATES:** Basic definitions, axiomatic definition of Boolean algebra, basic theorems and properties of Boolean algebra, Boolean functions, canonical and standard forms, other logic operations, digital logic gates.

#### UNIT-II

(9 Lectures)

**GATE LEVEL MINIMIZATION:** The k-map method, four-variable map, five-Variable map, Sum of Products and Product of Sums simplification, don't-care conditions, NAND and NOR implementation, AND-OR-INVERT, OR-AND-INVERT implementations, exclusive – OR function, The tabulation (Quine Mccluskey) method, determination and selection of Prime implicants.

#### UNIT-III

(14 Lectures)

**COMBINATIONAL LOGIC:** Introduction, combinational circuits, analysis procedure, design procedure, binary adder, binary subtractor, BCD adder, binary multiplier, Magnitude comparator, decoder, encoders, multiplexers.

**MEMORY AND PROGRAMMABLE LOGIC:** introduction, Random-access memory, memory decoding, error detection and correction, read only memory, programmable logic array, programmable array logic, sequential programmable devices

#### UNIT-IV

(10 Lectures)

**SEQUENTIAL LOGIC:** Classification of Sequential circuits (Synchronous, Asynchronous, Pulse mode, Level mode with examples), latches, Flip-Flops.

#### UNIT-V

(10 Lectures)

**REGISTERS AND COUNTERS:** Registers, shift registers, Ripple counters, synchronous counters, counter with unused states, ring counter, Johnson counter, LFSR counter.

#### TEXT BOOKS:

- 1.M. Morris Mano, Michael D. Ciletti (2008), *Digital Design*, 4<sup>th</sup> edition, Pearson Education/PHI, India.
- 2.Thomas L. Floyd (2006), *Digital fundamentals*, 9<sup>th</sup> edition, Pearson Education International.

#### REFERENCE BOOKS:

- 1.Zvi. Kohavi (2004), *Switching and Finite Automata Theory*, Tata McGraw Hill, India.
- 2.C.V.S. Rao (2009), *Switching and Logic Design*, 3<sup>rd</sup> edition, Pearson Education, India.
- 3.Donald D.Givone (2002), *Digital Principles and Design*, Tata McGraw Hill, India.



**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE VI/VII/VIII Semester

VCE-R15

**PRINCIPLES OF ANALOG AND DIGITAL COMMUNICATIONS**  
(Open Elective)

Course Code: A3477

L	T	P	C
3	0	0	3

**Course Overview:**

This course is useful to understand the basics of Signals, Systems, Random Variables and Communication. The course presents and integrates the basic concepts for both continuous-time and discrete signals and systems. This course provides a foundation in the theory and applications of random variables stochastic processes and an understanding of the mathematical techniques relating to random processes in the areas of signal processing, detection & estimation theory and communications. It gives the basics of Analog and Digital Communication and also gives the background required for advanced study on the course. This is accomplished by providing overviews of the necessary background in signal, system, probability, and random process theory required for the analog and digital communications. It gives more emphasis on stressing fundamental concepts. The topics in the course, more than enough to student's needs.

**Prerequisite(s):**NIL

**Course Outcomes:**

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

- CO1. Analyze linear and non - linear modulators and demodulators in time as well as frequency domain.
- CO2. Design a linear and non linear modulators and demodulators for the analog signals.
- CO3. Outline the basic concepts of digital communications with an insight into practical applications and Differentiate between PCM and DM and identify the applications of these modulation schemes in base band transmission.
- CO4. Estimate overall digital communication system for the improvement of the system performance.
- CO5. Analyze the performance of a digital communication system by introducing various spread spectrum modulation techniques.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE VI/VII/VIII Semester

VCE-R15

**PRINCIPLES OF ANALOG AND DIGITAL COMMUNICATIONS**  
(Open Elective)

Course Code: A3477

L	T	P	C
3	0	0	3

**SYLLABUS**

**UNIT - I**

**(11 Lectures)**

Introduction to communication system, need for modulation, Types of modulation techniques: AM, FM, PM, Generation and detection. Comparison of AM, FM, PM. Radio transmitters and receivers (TRF& Super heterodyne).

**UNIT - II**

**(12 Lectures)**

Sources of Noise, Resistor Noise, Shot Noise, Calculation of Noise in a Linear System, Noise in AM Systems, Noise in Angle Modulation Systems, Comparison between AM and FM with respect to Noise, Threshold Improvement in Discriminators, Comparisons between AM and FM.

**UNIT - III**

**(11 Lectures)**

**Analog-to-Digital Conversion:** Pulse modulation techniques, Sampling, Time Division Multiplexing, Pulse Amplitude Modulation, Pulse Width Modulation, Pulse Position Modulation, Digital Modulation Techniques: Pulse Code Modulation, Differential Pulse Code Modulation, Delta Modulation, Adaptive Delta Modulation, Continuously Variable Slope Delta Modulation, Companding, Noise in Pulse-Code and Delta-Modulation Systems.

**UNIT - IV**

**(11 Lectures)**

Binary Phase-Shift Keying, Differential Phase-Shift Keying, Differentially Encoded PSK (DEPSK), Quadrature Phase-Shift Keying (QPSK), M-ary PSK, Quadrature Amplitude Shift Keying (QASK), Binary Frequency Shift-Keying, Similarity of BFSK and BPSK, M-ary FSK, Minimum Shift Keying (MSK), Duo-binary Encoding.

**UNIT - V**

**(11 Lectures)**

**Spread Spectrum Modulation:** Direct Sequence (DS) Spread Spectrum, Use of Spread Spectrum with Code Division Multiple Access (CDMA), Ranging using DS Spread Spectrum, Frequency Hopping (FH) Spread Spectrum, Generation and Characteristics of PN Sequences, Acquisition (Coarse Synchronization) of a FH Signal, Tracking (Fine Synchronization) of a FH Signal, Acquisition (Coarse Synchronization) of a DS Signal, Tracking of a DS Signal.

**TEXT BOOKS:**

1. *Communication Systems*, Simon Haykins (2nd Edition).
2. *Analog and Digital Communication Systems* by Martin S. Roden, 3rd edition, Prentice Hall, 1994.
3. *Principles of Communications* By Taub and Schilling.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE VI/VII/VIII Semester

VCE-R15

**TRANSDUCERS AND MEASUREMENTS**  
(Open Elective)

Course Code: A3478

L	T	P	C
3	0	0	3

**Course Overview:**

This course provides an overall understanding of the elements and processes, including sources of errors, and digitally acquiring these measurements. Along with an overview of instrumentation principles, the physical principles and electrical characteristics for several common instrument transducers are studied. The electronic signal conditioning circuits required converting the electrical changes in the transducers to signal which can be interpreted accurately by a microprocessor or an embedded controller are analyzed and designed effectively. This course also gives an integration of hardware and software in designing computer controlled processes and/or systems with the aid of sensors, transducers data acquisition board, and instrument control.

**Prerequisite(s):**NIL

**Course Outcomes:**

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

- CO1. Aware the basic concepts of measurement parameters as well as instrument standards, characteristics and errors.
- CO2. Construct and design various measuring devices like voltmeters, Ammeters, Ohmmeters, analog, digital multi-meters and analyze different types of cathode ray oscilloscopes.
- CO3. Design different bridge networks and analyze balanced condition for finding out values of resistance, capacitance and inductance.
- CO4. Analyze different physical parameters like pressure, force, velocity, acceleration, sound, torque, strain and stress etc. using non-electrical transducers.
- CO5. Apply the principles and practice for instrument design and develop for real world problems.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE VI/VII/VIII Semester

VCE-R15

**TRANSDUCERS AND MEASUREMENTS**  
(Open Elective)

Course Code: A3478

L	T	P	C
3	0	0	3

**SYLLABUS**

**UNIT - I**

**CHARACTERISTICS OF INSTRUMENTS:** Block schematic of measuring system, Performance characteristics of instruments-static and dynamic characteristics, Errors in measurement.

**MEASURING INSTRUMENTS:**DC voltmeters- multirange, range extension, DC Ammeter- multi range, range extension, Ayrton shunt, ohmmeters-series type and shunt type, AC Voltmeter, thermocouple type RF ammeter.

**DIGITAL VOLTMETERS:** Dual slope and Successive Approximation type DVM

**UNIT – II**

**CATHODE RAY OSCILLOSCOPE (CRO):**Introduction to CRT, vertical amplifiers, horizontal deflection system, simple CRO.

**SPECIAL PURPOSE OSCILLOSCOPES:** Dual beam CRO, Dual trace oscilloscope, sampling oscilloscope, analog storage oscilloscope, digital storage oscilloscope, measurement of phase and frequency (lissajous patterns).

**UNIT - III**

**DC and AC BRIDGES:** Measurement of resistance Wheat's stone bridge, Kelvin's double bridge, measurement of Inductance using Maxwell's inductance bridge, Anderson's bridge, Hay's bridge, measurement of capacitance using Schering bridge, Wagner's ground connection, errors and precautions in using bridges.

**UNIT - IV**

**TRANSDUCERS-I:** Introduction, classification, strain gauges, LVDT, Piezo electric transducers, OPAMP applications in measurement and transducer circuits, instrumentation amplifier, thermometers, thermocouples, thermistors, sensistors.

**UNIT - V**

**TRANSDUCERS-II:** Measurement of non electrical quantities- displacement, pressure, torque, vibration, pH, sound, velocity, humidity, speed, analog and digital data acquisition systems, interfacing and bus standards, programmable logic controllers and their industrial applications.

**TEXT BOOKS:**

1. K Sawhney (2007), Electrical and Electronic Measurements and Instrumentation, 18<sup>th</sup> edition, Dhanpat Rai & Co, New Delhi.
2. H.S.Kalsi, Electronic Instrumentation, 3<sup>rd</sup> edition, Tata McGraw-Hill Education

**REFERENCE BOOKS:**

- 1.D. Helfrick, W.D. Cooper (2002), Modern Electronic Instrumentation and Measurement Techniques, 5th edition, Prentice Hall of India, New Delhi.
- 2.David A. Bell (2003), Electronic Instrumentation & Measurements, 2<sup>nd</sup> edition, Prentice Hall of India, New Delhi.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE VI/VII/VIII Semester

VCE-R15

**INTERNET OF THINGS**  
(Open Elective)

Course Code: A3479

L	T	P	C
3	0	0	3

**Course Overview:**

The explosive growth of the “Internet of Things” is changing our world and the rapid drop in price for typical IoT components is allowing people to innovate new designs and products at home. In this course students will learn the importance of IoT in society, the current components of typical IoT devices and trends for the future. This course covers IoT design considerations, constraints and interfacing between the physical world to mobile device, how to make design trade-offs between hardware and software, and key components of networking to ensure that students understand how to connect their device to the Internet.

**Prerequisite(s):**NIL

- Computer Architecture and Organization (A3508)
- Microprocessors and Microcontrollers (A3419)
- Embedded Systems (A3424)

**Course Outcomes:**

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

- CO1. Explain the definition and usage of the term “The Internet of Things” in different contexts.
- CO2. Understand where the IoT concept fits within the broader ICT industry and possible future trends.
- CO3. Differentiate between the levels of the IoT stack and be familiar with the key technologies and protocols employed at each layer of the stack.
- CO4. Design a simple IoT system comprising sensors, edge devices, wireless network connections and data analytics capabilities
- CO5. Use the knowledge and skills acquired during the course to build and test a complete, working IoT system involving prototyping, programming and data analysis.

# VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CSE VI/VII/VIII Semester

VCE-R15

## INTERNET OF THINGS

(Open Elective)

Course Code: A3479

L	T	P	C
3	0	0	3

### SYLLABUS

#### UNIT – I

(10

Lectures)

**INTRODUCTION & CONCEPTS:** Introduction to Internet of Things, Physical Design of IoT, Logical Design of IoT, IoT Enabling Technologies, IoT Levels.

#### UNIT - II

(12

Lectures)

**DESIGN PRINCIPLES FOR CONNECTED DEVICES:** Calm And Ambient Technology, Magic As Metaphor, Privacy, Keeping Secrets, Whose Data Is It Anyway?, Web Thinking For Connected Devices, Small Pieces, Loosely Joined, First Class Citizens On The Internet, Graceful Degradation.

#### UNIT - III

(11

Lectures)

**INTERNET PRINCIPLES:** An overview on IP, TCP & UDP, IP Addresses, MAC Addresses, TCP & UDP Ports, Application Layer Protocols

#### UNIT - IV

(11 Lectures)

**PROTOTYPING EMBEDDED DEVICES:** Electronics, Embedded Computing Basics, Arduino, Raspberry PI, Beagle Bone Black, Electronic IMP, and Other notable Platforms

#### UNIT - V

(12 Lectures)

**TECHNIQUES FOR WRITING EMBEDDED CODE:** Memory management, Types of memory, Making the most use of RAM, Performance & battery life, Libraries, Debugging.

**PROTOTYPE TO REALITY:** Who is the Business model for IoT?, Funding an IoT startup.

#### TEXT BOOKS:

1. Adrian McEwen & Hakim Cassimally (2014), *Designing the Internet of Things*, John Wiley and Sons, UK.
2. Vijay Madiseti and Arshdeep Bahga, "Internet of Things (A Hands – on - Approach)", 1 st Edition,VPT, 2014.

#### REFERENCE BOOKS:

1. Jan Holler, Vlasios Tsiatsis , Catherine Mulligan, Stefan Avesand, Stamatis Karnouskos, David Boyle, "From Machine – to - Machine to the Internet of Things: Introduction to a New Age of Intelligence", 1<sup>st</sup> Edition, Academic Press, 2014.
2. Francis daCosta, "Rethinking the Internet of Things: A Scalable Approach to Connecting Everything", 1<sup>st</sup> Edition, Apress Publications, 2013.
3. Daniel Kellmerit, "The Silent Intelligence: The Internet of Things", 2013.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE VI/VII/VIII Semester

VCE-R15

**NANO TECHNOLOGY APPLICATIONS TO ELECTRICAL ENGINEERING**  
(Open Elective)

Course Code: A3276

L	T	P	C
3	0	0	3

**Course Overview:**

The course is designed to teach the elements of advanced science and technology used in nanotechnology materials and nano device fabrication. The topics taught include the fundamentals of: quantum mechanics, nano scale quantum structures, bulk semiconductor and epitaxial growth techniques, vacuum technology, semiconductor material characterization, defects in crystals, diffusion and implantation, wafer manufacturing, and processing.

**Prerequisite(s):**NIL

**Course Outcomes:**

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

- CO1. Analyze the different forms of energy conversion methods conventional energy sources and sustainable renewable energy sources
- CO2. Investigate different Nano materials and characteristics and applications in electrical energy storage and electrical energy applications
- CO3. Evaluate micro fluid devices, Nano-engines, and energy conversion systems
- CO4. Explore hydrogen storage systems.

# VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CSE VI/VII/VIII Semester

VCE-R15

NANO TECHNOLOGY APPLICATIONS TO ELECTRICAL ENGINEERING

(Open Elective)

Course Code: A3276

L	T	P	C
3	0	0	3

## SYLLABUS

### UNIT – I

**INTRODUCTION:** Nanotechnology and its role in sustainable energy - Energy conversion process, Direct and in-direct energy conversion - Materials for: Light emitting diodes, Batteries, Advance turbines, Catalytic reactors, Capacitors and Fuel cells. Energy challenges - Development and implementation of renewable energy technologies.

### UNIT – II

**RENEWABLE ENERGY CONVERSION AND STORAGE:** Energy conversion and storage - Nano, micro, poly crystalline Silicon and amorphous Silicon for solar cells, Silicon-composite structure, Techniques for Si deposition. Micro-fuel cell technologies, integration and performance of micro-fuel cell systems.

### UNIT – III

**MICROFLUIDIC SYSTEMS-I:** Nano-electromechanical systems and novel micro fluidic devices - Nano engines – Driving mechanisms. Power generation - Micro channel battery - Micro heat engine (MHE) fabrication – Thermo capillary forces – Thermo capillary pumping (TCP) - Piezoelectric membrane.

### UNIT – IV

**HYDROGEN STORAGE METHODS-I:** Hydrogen storage methods - Metal hydrides and size effects - Hydrogen storage capacity - Hydrogen reaction kinetics - Carbon-free cycle.

### UNIT – V

**HYDROGEN STORAGE METHODS-II:** Gravimetric and volumetric storage capacities – Hydriding / Dehydriding kinetics - High enthalpy of formation and thermal management during the hydriding reaction.

### TEXT BOOKS:

1. J. Twidell and T. Weir, *Renewable Energy Resources*, E & F N Spon Ltd, London, (1986).
2. Martin A Green, *Solar cells: Operating principles, technology and system applications*, Prentice Hall Inc, Englewood Cliffs, NJ, USA, (1981).
3. H J Moller, *Semiconductor for solar cells*, Artech House Inc, MA, USA, (1993).
4. Ben G Streetman, *Solis state electronic device*, Prentice Hall of India Pvt Ltd., New Delhi (1995).

### REFERENCE BOOKS:

1. M.A. Kettani, *Direct energy conversion*, Addison Wesley Reading, (1970).
2. Linden, *Hand book of Batteries and fuel cells*, Mc Graw Hill, (1984).
3. Hoogers, *Fuel cell technology handbook*. CRC Press, (2003).
4. Vielstich, *Handbook of fuel cells: Fuel cell technology and applications*, Wiley, CRC Press, (2003).



# VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CSE VI/VII/VIII Semester

VCE-R15

INDUSTRIAL ELECTRONICS

(Open Elective)

Course Code: A3277

L	T	P	C
3	0	0	3

## Course Overview:

The student is introduced to various electronic components and systems used in modern industry. Operational amplifier principles and applications including comparators (zero and nonzero crossing Detectors), voltage followers, inverting and non-inverting amplifiers. Subtraction, summing (mixer), difference and compound amplifiers and active filters. Operational amplifiers circuits are configured to make up complex analog circuits. Speed channels Filtering Noise using passive components will be explained. The design of Precision mechanical systems will be explained also the over view of micro controllers will be dealt.

**Prerequisite(s):** NIL

## Course Outcomes:

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

- CO1. Apply the knowledge of electronics in developing the controllers for industrial applications
- CO2. Interpret system drawings, and design simple systems for sequential control systems involving valves and cylinders
- CO3. Evaluate the operational characteristics the electrical and mechanical actuation systems
- CO4. Construct a program and design a control system using microcontroller

# VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CSE VI/VII/VIII Semester

VCE-R15

## INDUSTRIAL ELECTRONICS (Open Elective)

Course Code: A3277

L	T	P	C
3	0	0	3

### SYLLABUS

#### UNIT - I

**INTRODUCTION:** Definition – Trends - Control Methods: Standalone, PC Based Real Time Operating Systems, Graphical User Interface, Simulation

**SIGNAL CONDITIONING:** Introduction – Hardware - Digital I/O, Analog input – ADC, resolution, speed channels Filtering Noise using passive components – Resistors, capacitors - Amplifying signals using OP amps.

#### UNIT – II

**PRECISION MECHANICAL SYSTEMS:** Pneumatic Actuation Systems - Electro-pneumatic Actuation Systems - Hydraulic Actuation Systems - Electro-hydraulic Actuation Systems - Timing Belts – Ball Screw and Nut - Linear Motion Guides - Linear Bearings - Harmonic Transmission - Bearings- Motor / Drive Selection.

#### UNIT – III

**ELECTRONIC INTERFACE SUBSYSTEMS:** TTL, CMOS interfacing - Sensor interfacing – Actuator interfacing – solenoids motors Isolation schemes- opto coupling, buffer IC's - Protection schemes – circuit breakers , over current sensing , resettable fuses , thermal dissipation - Power Supply - Bipolar transistors / mosfets

#### UNIT – IV

**ELECTROMECHANICAL DRIVES:** Relays and Solenoids - Stepper Motors - DC brushed motors – DC brushless motors - DC servo motors - 4-quadrant servo drives, PWM's - Pulse Width Modulation – Variable Frequency Drives, Vector Drives - Drive System load calculation.

#### UNIT – V

**MICROCONTROLLERS OVERVIEW:** 8051 Microcontroller, micro processor structure – Digital Interfacing - Analog Interfacing - Digital to Analog Convertors - Analog to Digital Convertors - Applications. Programming –Assembly, (LED Blinking, Voltage measurement using ADC).

#### TEXT BOOKS:

1. Mechatronics Electronics Control Systems in Mechanical and Electrical Engineering by W Bolton, Pearson Education Press, 3rd edition, 2005.
2. Mechatronics/M.D.Singh/J.G.Joshi/PHI.

#### REFERENCE BOOKS:

1. Mechatronics Source Book by Newton C Braga, Thomson Publications, Chennai.
2. Mechatronics – N. Shanmugam / Anuradha Agencies Publishers.
3. Mechatronics System Design / Devdasshetty/Richard/Thomson.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE VI/VII/VIII Semester

VCE-R15

**SOLAR ENERGY AND APPLICATIONS**  
(Open Elective)

Course Code: A3278

L	T	P	C
3	0	0	3

**Course Overview:**

This is an engineering introduction to Solar energy technologies and potentials. The course aims to introduce a general engineering/science audience to the basic concepts of solar energy. The concepts of Photo Voltaic cells and their properties will be explained. Applications of solar cells will be explained in detail also the environmental issues of solar systems will be explained.

**Prerequisite(s):**NIL

**Course Outcomes:**

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

- CO1. Compare the present and future available electrical power from solar energy in the world based on the knowledge of global solar horizontal irradiation.
- CO2. Assimilate and acquire the skills for design and engineering of solar thermal and solar photovoltaic technology and systems
- CO3. Identify simple to complex problems involved in solar thermal energy conversion technique used in the liquid based solar heating and cooling systems for buildings/societal needs.
- CO4. Examine a solar PV(Photo Voltaic) system components and their function by utilizing the previous literature knowledge on different Photovoltaic solar cells like crystalline, Multi-Crystalline, Amorphous and thin film
- CO5. Analyze the techno economics interaction of developments in the solar energy systems

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE VI/VII/VIII Semester

VCE-R15

**SOLAR ENERGY AND APPLICATIONS**  
(Open Elective)

Course Code: A3278

L	T	P	C
3	0	0	3

**SYLLABUS**

**UNIT - I**

**PRINCIPLES OF SOLAR RADIATION:** Role and potential of new and renewable source, the solar energy option, Environmental impact of solar power, physics of the sun, the solar constant, extraterrestrial and terrestrial solar radiation, solar radiation on tilted surface, instruments for measuring solar radiation and Sun shine, solar radiation data.

**UNIT - II**

**SOLAR ENERGY COLLECTORS:** Flat plate and concentrating collectors, classification of concentrating collectors, orientation and thermal analysis, advanced collectors.

**STORAGE AND APPLICATIONS:** Different methods of solar energy storage, Sensible, latent heat and stratified storage, solar ponds. Solar Applications- solar heating /cooling technique, solar distillation and drying.

**UNIT - III**

**PHOTO VOLTAICS (PV):** Fundamentals of solar cells, types of solar cells, semiconducting materials, band gap theory, absorption of photons, excitations and photo emission of electrons, band engineering.

**PV CELL PROPERTIES:** Solar cell properties and design, p-n junction photodiodes, depletion region, electrostatic field across the depletion layer, electron and holes transports, device physics, charge carrier generation, recombination and other losses, I-V characteristics, output power.

**UNIT - IV**

**SOLAR CELL APPLICATIONS:** PV cell interconnection, module structure and module fabrication, Equivalent circuits, load matching, efficiency, fill factor and optimization for maximum power, Design of stand-alone PV systems, system sizing, device structures, device construction, DC to AC conversion, inverters, on-site storage and grid connections.

**UNIT - V**

**COST ANALYSIS AND ENVIRONMENTAL ISSUES:** Cost analysis and pay back calculations for different types of solar panels and collectors, installation and operating costs, Environmental and safety issues, protection systems, performance monitoring.

**ALTERNATIVE ENERGY SOURCES:** Solar Energy: Types of devices for Solar Energy Collection, Thermal Storage System. Control Systems, Wind Energy, Availability, Wind Devices, Wind Characteristics, Performance of Turbines and systems.

**TEXT BOOKS:**

1. G. D. Rai (2009), *Non-Conventional Energy Sources*, 4th edition, Khanna Publishers, New Delhi.
2. Martin A. Green (2008), *Solar Cells: Operating Principles, Technology and system Applications*, 1st edition, Prentice Hall, New Delhi.

**REFERENCES BOOKS:**

1. Sukatme (2008), *Solar Energy*, 3rd Edition, McGraw Hill Companies, New Delhi.
2. D. Yogi gosuami, Frank Kreith, Jan F. Kreider (2000), *Principles of Solar Engineering*, 2nd edition, Taylor & Francis, USA.



# VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CSE VI/VII/VIII Semester

VCE-R15

ENERGY MANAGEMENT AND AUDIT

(Open Elective)

Course Code: A3279

L T P C

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## Course Overview:

Energy management can help industry control its operating costs. Energy management is also important for reducing local, regional and global emissions and can help mitigate the problem of global warming. This course will help industry professionals acquire the skills and techniques required to implement energy management. This course will also benefit researchers and students who are interested in working on energy management. In the context of the Energy Conservation Act 2001, the Bureau of Energy Efficiency has emphasised the importance of Energy Managers and Certified Energy Auditors. This course is designed to provide the background required for engineers to meet this role.

**Prerequisite(s):**NIL

## Course Outcomes:

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

- CO1. Analyze the influence of energy availability on the development of Industries and various other organizations.
- CO2. Discuss the concepts and technologies used for energy conservation.
- CO3. Develop methods for evaluating worth of project.
- CO4. Investigate the schemes for demand side management.
- CO5. Evaluate the VAR requirements for effective voltage control.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE VI/VII/VIII Semester

VCE-R15

**ENERGY MANAGEMENT AND AUDIT**  
(Open Elective)

Course Code: A3279

L	T	P	C
3	0	0	3

**SYLLABUS**

**UNIT - I**

**INTRODUCTION:** Principles of Energy Management, Managerial Organization. Functional Areas for Manufacturing Industry, Process Industry, Commerce, Government. Role of Energy Manager in each of the organization. Initiating, Organizing and Managing Energy Management Programs.

**UNIT - II**

**ENERGY AUDIT:** Definition and Concepts, Types of Energy Audits, Basic Energy Concepts. Resources for Plant Energy Studies, Data Gathering, Analytical Techniques. Energy Conservation: Technologies for Energy Conservation, Design for Conservation of Energy materials, energy flow networks, critical assessment of energy usage, formulation of objectives and constraints, synthesis of alternative options and technical analysis of options, process integration.

**UNIT - III**

**ECONOMIC ANALYSIS:** Scope, Characterization of an Investment Project, Types of Depreciation, Time Value of money, budget considerations, Risk Analysis.

**METHODS OF EVALUATION OF PROJECTS:** Payback, Annualized Costs, Investor's Rate of return, Present worth, Internal Rate of Return. Pros and Cons of the common methods of analysis, replacement analysis.

**UNIT - IV**

**DEMAND SIDE MANAGEMENT:** Concept and Scope of Demand Side Management, Evolution of Demand Side Management, DSM Strategy, Planning, Implementation and its application. Customer Acceptance & its implementation issues. National and International Experiences with DSM.

**UNIT - V**

**VOLTAGE AND REACTIVE POWER IN DISTRIBUTION SYSTEM:** Voltage and reactive power calculations and control: Voltage classes and nomenclature, voltage drop calculations, Voltage control, VAR requirements and power factor, Capacitors unit and bank rating, Protection of capacitors and switching, Controls for switched capacitors and fields testing.

**TEXT BOOKS:**

1. W. R. Murphy, G. McKay (2008), *Energy Management*, 1<sup>st</sup> edition, B.S. Publications, New Delhi.
2. Tripathy S. C., "Electric Energy Utilization and conservation", Tata McGraw Hill.
3. Industrial Energy Conservation Manuals, MIT Press, Mass, 1982.

**REFERENCE BOOKS:**

1. B. Smith (2007), *Energy Management Principles*, 1<sup>st</sup> edition, Pergamon Press, Inc., England.
2. Energy Management Handbook, Edited by W.C.Turner, Wiley, New York, 1982.
3. IEEE Bronze Book, 'Recommended Practice for Energy Conservation and cost effective planning in Industrial facilities, IEEE Press.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE VI/VII/VIII Semester

VCE-R15

**ELEMENTS OF MECHANICAL ENGINEERING**  
(Open Elective)

Course Code: A3376

L	T	P	C
3	0	0	3

**Course Overview:**

The course description is multidisciplinary nature of Natural Resources: Renewable and nonrenewable resource. Hydraulic Machines deals describes about the hydraulic turbines. The course is also describing about the various machine tool operations and joining processes.

**Prerequisite(s):**NIL

**Course Outcomes:**

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

- CO1. Distinguish renewable and non-renewable energy sources and the associated environmental issues.
- CO2. Classify hydraulic turbines and gas turbines based on working principles.
- CO3. Apply metal removal and joining processes to get the designed shape and size of products in manufacturing.
- CO4. Make use of engineering materials such as ferrous & non-ferrous metals, alloys, composite for different applications.
- CO5. Explain the basic concepts of refrigerants, refrigeration, air-condition system.



**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE VI/VII/VIII Semester

VCE-R15

**ELEMENTS OF MECHANICAL ENGINEERING**  
(Open Elective)

Course Code: A3376

L	T	P	C
3	0	0	3

**SYLLABUS**

**UNIT - I**

**ENERGY RESOURCES:** Non-renewable and renewable energy resources, solid, liquid and gaseous fuels, Calorific values of fuels, Combustion and combustion products of fuels,

**ENERGY:** Introduction and application of Energy sources like fossil fuels, Nuclear Fuels, Solar, Hydal, wind and bio fuels, Environmental issues like global warming and ozonedepletion.

**UNIT – II**

**TURBINES:**

Introduction Classification Efficiency, Principal and operation of pelton wheel Francis Turbine and Caplon Turbine

**Gas Turbines:** Classification, Working principles and Operations of Open cycle and closed cycle gas turbines.

**UNIT - III:**

**MACHINE TOOL OPERATIONS:**

Turning, facing, knurling, Thread cutting, Taper Turning by swiveling the compound rest, Drilling, Boring, Reaming, Tapping, Counter Sinking, Counter Boring, -Plain milling, End milling, Slot milling.

**UNIT –IV:**

**ENGINEERING MATERIALS AND JOINING PROCESSES:**

**ENGINEERING MATERIALS:** Types and applications of Ferrous & Nonferrous metals and alloys.

**Composites:** Introduction: Definition, Classification and applications

**Joining Process: welding:** Definition, classification of welding, Description of Electric Arc Welding and Oxy-Acetylene Welding, soldering , brazing, Differences between soldering, Brazing and Welding.

**UNIT - V**

**REFRIGERATION AND AIR-CONDITIONING:** Properties of refrigerants, list of commonly used refrigerants. Refrigeration –Definitions – Refrigerating effect, Ton of Refrigeration, COP, Relative COP, unit of Refrigeration. Principle and working of an vapor compression refrigeration and vapour absorption refrigeration systems. Principle and applications of air conditioners, Room air conditioner.

**TEXT BOOKS:**

- 1.G. D. Rai (2010), Non-Conventional Energy Sources, 2nd edition, Pearson, India.
2. Domkundwar, S. C. Arora (2009), A Course in Refrigeration and Air conditioning, 6th edition, Dhanpatrai Publications, New Delhi, India.
- 3.Ganesan (2011), Gas Turbines, 3rd edition, Tata McGraw-Hill education (P) Ltd, New Delhi, India.
- 4.R K Jain(2004) Production Technology, Khanna Publications.

**REFERENCE BOOKS:**

1. S. Trymbaka Murthy, “A Text Book of Elements of Mechanical Engineering”, 4th Edition, Universities Press (India) Pvt. Ltd., 2006.
2. K.P. Roy, S.K. Hajra Choudhury, Nirjhar Roy, “Elements of Mechanical Engineering”, Media Promoters & Publishers Pvt. Ltd.,Mumbai,7<sup>th</sup> Edition, 2012
- 3.Pravin Kumar, (2013), “Basic Mechanical Engineering”, Edition, Pearson.



**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE VI/VII/VIII Semester

VCE-R15

**BASIC THERMODYNAMICS AND HEAT TRANSFER**  
(Open Elective)

Course Code: A3377

L	T	P	C
3	0	0	3

**Course Overview:**

This course focuses on basic areas of the relationship between heat and work in a substance during different types of thermodynamic processes. Specifically, thermodynamics focuses largely on how a heat transfer is related to various energy changes within a system undergoing a thermodynamic process. The course is extended to study the Air standard cycles and various modes of heat transfer in detail.

**Prerequisite(s):**NIL

**Course Outcomes:**

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

- CO1. Define the laws of thermodynamics and heat transfer.
- CO2. Explain the basic concepts of thermodynamics and heat transfer.
- CO3. Solve the problems by applying the knowledge of thermodynamic and heat transfer laws.
- CO4. Evaluate the performance of thermodynamic cycles, heat engines and heat pumps.
- CO5. Analyze heat transfer due to conduction, convection and radiation.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE VI/VII/VIII Semester

VCE-R15

**BASIC THERMODYNAMICS AND HEAT TRANSFER**  
(Open Elective)

Course Code: A3377

L	T	P	C
3	0	0	3

**SYLLABUS**

**UNIT – I**

**BASIC CONCEPTS OF THERMODYNAMICS:** Macroscopic and microscopic approaches, thermodynamic systems, boundary, surroundings, thermodynamic property, intensive and extensive properties, thermodynamic equilibrium, state, path, process and cycle, quasi static, reversible and irreversible processes, Energy and its forms, concepts of heat and work, Zeroth Law of thermodynamics.

**UNIT – II**

**FIRST LAW OF THERMODYNAMICS:** First law of thermodynamics, internal energy, enthalpy, PMM -I, Steady flow energy equation, Application of First law and Limitations of first law of thermodynamics.

**SECOND LAW OF THERMODYNAMICS:** Kelvin-Planck and Clausius statements, heat engine, heat pump, refrigerator, PMM-II, Carnot cycle, Carnot heat engine, Carnot theorem and its corollaries, Entropy.

**UNIT – III**

**AIR STANDARD CYCLES:** Otto, Diesel and Dual combustion cycles, description and representation on PV and TS diagrams, Thermal efficiency, mean effective pressures.

**UNIT –IV**

**BASIC CONCEPTS OF HEAT TRANSFER:** Modes and mechanisms of heat transfer, Basic laws of heat transfer –Applications of heat transfer.

**CONDUCTION HEAT TRANSFER:** General heat conduction equation in Cartesian coordinates. Different forms of general equation – Steady state and Transient heat transfer – Initial and boundary conditions. One dimensional steady state heat conduction through Homogeneous slabs, Overall heat transfer coefficient.

**UNIT –V**

**FORCED CONVECTION:** Concepts of hydrodynamic and thermal boundary layer and use of empirical correlations for Flat plates.

**FREE CONVECTION:** Development of Hydrodynamic and thermal boundary layer along a vertical plate – Use of empirical relations for Vertical plates.

**RADIATION HEAT TRANSFER:** Introduction, properties and definitions, Laws of black-body radiation, Laws of Planck, Kirchoff, Lambert, Stefan and Boltzmann, Heat exchange between two black bodies, Emissivity, heat exchange between grey bodies.

**TEXT BOOKS:**

1. P. K. Nag (2012), *Engineering Thermodynamics*, 4<sup>th</sup> edition, Tata McGraw-Hill, New Delhi, India.
2. YUNUS A CENGEL, (2016), *Heat and mass transfer: fundamentals & applications*, 5<sup>th</sup> edition, TMH, New Delhi, India.

**REFERENCE BOOKS:**

1. J. B. Jones, R. E. Dugan (2009), *Engineering Thermodynamics*, 1st edition, Prentice Hall of India Learning, New Delhi, India.
2. M MRathod (2010), *Thermal Engineering*, Tata McGraw Hill, New Delhi, India.
3. M. Thirumaleshwar, (2014), *Fundamentals of Heat & Mass Transfer*, Second Edition, Pearson, India
4. R.C. Sachdeva, (2014), *Fundamentals of Engineering, Heat & Mass Transfer*, Third Edition, New Age, New Delhi.



**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE VI/VII/VIII Semester

VCE-R15

**MECHANICAL MEASUREMENTS AND INSTRUMENTATION**  
(Open Elective)

Course Code: A3378

L	T	P	C
3	0	0	3

**Course Overview:**

This course covers the terminology, concepts, principles and computations used by engineers and technicians to specify, analysis and maintain instrumentation and control systems. It emphasizes practices in industry concepts, so that students learn what aspects of plant design and control are critical. Practical examples have been used for many common pressure, level, temperature and flow measuring systems. Approaches are presented for measurement selection, process/modification, and control system design.

**Prerequisite(s):**NIL

**Course Outcomes:**

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

- CO1. Identify the functional elements of generalized measuring system and the errors occurring in Instrumentation and provide the remedial measures
- CO2. List various pressure measuring instruments and applications in real life
- CO3. Evaluate the measuring instruments and to trace the standards used to the ultimate standards.
- CO4. Analyze the measuring system for the measurement of Displacement, Temperature, Flow, Liquid level, Stress, Strain and humidity.
- CO5. Classify the various types of humidity, acceleration and vibration measurements.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE VI/VII/VIII Semester

VCE-R15

**MECHANICAL MEASUREMENTS AND INSTRUMENTATION**  
(Open Elective)

Course Code: A3378

L	T	P	C
3	0	0	3

**SYLLABUS**

**UNIT - I**

**INTRODUCTION:** Definition, Basic principles of measurement, Measurement systems, generalized configuration and functional descriptions of measuring instruments, examples. Dynamic performance characteristics, sources of error, Classification and elimination of error.

**MEASUREMENT OF DISPLACEMENT:** Theory and construction of various transducers to measure displacement, Piezoelectric, Inductive, capacitance, resistance, ionization and Photo electric transducers, Calibration procedures.

**UNIT - II**

**MEASUREMENT OF PRESSURE:** Introduction, classification, basic principles used of Manometers, Piston, Bourdon pressure gauges, Bellows, Diaphragm gauges. Low pressure measurement, Thermal conductivity gauges, ionization pressure gauges, McLeod pressure gauge.

**UNIT - III**

**MEASUREMENT OF LEVEL:** Direct method, Indirect methods, capacitive, ultrasonic, magnetic, Bubler level indicators.

**FLOW MEASUREMENT:** Rotameter, magnetic, Ultrasonic, Turbine flow meter, hot wire anemometer, Laser Doppler Anemometer (LDA).

**MEASUREMENT OF SPEED:** Mechanical Tachometers, Electrical tachometers, Stroboscope, Non-Contact type of tachometer.

**UNIT - IV**

**STRESS STRAIN MEASUREMENTS:** Introduction to stress and strain, electrical strain gauge, gauge factor, method of usage of resistance strain gauge for bending compressive and tensile strains, usage for measuring torque, Strain gauge Rosettes.

**MEASUREMENT OF TEMPERATURE:** Classification, Ranges, Various Principles of measurement, Expansion, Electrical Resistance, Thermistor, Thermocouple, Pyrometers, Temperature Indicators.

**UNIT - V**

**MEASUREMENT OF HUMIDITY:** Moisture content of gases, sling psychrometer, Absorption psychrometer and Dew point meter.

**MEASUREMENT OF ACCELERATION AND VIBRATION:** Different simple instruments, Principles of Seismic instruments, Vibrometer and accelerometer.

**TEXT BOOKS:**

1. D.S. Kumar (2011), *Mechanical Measurements and Controls*, 4<sup>th</sup> edition, Metropolitan Book Co. Pvt Ltd., New Delhi, India.
2. A. K. Tayal (2004), *Instrumentation and mechanical Measurements*, 2<sup>nd</sup> edition, Galgotia Publications, New Delhi, India.

**REFERENCE BOOKS:**

1. Er. R. K. Jain (2011), *Mechanical and Industrial Measurements*, 12<sup>th</sup> edition, Khanna Publishers, New Delhi, India.
2. Chennakesava R. Alavala (2010), *Principles of Industrial Instrumentation and Control Systems*, 1<sup>st</sup> edition, Cengage Learning, New Delhi, India.
3. B. C. Nakra, K. K. Choudhary (2010), *Instrumentation, measurement and analysis*, 4<sup>th</sup>, Tata





**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE VI/VII/VIII Semester

VCE-R15

**ENGINEERING OPTIMIZATION**  
(Open Elective)

Course Code: A3379

L	T	P	C
3	0	0	3

**Course Overview:**

Optimization involves finding the “best” solution according to specified criteria. In the context of engineering design, the “best” solution may refer to a minimum cost or weight, maximum quality or efficiency, or some other performance index pertaining to a disciplinary objective. However, determining the optimal design involves more than just the minimization or maximization of an objective function. Designers must also identify the design variables that represent the physical form of the system and the constraints that represent limitations on the design space. Typically, the problems of interest in engineering are of a nonlinear nature, in that the objective functions and constraints considered are nonlinear.

**Prerequisite(s):**NIL

**Course Outcomes:**

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

- CO1. Explain various optimization techniques.
- CO2. Solve problems involving single variable and multi variables under constrained or unconstrained environments.
- CO3. Examine the impact of various factors affecting the Linear programming problem and solution using sensitivity (Post Optimality) analysis, with the aid of Simplex Method, Revised Simplex Method, Dual Simplex Method etc.
- CO4. Apply dynamic programming technique to find optimum solution for inventory, capital budgeting, resource allocation, Production planning and control problems etc.
- CO5. Solve quadratic, geometric and non-linear programming problems using different methods.

# VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CSE VI/VII/VIII Semester

VCE-R15

## ENGINEERING OPTIMIZATION

(Open Elective)

Course Code: A3379

L	T	P	C
3	0	0	3

### SYLLABUS

#### UNIT I

**OPTIMIZATION TECHNIQUE:** Introduction, Single-Variable Optimization, Multivariable Optimization with No Constraints, Multivariable Optimization with Equality Constraints, Multivariable Optimization with Inequality Constraints, Convex Programming Problem.

#### UNIT II

**LINEAR PROGRAMMING:** Introduction, Revised Simplex Method, Duality in Linear Programming, Decomposition Principle, Sensitivity or Postoptimality Analysis, Transportation Problem, Karmarkar's Method, Quadratic Programming.

#### UNIT III

**NON-LINEAR PROGRAMMING:** Introduction, Unimodal Function, Unrestricted Search, Exhaustive Search, Dichotomous Search, Interval Halving Method, Fibonacci Method, Golden Section Method, Comparison of Elimination Methods, Quadratic Interpolation Method, Cubic Interpolation Method, Direct Root Methods, Rate of convergence, Design variables, Random search methods, Chirivariate methods, Powell's method, Newton's method, Marquard Method, Test function.

#### UNIT IV

**GEOMETRIC PROGRAMMING:** Introduction, Posynomial, Unconstrained Minimization Problem, Primal-Dual Relationship and Sufficiency Conditions in the Unconstrained Case, Constrained Minimization, Primal and Dual Programs in the Case of Less-Than Inequalities, Geometric Programming with Mixed Inequality Constraints, Complementary Geometric Programming, Applications of Geometric Programming.

#### UNIT V

**DYNAMIC PROGRAMMING:** Introduction, Multistage Decision Processes, Concept of Sub optimization and the Principle of Optimality, Computational Procedure in Dynamic Programming, The Calculus Method of Solution, The Tabular Method of Solution, Conversion of a Final Value Problem into an Initial Value Problem, Linear Programming as a Case of Dynamic Programming, Continuous Dynamic Programming, Applications.

#### TEXT BOOKS:

1. C B Gupta (2013), Optimization Techniques in Operations Research, 1<sup>st</sup> Edition, I K International Publications, New Delhi.
2. Singiresel S Rao (2011), Engineering Optimizations, 4<sup>th</sup> Edition, Elsevier Butterworth, Heineman, USA.

#### REFERENCES:

1. Jasbir Arora (2016), Introduction to Optimum Design, 4<sup>th</sup> Edition, Academic press in an Imprint of Elsevier, USA.
2. N V S Raju (2014), Optimization Methods for Engineering, 1<sup>st</sup> edition, PHI Publications, New Delhi.
3. K V Mittal (1996), Optimization Methods in Operations research and system analysis, 3<sup>rd</sup> Edition, New age Publications, New Delhi.
4. Edwin K, P Chang, Stanislaw H. Zak (2013), An Introduction to Optimization, 3<sup>rd</sup> Edition, Jhon Wiley, New York.



**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE VI/VII/VIII Semester

VCE-R15

**ENVIRONMENTAL POLLUTION AND MANAGEMENT**  
(Open Elective)

Course Code: A3176

L	T	P	C
3	0	0	3

**Course Overview:**

The course has been designed to improve the understanding of the students about different pollution control strategies and the skills of application of remediation techniques to combat pollution in three environmental compartments i.e. air, water and soil. The course will also be dealing about the sources of pollution in air, soil, water, solid-waste and noise and the impacts these sources on the environment and health. In addition, the students will be given the training to develop the particular skills required in pollution related structured research.

**Prerequisite(s):**NIL

**Course Outcomes:**

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

- CO1. Distinguish between various modes of air pollution and their characteristic.
- CO2. Examine air pollution sampling and classify its level.
- CO3. Evaluate water quality and propose necessary measures.
- CO4. List different standards laid by governing authorities.
- CO5. Summarize functions carried out by controlling bodies.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE VI/VII/VIII Semester

VCE-R15

**ENVIRONMENTAL POLLUTION AND MANAGEMENT**  
(Open Elective)

Course Code: A3176

L T P C  
3 0 0 3

**SYLLABUS**

**UNIT-I**

**(12**

**Lectures)**

Water pollution – sources & types of water pollution – physical, chemical & biological – effect of water pollution. Drinking water quality standards waste water treatment – primary, secondary, tertiary-water pollution prevention & control act – 1974.

**UNIT-II**

**(12**

**Lectures)**

Air pollution –structure and composition of atmosphere – classification, sources & effects of air pollution – Acid rain –green house effect – global warming – Ozone depletion.

**UNIT-III**

**(12**

**Lectures)**

Prevention and control of air pollution particulate control – settling chamber, scrubber, bag filter, cyclones electrostatic precipitators. Gaseous emission control methods. Air pollution prevention and control Act 1981.

**UNIT-IV**

**(12**

**Lectures)**

Soil Pollution – soil pollutants – types – sources, effects & Control. Noise Pollution – sources effects & Control.

**UNIT-V**

**(12**

**Lectures)**

Government Agencies & Programs – The Tiwari committee – creation of NCEPC, Department of Environment & Forest – Function of State Pollution Control Board.

**TEXT BOOKS:**

- 1.Rao, M. N and H.V.N. Rao (2005) Air Pollution, Tata McGraw – Hill Publishing Company Limited. New Delhi.
- 2.Kudesia, V.P and Ritu Kudesia (2005) Water Pollution, Pragati Prakashan Publication, Meerut.

**REFERENCE BOOKS:**

- 1.Sawyer, C. N., P.L McCarty and G.F. Perkin (1994) Chemistry for Environmental Engineers, II Edition. McGraw-Hill.
- 2.Sharma, B.K and H.Kaur (1994) Soil and Noise Pollution. Goel Publishing House, Meerut.
- 3.Kumarasawmy, K., A. Alagappa Moses and M. Vasanthi (2004) Environmental Studies (A Text Book for All Under Graduate Students) Bharathidasan University Publications.

# VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CSE VI/VII/VIII Semester

VCE-R15

## REMOTE SENSING AND GIS

(Open Elective)

Course Code: A3177

L	T	P	C
3	0	0	3

### Course Overview:

This course covers the study of elements in remote sensing process and steps involved in electromagnetic remote sensing process. This course also covers the principals of photometry and various concepts of and terminology of GIS and also includes how the data is presented and data base management system. In this course the applications of remote sensing and GIS in civil engineering.

### Prerequisite(s):NIL

### Course Outcomes:

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

- CO1. Explain basics of Aerial Photography, Remote sensing and GIS.
- CO2. Describe the working principle of interpretation of Aerial photographs and satellite.
- CO3. Utilize knowledge about the principles and physics of Remote sensing and data acquisition
- CO4. Summarize the data types, data storage and carry out the analysis of spatial and attribute data.
- CO5. Apply applications of remote sensing and GIS in various fields.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE VI/VII/VIII Semester

VCE-R15

**REMOTE SENSING AND GIS**  
(Open Elective)

Course Code: A3177

L T P C  
3 0 0 3

**SYLLABUS**

**UNIT – I**

**(12**

**Lectures)**

**INTRODUCTION TO PHOTOGRAMMETRY:** Principles & types of aerial photograph, geometry of vertical aerial photograph, Scale & Height measurement on single vertical aerial photograph, Height measurement based on relief displacement, Fundamentals of stereoscopy, fiducial points, parallax measurement using fiducial line.

**UNIT – II**

**(12**

**Lectures)**

**REMOTE SENSING:** Basic concept of Remote sensing, Data and Information, Remote Sensing data collection, Remote sensing advantages & Limitations, Remote sensing process. Electro-magnetic Spectrum, Energy interactions with atmosphere and with earth surface features (Soil, Water, and Vegetation).

Indian Satellites and Sensors characteristics, Resolution, Map and Image and False color composite, introduction to digital data, elements of visual interpretation techniques.

**UNIT – III**

**(12**

**Lectures)**

**GEOGRAPHICAL INFORMATION SYSTEMS:** Introduction to GIS; Components of a GIS; Geospatial Data: Spatial Data - Attribute data - joining Spatial and Attribute data; GIS operations: Spatial Data input- Attribute data Management - Data display - data exploration - Data Analysis.

**COORDINATE SYSTEMS:** Geographic Coordinate System: Approximation of Earth, Datum; Map Projections; Types of Map Projection parameters - Commonly used Map Projections - Projected coordinate Systems.

**UNIT – IV**

**(10**

**Lectures)**

**GIS SPATIAL ANALYSIS:** Computational Analysis Methods (CAM), Visual Analysis Methods (VAM), Data storage-vector data storage, attribute data storage, overview of the data manipulation and analysis. Integrated analysis of the spatial and attribute data.

**UNIT – V**

**(14**

**Lectures)**

**APPLICATIONS :** WATER RESOURCES APPLICATIONS - Surface water mapping - Flood and Drought impact assessment - Rainfall – Runoff relations - Watershed management for sustainable development and Watershed characteristics - TRANSPORTATION – shortest path- vehicle tracking – network travel cost – transportation master plan. DISASTER MANAGEMENT – ENVIRONMENTAL ENGINEERING – environmental impact assessment - site remediation – fire growth stimulation. AGRICULTURE.

**TEXT BOOKS:**

1. James B. Campbell, Randolph H. Wynne (2011), *Introduction to Remote Sensing*, 5th edition, Guilford Publications Inc., New York, USA.
2. L. R. A. Narayana (1999), *Remote Sensing and its applications*, Universities Press, India.

3. M. Anji Reddy (2001), *Remote Sensing and Geographical Information systems*, B. S. Publications, New Delhi, India.

**REFERENCE BOOKS:**

1. Thomas M. Lillesand, Ralph W. Kiefer (1994), *Remote Sensing and Image Interpretation*, Wiley & Sons, New Delhi, India.
2. Peter A. Burrage, Rachael (2011), *Principals of Geo physical Information Systems*, Oxford Press, India.
3. S. Kumar (2005), *Basics of remote sensing and GIS*, Laxmi Publications, New Delhi, India.



**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE VI/VII/VIII Semester

VCE-R15

**DISASTER MANAGEMENT**  
(Open Elective)

Course Code: A3178

L	T	P	C
3	0	0	3

**Course Overview:**

This course will introduce students to the vocabulary and core components of Disaster Management. We will discuss the importance of this growing field that is changing rapidly as a result of an increase in frequency, complexity, and severity of man-made, natural, and technological disasters. We will examine historical events that have changed the nature of the field, and introduce students to the leadership and management roles that have emerged as a result of these events taking place.

**Prerequisite(s):**NIL

**Course Outcomes:**

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

- CO1. List out different causes of Environmental hazards.
- CO2. Classify environmental hazards and disasters, Endogenous hazards, exogenous hazards, infrequent events - Cumulative atmospheric hazards / disasters.
- CO3. Explain different characteristics of hazards.
- CO4. Develop Emerging approaches in Disaster management.

# VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CSE VI/VII/VIII Semester

VCE-R15

## DISASTER MANAGEMENT

(Open Elective)

Course Code: A3178

L	T	P	C
3	0	0	3

### SYLLABUS

#### UNIT-I

(12Lectures)

**ENVIRONMENTAL HAZARDS & DISASTERS:** Meaning of Environmental hazards, Environmental Disasters and Environmental stress. Concept of Environmental Hazards, Environmental stress & Environmental Disasters. Different approaches & relation with human Ecology - Landscape Approach - Ecosystem Approach - Perception approach - Human ecology & its application in geographical researches.

#### UNIT – II

(12Lectures)

**TYPES OF ENVIRONMENTAL HAZARDS & DISASTERS:** Natural hazards and Disasters – Man induced hazards & Disasters - Natural Hazards - Planetary Hazards / Disasters - Extra Planetary Hazards / disasters - Planetary Hazards - Endogenous Hazards - Exogenous Hazards

#### UNIT- III

(12Lectures)

**ENDOGENOUS HAZARDS:** Volcanic eruption - Earthquakes - landslides - Volcanic Hazards / Disasters - Causes and distribution of Volcanoes - Hazardous effects of volcanic eruptions - Environmental impacts of volcanic eruptions - Earthquake Hazards / disasters - Causes of Earthquakes - Distribution of earthquakes - Hazardous effects of earthquakes - Earthquake Hazards in India - Human adjustment, perception & mitigation of earthquake.

#### UNIT- IV

(13Lectures)

Exogenous hazards / disasters - Infrequent events - Cumulative atmospheric hazards / disasters  
Infrequent events: Cyclones - Lightning – Hailstorms.

**CYCLONES:** Tropical cyclones & Local storms - Destruction by tropical cyclones & local storms (causes, distribution human adjustment, perception & mitigation) Cumulative atmospheric hazards/ disasters :- Floods - Droughts - Cold waves - Heat waves  
Floods :- Causes of floods - Flood hazards India - Flood control measures (Human adjustment, perception & mitigation) Droughts :- Impacts of droughts - Drought hazards in India - Drought control measures - Extra Planetary Hazards / Disasters - man induced Hazards / Disasters - Physical hazards / Disasters - Soil erosion

**SOIL EROSION:** Mechanics & forms of Soil Erosion - Factors & causes of Soil Erosion - Conservation measures of Soil Erosion.

**CHEMICAL HAZARDS / DISASTERS:** Release of toxic chemicals, nuclear explosion - Sedimentation processes  
Sedimentation processes: - Global Sedimentation problems - Regional Sedimentation problems - Sedimentation & Environmental problems - Corrective measures of Erosion & Sedimentation

**BIOLOGICAL HAZARDS / DISASTERS:** Population Explosion

#### UNIT-V

(12Lectures)

Emerging approaches in Disaster Management - Three stages, Pre-disaster Stage (preparedness) Emergency Stage Post Disaster stage – Rehabilitation

**TEXT BOOKS:**

1. Disaster Mitigation: Experiences And Reflections by Pradeep Sahni
2. Natural Hazards & Disasters by Donald Hyndman & David Hyndman - Cengage Learning

**REFERENCE BOOKS:**

1. R. B. Singh (Ed) Environmental Geography, Heritage Publishers New Delhi, 1990
2. Savinder Singh Environmental Geography, PrayagPustakBhawann 1997
3. Kates, B. I & White, G. F The Environment as Hazards, oxford, New York, 1978
4. R. B. Singh (Ed) Disaster Management, Rawat Publication, New Delhi, 2000
5. H. K. Gupta (Ed) Disaster Management, Universities Press, India, 2003
6. R. B. Singh, Space Technology for Disaster Mitigation in India (INCED), University of Tokyo, 1994
7. Dr.Satender, Disaster Management in Hills, Concept Publishing Co., New Delhi, 2003
8. S. Arya Action Plan For Earthquake, Disaster, Mitigation in V. K. Sharma (Ed) Disaster Management IIPA Publication New Delhi, 1994
9. R. K. Bhandani An overview on Natural & Manmade Disaster & their Reduction, CSIR, New Delhi
10. M. C. Gupta Manuals on Natural Disaster Management in india, National Centre for Disaster Management, IIPA, New Delhi, 2001.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE VI/VII/VIII Semester

VCE-R15

**CONSTRUCTING PLANNING AND MANAGEMENT**  
(Open Elective)

Course Code: A3179

L	T	P	C
3	0	0	3

**Course Overview:**

The construction management degree prepares you for a wide range of professional roles in the building and construction industry. This course is management-oriented and focuses on a broad range of interrelated disciplines including domestic, commercial and civil construction. You will be taught by a dedicated team of professionals with qualifications and experience in construction-related disciplines. Core subjects include construction technology, measurement and estimating, project management, contracts administration, building law and economics, and communication and computer skills.

**Prerequisite(s):**NIL

**Course Outcomes:**

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

- CO1. Improve business and management skills in positions within the construction industry.
- CO2. Adapt technical skills and knowledge in mathematics, science, construction, and technology in support of planning, analyzing, and solving construction problems.
- CO3. Utilize industry resources including associations and organizations, professional publications, and governmental data to analyze, evaluate, and apply current trends within the industry.
- CO4. Make use of decision-making in personal and professional endeavors.
- CO5. Design a quality construction project from start to completion while maintaining budget, schedule, and safety requirements.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE VI/VII/VIII Semester

VCE-R15

**CONSTRUCTING PLANNING AND MANAGEMENT**  
(Open Elective)

Course Code: A3179

L	T	P	C
3	0	0	3

**SYLLABUS**

**UNIT – I**

(10Lectures)

Contract management, project estimation, types of estimation, contract document, classification, bidding, and procurement process.

**UNIT-II**

Lectures)

(10

**PERT AND CPM:** Introduction, origin of PERT and CPM, planning, scheduling and controlling, bar charts, milestone charts, weaknesses in bar charts, PERT and CPM networks comparison, event, activity, rules for drawing networks, numbering the events (Fulkerson's law), dummy activities.

**UNIT – III**

(12Lectures)

**CPM - PERT NETWORK ANALYSIS:** Time estimate, expected time, earliest allowable occurrence time, latest allowable occurrence time, slack, project duration, probability of completion, start and finish time estimates, floats, project scheduling, critical and sub-critical path. Updating - process of updating, when to update.

**UNIT – IV**

(12Lectures)

**CPM COST MODEL & RESOURCES ALLOCATIONS, RESOURCE SCHEDULING:** Cost analysis, direct and indirect costs, operation time, normal and crash times and costs, optimizing project cost, crash limit, free float limit, optimization. Resource smoothening, resource leveling.

**UNIT – V**

(10Lectures)

Construction claims, dispute and dispute resolution, and, source of claim, claim management, arbitration, project closure, construction closure and contract closure.

**TEXT BOOKS:**

1. Punmia, Khandelwal (2006), *Project planning and control with PERT and CPM*, 3rd edition, Laxmi Publications, New Delhi, India.
2. Construction project management-theory and practice, Nirajjha, Pearson education,2010.

**REFERENCE BOOKS:**

1. L. S. Srinath (1975), *PERT and CPM*, 2nd Edition, Afflicted East West Press Pvt. Ltd, New Delhi, India.
2. U. K. Shrivastava (1999), *Construction Planning and Management*, Galgotia Publications Pvt. Ltd., New Delhi, Construction technology by subir k. Sarkar, subhajit saraswathi/oxford university press,2009

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE VI/VII/VIII Semester

VCE-R15

**BASIC PROGRAM IN ENTREPRENEURSHIP**  
(Open Elective)

Course Code: A3081

L	T	P	C
3	0	0	3

**Course Overview:**

The Students are able to understand the entrepreneurship styles, able to identify their flow. The Students ability to generate ideas through mind mapping, DISTRUP model and evaluate the generated ideas. The effectuation principles helps the students to understand the expertise of expert entrepreneurs in dealing with entrepreneurial activities. The concept of Value Proposition canvas helps the identify customer segment and value proposition to address the customer problems. The Minimum Viable Product (MVP) is validated through Test card, learning card with the help of Prototypes.

**Prerequisite(s):**NIL

**Course Outcomes:**

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

- CO1. Understand the role, characteristics, qualities, and functions of entrepreneur and use this knowledge to become future entrepreneurs.
- CO2. Understand various Institutional support for setting up a business enterprise and apply this knowledge while approaching these institutions for financial support.
- CO3. Understand role, importance and functions of women entrepreneur and use this knowledge to become future women entrepreneurs.
- CO4. Understand the concept of Project Management and steps in Project development and apply this knowledge while taking future project assignments.
- CO5. Understand training programs and different training institutions to impart training and apply this knowledge to train existing and future entrepreneurs.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE VI/VII/VIII Semester

VCE-R15

**BASIC PROGRAM IN ENTREPRENEURSHIP**  
(Open Elective)

Course Code: A3081

L	T	P	C
3	0	0	3

**SYLLABUS**

**UNIT-I**

**SELF-DISCOVERY**

**Introduction** - Who is your role model?

**Finding your Flow** – Introduction, Finding your flow Activity Instructions, Activity on finding your flow and Activity Debrief.

**Entrepreneurial CV** – Introduction, Activity Instructions, Activity on Entrepreneurial CV and Activity Debrief.

**Your Draft Action Plan** - Introduction, Activity Instructions, Activity on Your Draft Action Plan and Activity Debrief

**Assignment – Final Action Plan and Quizzes**

**IDEA GENERATION**

**D.I.S.T.R.U.P.T** -D.I.S.T.R.U.P.T A Model for Ideation, Activity Instructions and Activity on Let's ID8.

**Mind Mapping for Ideas** – Mind Mapping for Ideas, Activity Instructions on Let's Create a Mind Map, Activity on Mind Mapping and Activity Debrief.

**Brainstorm** – Activity Instructions on Let's Brainstorm, Activity on Let's Brainstorm and Activity Debrief.

**Assignment – Idea Bank and Quizzes**

**UNIT-II**

**IDEA EVALUATION**

**Decision Matrix Analysis** – Concept and Introduction, Decision Making Analysis – An Example, Decision Matrix Analysis – Activity Instructions, Activity on Decision Matrix Analysis and Activity Debrief.

**Paired Comparison Analysis** - Concept and Introduction, Paired Comparison Analysis – Activity Instructions, Activity on Paired Comparison Analysis and Activity Debrief.

**5 Q Framework** - The 5 Questions Framework, Class Activity - Apply 5Q Framework, Activity Debrief on 5Q Framework.

**Idea Presentation** – 1 Minute Elevator Pitch Activity Instructions, Activity on Crafting your 1 minute Pitch.

**Assignment: Back of the Envelope Calculation and Quizzes**

**ENTREPRENEURIAL OUTLOOK**

**Effectuation** – What is Effectuation? First Principle of Effectuation, Second Principle of Effectuation, Classroom Activity: Start with Your Means – Instructions, Activity and Activity Debrief

**Lean Startup** - What is Lean Startup? Lean Startup Process, Class Activity: Let's Assume!, instructions, Activity and Activity Debrief.

**Assignment: Get Out of the Building (GOOTB) – Team Formation and Presentation, Quizzes.**

**UNIT-III**

**CUSTOMER DISCOVERY**

**Segmentation & Targeting** – Introduction, Niche Marketing, Class Activity: Find Your Niche, Activity Instructions, Activity, Mapping the Consumption Chain, Mapping the Consumption Chain – 17 Qs.

**Assignment: Drawing the Consumption Map.**

**Why Customers Won't Buy** – Introduction, Why Customers Won't Buy – Switching Cost, Why Customers Won't Buy – Psychological Biases, Customer Reluctance, Class Activity: What's the Alternative? Introduction and Activity Instructions and Activity.

Class Activity: This Is My Customer! - Activity Instructions, Activity and Activity Debrief.

**Assignment: Completing Outcome-Driven Innovation and Quizzes**

#### **UNIT-IV**

##### **VALUE PROPOSITION**

**Value Proposition Design** – Introduction, Customer Segment and Value Proposition Design - Customer Segment Example, Class Activity: Value Proposition Design: Customer Segment – Activity Instructions, Define your Customer Segment, Canvas: Value Proposition -, Value Proposition Design Customer Segment – Activity Debrief, Validation Exercise (Out of Class Activity).

**Value Proposition and Assessing Fit**- Introduction and Value Proposition and Assessing Fit – Example, Class Activity: Value Proposition and Assessing Fit – Activity Instructions, Activity and Activity Debrief, Value Proposition Canvas, Refine Your Value Proposition.

**Blue Ocean Strategy** – Introduction, Blue Ocean Strategy – Example, Class Activity: Refine Your Value Proposition: Blue Ocean Strategy – Activity Instructions, Four Actions Framework, Strategy Canvas, Refine Your Value Proposition: Blue Ocean Strategy – Activity Debrief.

**Assignment – Competition Analysis and Quizzes**

#### **UNIT-V**

##### **PROTOTYPING**

**Prototyping** - What is Prototyping?

Class Activity: Design Your Experiment

**MVP and Test Card**-Concept, MVP and Test Card- Example and Activity Instructions, How to Build a Prototype, Test Card, Test Card Activity Debrief and MVP Assignment Instructions.

**Assignment: Designing the MVP and Quizzes**

Class Activity: MVP Presentation, Capstone Project and Learning Card – Introduction, Learning Card – Introduction and Example, MVP Design Template – PPT, Capstone Project - Assignment Instructions.

**Assignment: Learning Card and Capstone Presentation and Quizzes**

##### **CAPSTONE PROJECT**

Class Activity: Capstone Project Presentation, Capstone Project - Assignment Debrief and Goodbye.

##### **References:**

1. WFNEN 101 '*Basic Program in Entrepreneurship*', Retrieved from [www.Learnwise.org](http://www.Learnwise.org), Wadhvani Foundation, 2018.



**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE VI/VII/VIII Semester

VCE-R15

**HUMAN RESOURCE MANAGEMENT**  
(Open Elective)

Course Code: A3077

L	T	P	C
3	0	0	3

**Course Overview:**

The course makes the students to equip with basic concepts, function of HRM and Human Resource Planning. Students will be able to understand HR specific functions, importance of Industrial relations, Trade Union and Grievance redressal machinery.

**Prerequisite(s):**NIL

**Course Outcomes:**

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

- CO1. Identify functions of Human Resource Management.
- CO2. Illustrate the process of Recruitment and selection.
- CO3. Analyze the needs and methods for training.
- CO4. Outline the functional relationship with performance and compensation.
- CO5. Illustrate the importance of Industrial relations through collective bargaining, trade unions and industrial settlement machinery.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE VI/VII/VIII Semester

VCE-R15

**HUMAN RESOURCE MANAGEMENT**  
(Open Elective)

Course Code: A3077

L	T	P	C
3	0	0	3

**SYLLABUS**

**UNIT-I**

**INTRODUCTION HUMAN RESOURCE MANAGEMENT:** Introduction and significance of HRM, Scope, functions of HRM, changing environment of HRM and Challenges. Human Resource Planning, Objectives, Factors influencing Human Resource planning, HR Planning Process.

**UNIT-II**

**JOB ANALYSIS AND RECRUITMENT:** Job analysis- Job description, Job specification, Sources of Recruitment; Selection, process of selection and techniques, Retention of Employees.

**UNIT-III**

**HUMAN RESOURCES DEVELOPMENT:** Training Vs Development, Need, Process of training, Methods of training, Training Evaluation, Career planning, Performance Management System, Methods of Appraisal, Common Errors.

**UNIT-IV**

**COMPENSATION MANAGEMENT:** Concepts and components of wages, Factors influencing wage fixation, Job evaluation, Methods of payment, Incentives and Fringe benefits.

**UNIT-V**

**INDUSTRIAL RELATIONS:** Components of Industrial Relation, Trade Unions, functions of Trade Union, Employee Participation, Collective Bargaining, Grievance Redressal, Industrial Dispute Settlement machinery.

**TEXT BOOKS:**

1. Biswajeet Pattanayak (2009), *Human Resource Management*, Prentice hall of India, New Delhi, India.
2. R. Wayne Mondy and Robert M. Noe (2009), *Human Resource Management*, Pearson, India.

**REFERENCE BOOKS:**

1. Aswathappa. K. (2007), *Human Resources and Personnel Management*, Tata MC Graw Hill, New Delhi, India.
2. Monappa. A, Saiyadain. M. (1979), *Personnel Management*, Tata Mc Graw Hill, New Delhi, India.
3. C. B. Mamoria (2003), *Personnel Management*, Himalaya Publishing House, India.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE VI/VII/VIII Semester

VCE-R15

**ORGANIZATION BEHAVIOR**  
(Open Elective)

Course Code: A3078

L	T	P	C
3	0	0	3

**Course Overview:**

The course makes the students to learn the concept organizational behaviour in its broadest multi – disciplinary context of Individual, group and organization. Insight on group behaviour and role of leadership theories related to behavioural perspectives would also be instilled in the students.

**Prerequisite(s):**NIL

**Course Outcomes:**

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

- CO1. Understand approaches, opportunities and challenges of OB and use this knowledge to understand behaviour people in organizations.
- CO2. Explain the importance of diversity in organizations as well as personality and perception of individual and apply this knowledge for better understanding of human beings in organizations.
- CO3. Indicate the group behaviour and leadership styles exhibit by the managers and apply this knowledge to get the things done through subordinates efficiently and effectively.
- CO4. Illustrate motivation theories and different Organization structures and apply this knowledge to create suitable organization structure for business as well as to get better work from employees.
- CO5. Interpret the role of Conflict management, Stress management, Organization change and Self-management and apply this knowledge for solving different problems of organizations.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE VI/VII/VIII Semester

VCE-R15

**ORGANIZATION BEHAVIOR**  
(Open Elective)

Course Code: A3078

L	T	P	C
3	0	0	3

**SYLLABUS**

**UNIT-I**

**INTRODUCTION TO ORGANIZATIONAL BEHAVIOR:** Foundation of O.B - Conceptual Model for O.B. – Organization System in Global Environment – Importance of Interpersonal Skills - Challenges & Opportunities for O.B- Developing O.B. Model – Approaches to O.B.

**UNIT-II**

**INDIVIDUAL BEHAVIOR:** Diversity – Biographical Characteristics - Ability – Implementing Diversity Management – Strategies – Attitudes & Job Satisfaction.

**PERSONALITY:**Theories of Personality – Perception – Process of Perception – Perception & Individual Decision Making – Motivation from concepts to Applications.

**UNIT-III**

**GROUP BEHAVIOR:** Foundations of Group Behaviour – Defining and Classifying Groups – Stages of Group Development – Group Properties – Roles – Norms – Status, Size and Cohesiveness – Group Decision Making – Understanding Work Teams – Types of Teams – Creating Effective Teams.

**LEADERSHIP THEORIES:**Leadership Theories – Challenges to Leadership Construct – Finding and Creating Effective Leaders – Power & Politics.

**UNIT-IV**

**MOTIVATION THEORIES:** Maslow’s Hierarchy of Needs, Two- factor theory of Motivation, Alderfer’s ERG theory, McClelland’s need based Motivational Model, Douglas McGregor Theories of X and Y.

**FOUNDATION OF ORGANIZATIONAL STRUCTURE:** Nature of organizing, organizational levels, span of control and types of span of control, factors determining span, organizational structure, departmentation and types of departmentation, making organizing effective.

**UNIT-V**

**ORGANIZATIONAL CULTURE AND CLIMATE:**Conflicts management - Organization Change - Stress Management – Self Management – Managing Careers.

**TEXT BOOKS:**

1. Stephen P. Robbins, Timothy (2012), *Organization Behaviour*, Ed. 14, Pearson Publications.
2. Mirza S Saiyadain (2011), *Organisation Behaviour*, TMH, New Delhi
3. Aryasri & VSP Rao (2009), *Management and Organisational Behaviour*, Excel Publications.

**REFERENCE BOOKS:**

1. Kavitha Singh (2009), *Organisational Behaviour*, Pearson Publications
2. Aswathappa (2009), *Organisational Behaviour*, Himalaya Publications
3. John M. Ivancevich (2009), *Organisational Behaviour & Management*, TMH, New Delhi
4. Koontz, Weihrich & Aryasri (2009), *Principles of Management*, TMH, New Delhi
5. Luthans, Fred (2009), *Organisational Behaviour*, 11/e, McGraw Hill, 2009.
6. Pierce and Gardner (2009), *Management and Organisational Behaviour: An Integrated Perspective*, Cengage
7. Deepak Kumar Bhattacharyya (2012), *Principles of Management-text and cases*, Pearson.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE VI/VII/VIII Semester

VCE-R15

**LOGISTICS AND SUPPLY CHAIN MANAGEMENT**  
(Open Elective)

Course Code: A3079

L	T	P	C
3	0	0	3

**Course Overview:**

The course enables the students to identify the concepts of Supply chain management functions, drivers and different types of Logistics management. It would make the students to know the importance of Supply chain customer service and bench mark practices.

**Prerequisite(s):NIL**

**Course Outcomes:**

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

CO1.Understand Supply chain management functions, drivers and different types of Logistics and apply the knowledge in business environment.

CO2.Illustrate the importance of Supply chain customer service and bench mark practices and apply them in business environment.

CO3.Explain the role of Sourcing and Distribution in supply chain and apply the knowledge in decision making process of organization.

CO4.Interpret the importance of Co-ordination in supply chain and role of Information Technology in supply chain and use this knowledge to run the organization successfully.

CO5.Classify Global logistics & Global supply chain processes and strategies and use this knowledge to understand Global supply chain and logistics environment.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE VI/VII/VIII Semester

VCE-R15

**LOGISTICS AND SUPPLY CHAIN MANAGEMENT**  
(Open Elective)

Course Code: A3079

L	T	P	C
3	0	0	3

**SYLLABUS**

**UNIT-I**

**INTRODUCTION:** Supply Chain Management- Concept, Objectives, Scope and Functions of Supply Chain; Process view of a Supply Chain. Supply Chain Drivers - Facilities, Inventory, Transportation, Information, Sourcing, Pricing; Obstacles to Achieve Strategic fit, Logistics Management: Introduction, Difference between Logistics and Supply Chain; Inbound, Inter and Outbound Logistics; Integrated Logistics Management; 3PL, 4PL, Intermodal and Reverse Logistics.

**UNIT-II**

**SUPPLY CHAIN CUSTOMER SERVICE** - The Marketing and Logistics interface, Customer Service and Customer Retention, Service-Driven Logistics System, Setting customer Service Priorities and Service Standards.

**BENCH MARKING:** Objectives, Bench marking Cycle, Process and types, Setting Bench marking Priorities.

**UNIT-III**

**SOURCING IN SUPPLY CHAIN:** Role of Sourcing in Supply Chain Management, Supplier Scoring and Assessment; Supplier Selection and Controlling; The Procurement process, Sourcing Planning and Analysis; Global Sourcing.

**NETWORK DESIGN IN SUPPLY CHAIN:** The role of distribution in the Supply Chain Management, factors influencing distribution network design; Transportation Fundamentals: The role of Transportation in Supply Chain, Factors influencing Transportation Decisions, Modes of transportation, Transportation documentation.

**UNIT-IV**

**COORDINATION IN SUPPLY CHAIN:** Introduction, Lack of Supply Chain Coordination and the Bullwhip effect, Impact of Lack of Coordination, Obstacles to Coordination in Supply Chain, Managerial levers to achieve Coordination.

**IT IN SUPPLY CHAIN:** The role of IT in the Supply Chain, The Supply Chain IT framework; CRM, Internal SCM, SRM; The future of IT in Supply Chain, Supply Chain IT in Practice.

**UNIT-V**

**GLOBAL LOGISTICS AND GLOBAL SUPPLY CHAIN:** Logistics in Global Economy, Change in Global Logistics, Global Supply Chain business process; Global Strategy; Global Purchasing, Global SCM.

**TEXT BOOKS:**

1. K.Sridhara butt, "Logistics and Supply Chain management", Himalaya Publishers, New Delhi, 2009.

**REFERENCE BOOKS:**

1. Sunil Chopra and Peter Meindl, " Supply Chain Management: Strategy, Planning & Operations", Pearson Education, New Delhi, 2004.
2. Donald J Bowerfox and David J Closs, " Logistics Management: The integrated Supply Chain Process", TMH, 2003.
3. D.K.Agarwal, "Logistics and Supply Chain management", Mc millan Publishers, 2011

4. B.Rajasekhar, Acharyulu, “Logistics and Supply Chain management”, Excel Books, New Delhi, 2009.

**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE VI/VII/VIII Semester

VCE-R15

**NATIONAL SERVICE SCHEME (NSS)**  
(Open Elective)

Course Code: A3080

L	T	P	C
3	0	0	3

**Course Overview:**

National Service Scheme, under the Ministry of Youth Affairs & Sports Govt. of India, popularly known as NSS was launched in Gandhiji's Birth Centenary Year 1969, in 37 Universities involving 40,000 students with primary focus on the development of personality of students through community service. Today, NSS has more than 3.2 million student volunteers on its roll spread over 298 Universities and 42 (+2) Senior Secondary Councils and Directorate of Vocational Education all over the country. From its inception, more than 3.75 crores students from Universities, Colleges and Institutions of higher learning have benefited from the NSS activities, as student volunteers.

**Prerequisite(s):**NIL

**Course Outcomes:**

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

- CO1. Contrast the different types of NSS activities and financial pattern of expenditure in Community service.
- CO2. Enhance the concept of youth, as an agent in social change.
- CO3. Classify and explain the working of organizational functionaries of NSS.
- CO4. Design a system, component or process to meet the desired needs applicable to society, with realistic constraints such as economic, safety, manufacturability and sustainability etc., by youth –adult partnership.
- CO5. Recognize the need for, and an ability to engage in society with lifelong learning capabilities with the concepts of volunteerism and its functions.

# VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CSE VI/VII/VIII Semester

VCE-R15

NATIONAL SERVICE SCHEME (NSS)

(Open Elective)

Course Code: A3080

L	T	P	C
3	0	0	3

## SYLLABUS

### Unit-01: INTRODUCTION AND BASIC CONCEPTS OF NSS

- a) History, philosophy, aims & objectives of NSS
- b) Emblem, flag, motto, song, badge etc.
- c) Organizational structure, roles and responsibilities of various NSS functionaries

### Unit-02: NSS PROGRAMMES AND ACTIVITIES

- a) Concept of regular activities, special camping, Day Camps
- b) Basis of adoption of village/slums, Methodology of conducting Survey
- c) Financial pattern of the scheme
- d) Other youth prog./schemes of GOI
- e) Coordination with different agencies
- f) Maintenance of the Diary

### Unit-03: UNDERSTANDING YOUTH

- a) Definition, profile of youth, categories of youth
- b) Issues, challenges and opportunities for youth
- c) Youth as an agent of social change

### Unit-04: COMMUNITY MOBILISATION

- a) Mapping of community stakeholders
- b) Designing the message in the context of the problem and the culture of the community
- c) Identifying methods of mobilization
- d) Youth-adult partnership

### Unit-05: VOLUNTEERISM AND SHRAMDAN

- a) Indian Tradition of volunteerism
- b) Needs & importance of volunteerism
- c) Motivation and Constraints of Volunteerism
- d) Shramdan as a part of volunteerism



**VARDHAMAN COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

B. Tech. CSE VI/VII/VIII Semester

VCE-R15

**PYTHON FOR DATA SCIENCE**  
(Open Elective)

Course Code: A3680

L	T	P	C
3	0	0	3

**Course Overview:**

Python is a very powerful programming language used for many different applications. Over time, the huge community around this open source language has created quite a few tools to efficiently work with Python. In recent years, a number of tools have been built specifically for data science. As a result, analyzing data with Python has never been easier. In this course learners will start from the very beginning, with basic arithmetic and variables, and learn how to handle data structures, such as Python lists, Numpy arrays, and Pandas DataFrames. Along the way, they'll learn about Python functions and control flow, look at the world of data visualizations with Python and create your own stunning visualizations based on real data.

**Prerequisite(s):**NIL

**Course Outcomes:**

- CO1. Explore Python language fundamentals, including basic syntax, variables, and types
- CO2. Use and manipulate regular lists, functions and packages
- CO3. Build Numpy arrays, and perform interesting calculations
- CO4. Create and customize plots on real data
- CO5. Supercharge your scripts with control flow, and get to know the Pandas DataFrame.

# VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CSE VI/VII/VIII Semester

VCE-R15

## PYTHON FOR DATA SCIENCE

(Open Elective)

Course Code: A3680

L T P C

3 0 0 3

### Syllabus

#### UNIT-I

**Introduction to Data Science for Python:** Objective, History, Methodologies, Data Science Applications, Python for Data science, Python Libraries.

**Introduction to Python:** Features of python, Applications of python, Syntax, Comments, Indentations, Number types, Variables and Data Types, Operators, conditional statement, Loops in Python.

#### UNIT-II:

**Python List:** Create Python List, Access Python List, Slicing a Python List, slicing and dicing, Reassigning a Python List (Mutable), Reassigning the whole Python list, Deleting list and elements, Multidimensional Lists, List Operations, Built-in List Functions.

**Python Tuple:** Create a Python Tuple, Tuples Packing, Tuples Unpacking, Creating a tuple with a single item, Access Python Tuple, Slicing a Tuple, Deleting a Python Tuple, Reassigning Tuples, Tuple Functions

Tuple Operations.

#### UNIT-III:

**Python Dictionary:** Create a Dictionary, Dictionaries with mixed keys, Access a Python Dictionary, Delete Python Dictionary, In-Built Functions on a Python Dictionary, In-Built Methods on a Python Dictionary, Dictionary Operations.

**Python Function:** User-Defined Functions in Python, Python Built-in Functions, Python Lambda Expressions, Recursion Function.

#### UNIT-IV:

**Python NumPy:** Features of Numpy, NumPy ndarray, Data Types, Functions of NumPy Array, Numpy Array Indexing, Mathematical Functions on Arrays in NumPy.

#### UNIT-V:

**Python Pandas:** Pandas Features, Install Pandas, Dataset in Pandas, Data Frames, Manipulating the Datasets, Describing a Dataset, group by Function, Filtering, Missing Values in Pandas, Concatenating Data Frames.

#### TEXT BOOKS:

1. Mark Smart, (2018), Introduction to Data Science with Python: Basics of Numpy and Pandas.
2. VK Jain, Data Science & Analytics, Khanna Book Publishing; 1 edition (2018)

#### REFERENCE BOOKS:

1. Frank Kane (2017) Hands-On Data Science and Python Machine Learning 1st Edition, Kindle Edition

## 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 UGC 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 to be University and an Autonomy College?**

A Deemed to be University is fully autonomous to the extent of awarding its own Degree. A Deemed to be 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 performance, 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 an eye on the academics and keep its reports and recommendations every year. In addition to the 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 students with their final grades 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-in 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?**  
Students shall be permitted for re-evaluation after the declaration of end semester examination results within a stipulated period by paying prescribed fee. But there will not be any re-examination system.
- 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 grades will reflect the average performance of all the semesters put together in CGPA format.
- 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 internal and external examinations. All matters involving the conduct of examinations, spot valuations, tabulations, preparation of Grade Sheet 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 and posted 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 UG and 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 (AUTONOMOUS)

## 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 I Semester / III Semester for the academic year 2015-2016/ 2016-2017 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/JNTUH. 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 on 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 is not permissible and involving in Ragging is an **offence** and punishable as per JNTUH/UGC rules and the law.
7. I will **pay** tuition fees, examination fees and any other **dues** within the stipulated time as required by the Institution/ 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 **absent myself continuously for 3 days**, my **parents** will have to meet the HOD concerned/ Principal.
10. I hereby **acknowledge** that I have **received** a copy of **R15 Academic Rules and Regulations, Syllabus copy** and hence, I shall **abide** by all the rules specified in it.

## ACKNOWLEDGEMENT

I have carefully gone through the terms of the undertaking mentioned above and I 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, shall be liable for suitable action as per College/JNTUH rules and the law. I undertake that I/he/she will strictly follow the above terms.

Signature of Student

Signature of Parent  
Name & Address with Phone Number







# VARDHAMAN COLLEGE OF ENGINEERING (AUTONOMOUS)

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Signature of Student

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Name & Address with Phone Number