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

BACHELOR OF TECHNOLOGY
CIVIL ENGINEERING

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**: CE **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
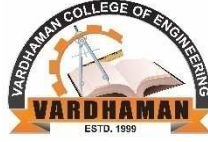
Vision:

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 CIVIL ENGINEERING

Department Vision:

To be a center of excellence in civil engineering education, research and consultancy to support thecommunity at large.

Department Mission:

❖ Providing knowledge based resources in civil engineering and allied fields.

❖ Tandem with Iindustry to facilitate advancement of technology.

❖ Promoting consultancy for industrial and societal needs.

❖ Inspiring to become an ethical entrepreneur.

Program Educational Objectives (PEOs)

PEO1: Graduates will Address the technical challenges as a professional by utilizing and enhancing theiranalytical skills in real world problems in civil engineering.

PEO2: Graduates will adapt to rapidly changing environment in Design and execution of projects and toachieve a high level of technical expertise through lifelong learning.

PEO3: Graduates will Communicate their ideas to be effective in collaborating with industry and R & Dcenters and working as a team member/leader by upholding their responsibilities withexcellence.

PEO4: Graduates will explore and apply multidisciplinary open-ended engineering activities consideringthe societal and economic impacts of engineering decisions, professional and ethicalresponsibilities of civil engineers.

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: Prepare detailed project reports and execution of industrial projects.

PSO2: Provide solutions for irrigation, drainage and rural water supply.

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

FIRST SEMESTER (23 weeks)	Instruction Period	:17 weeks	19 weeks
	Mid Semester Tests	:2 weeks	
	Preparation & Practical Examinations		2 weeks
	External Examinations		2 weeks
Semester Break			2 weeks
SECOND SEMESTER (23 weeks)	Instruction Period	:17 weeks	19 weeks
	Mid Semester Tests	:2 weeks	
	Preparation & Practical Examinations		2 weeks
	External Examinations		2 weeks
Summer Vacation			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 andevaluated.

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

Continuous Internal Evaluation	Mid Semester Test	15 Marks
	Online Objective Test	05 Marks
	Alternate Assessment	05 Marks
External Evaluation	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 09th week as per the given schedule for the first half of the total syllabus. The second Mid Semester Test will be held in the 18th 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 20 minutes duration. The Online Objective Test will be held in the 18th 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.

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10.1.3. 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.

10.1.4. 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 projectand 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 followingconditions:

- 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 followingconditions:

- 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	
First Class with Distinction	≥ 8.0 CGPA	From the aggregate marks secured from **184** Credits for Regular Students and **136** Credits for Lateral Entry Students.
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.

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

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 ith course and G_i is the grade point scored by student in the ith 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 ith 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 21st 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
	If the student:	
1. (a)	Possesses or keeps accessible in examination hall, any paper, note book, programmable calculators, Cell phones, pager, palm computers or any other form of material concerned with or related to the subject of the examination (theory or practical) in which he is appearing but has not made use of (material shall include any marks on the body of the 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)	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.
2.	Has copied in the examination hall from any paper, book, programmable calculators, palm computers or any other form of material relevant to the subject of the examination (theory or practical) in which the 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.
3.	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.
4.	Smuggles in the Answer book or additional sheet or takes out or arranges to send out the question paper during the examination or answer book or additional sheet, during or after the examination.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the 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.
5.	Uses objectionable, abusive or offensive language in the answer paper or in letters to the examiners or writes to the examiner requesting him to award pass marks.	Cancellation of the performance in that subject.
6.	Refuses to obey the orders of the Chief Superintendent/Assistant – Superintendent / any officer on duty or misbehaves or creates disturbance of any kind in and around the examination hall or organizes a walk out or instigates others to walk out,	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.
7.	Leaves the exam hall taking away answer script or intentionally tears of the script or any part thereof inside or outside the examination hall.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the 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.
8.	Possess any lethal weapon or firearm in the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the 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.
9.	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.
10.	Comes in a drunken condition to the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the 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.
11.	Copying detected on the basis of internal evidence, such as, during valuation or during special scrutiny.	Cancellation of the performance in that subject and all other subjects the student has appeared including practical examinations and project work of that semester/year examinations.
12.	If any malpractice is detected which is not covered in the above clauses 1 to 11 shall be reported to the University for further action to award suitable punishment.	

COURSE STRUCTURE (VCE-R15)

B. TECH - CIVIL ENGINEERING

REGULATIONS: VCE-R15

I SEMESTER

Code	Course	Category	L	T	P	Credits	Internal	External	Total
			Periods per Week				**Scheme of Examination Maximum Marks**		
A3001	Mathematics – I	BS	4	1	0	4	25	75	100
A3002	Engineering Physics	BS	3	1	0	3	25	75	100
A3003	Engineering Chemistry	BS	3	1	0	3	25	75	100
A3501	Computer Programming	BE	4	1	0	4	25	75	100
A3301	Engineering Mechanics - I	BE	3	1	0	3	25	75	100
A3502	Computer Programming Through C Lab	BE	0	0	3	2	25	75	100
A3007	Engineering Physics and Engineering Chemistry Lab	BS	0	0	3	2	25	75	100
A3302	Engineering Drawing – I	BE	0	2	3	3	25	75	100
	TOTAL		**17**	**07**	**09**	**24**	**200**	**600**	**800**

II SEMESTER

Code	Course	Category	L	T	P	Credits	Internal	External	Total
			Periods per Week				**Scheme of Examination Maximum Marks**		
A3006	Mathematics – II	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
A3303	Engineering Mechanics – II	BE	4	1	0	4	25	75	100
A3202	Basic Electrical Electronics Engineering	BE	3	0	0	3	25	75	100
A3008	English Language Communication Skills Lab	HS	0	0	3	2	25	75	100
A3305	Engineering Workshop	BE	0	0	3	2	25	75	100
A3304	Engineering Drawing – II	BE	0	2	4	3	25	75	100
	TOTAL		**17**	**05**	**10**	**24**	**200**	**600**	**800**

III SEMESTER

Code	Course	Category	L	T	P	Credits	Internal	External	Total
			Periods per Week				**Scheme of Examination Maximum Marks**		
A3011	Managerial Economics and Financial Analysis	HS	3	1	0	3	25	75	100
A3101	Fluid Mechanics	CE	4	1	0	4	25	75	100
A3102	Building Materials and Construction	BE	3	1	0	3	25	75	100
A3103	Surveying - I	CE	4	0	0	4	25	75	100
A3104	Strength of Materials - I	CE	3	1	0	3	25	75	100
A3010	Environmental Science	BS	3	0	0	3	25	75	100
A3105	Strength of Materials Lab	CE	0	0	3	2	25	75	100
A3106	Surveying – I Lab	CE	0	0	3	2	25	75	100
	TOTAL		**20**	**04**	**06**	**24**	**200**	**600**	**800**

B. TECH - CIVIL ENGINEERING

REGULATIONS: VCE-R15

IV SEMESTER

Code	Course	Category	L	T	P	Credits	Internal	External	Total
			Periods per Week				Scheme of Examination Maximum Marks		
A3107	Concrete Technology	CE	3	1	0	3	25	75	100
A3108	Strength of Materials – II	CE	3	1	0	3	25	75	100
A3109	Structural Analysis – I	CE	3	1	0	3	25	75	100
A3110	Hydraulics and Hydraulic Machines	CE	4	0	0	4	25	75	100
A3111	Building Planning and Drawing	CE	2	0	4	4	25	75	100
A3112	Surveying - II	CE	3	1	0	3	25	75	100
A3113	Fluid Mechanics and Hydraulic Machinery Lab	CE	0	0	3	2	25	75	100
A3114	Surveying – II Lab	CE	0	0	3	2	25	75	100
A3021	Gender Sensitization	AC	0	3	0	0	25*	50*	75*
	TOTAL		18	07	10	24	200	600	800

V SEMESTER

Code	Course	Category	L	T	P	Credits	Internal	External	Total
			Periods per Week				Scheme of Examination Maximum Marks		
A3115	Design of Reinforced Concrete Structures	CE	4	1	0	4	25	75	100
A3116	Structural Analysis - II	CE	3	1	0	3	25	75	100
A3117	Geo Technical Engineering - I	CE	3	1	0	3	25	75	100
A3118	Engineering Geology	BS	4	0	0	4	25	75	100
A3119	Water Resources Engineering - I	CE	3	1	0	3	25	75	100
A3120	Estimating and Costing	CE	3	1	0	3	25	75	100
A3121	Engineering Geology Lab	BS	0	0	3	2	25	75	100
A3122	Geotechnical Engineering Lab	CE	0	0	3	2	25	75	100
A3012	Professional Ethics and Human Values	AC	3	0	0	0	25*	75*	100*
	TOTAL		23	05	06	24	200	600	800

VI SEMESTER

Code	Course	Category	L	T	P	Credits	Internal	External	Total
			Periods per Week				Scheme of Examination Maximum Marks		
A3123	Design of Steel Structures	CE	3	1	0	3	25	75	100
A3124	Geo Technical Engineering - II	CE	3	1	0	3	25	75	100
A3125	Environmental Engineering	CE	3	1	0	3	25	75	100
	Open Elective – I	OE	3	0	0	3	25	75	100
	Professional Elective - I	PE	4	0	0	4	25	75	100
	Professional Elective - II	PE	4	0	0	4	25	75	100
A3126	Environmental Engineering Lab	CE	0	0	3	2	25	75	100
A3127	Computer Aided Drafting of Buildings Lab	CE	0	0	3	2	25	75	100
A3012	Intellectual Property Rights	AC	3	0	0	0	25*	75*	100*
	TOTAL		23	03	06	24	200	600	800

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

B. TECH - CIVIL ENGINEERING

REGULATIONS: VCE-R15

VII SEMESTER									
Code	**Course**	**Category**	**Periods per Week**			**Credits**	**Scheme of Examination Maximum Marks**		
			L	**T**	**P**		**Internal**	**External**	**Total**
A3128	Transportation Engineering	CE	3	1	0	3	25	75	100
A3129	Water Resources Engineering - II	CE	3	1	0	3	25	75	100
A3130	Remote Sensing and GIS Applications	CE	3	1	0	3	25	75	100
	Open Elective - II	OE	3	0	0	3	25	75	100
	Professional Elective – III	PE	4	0	0	4	25	75	100
	Professional Elective – IV	PE	4	0	0	4	25	75	100
A3131	Concrete and Highway Engineering Lab	CE	0	0	2	1	25	75	100
A3132	Geographical Information Systems Lab	CE	0	0	2	1	25	75	100
A3133	Mini Project	MP	0	0	0	2	100	0	100
	TOTAL		20	03	04	24	300	600	900

VIII SEMESTER									
Code	**Course**	**Category**	**Periods per Week**			**Credits**	**Scheme of Examination Maximum Marks**		
			L	**T**	**P**		**Internal**	**External**	**Total**
A3014	Management Science	HS	3	1	0	3	25	75	100
	Open Elective – III	OE	3	0	0	3	25	75	100
	Professional Elective – V	PE	4	0	0	4	25	75	100
A3134	Technical Seminar	TS	0	0	3	2	100	0	100
A3135	Project Work	PW	0	0	20	12	50	150	200
TOTAL			10	1	23	24	225	375	600

B. TECH. - CIVIL ENGINEERING

Professional Elective - I			
Code	**Course**	**Code**	**Course**
A3151	Environmental Impact Assessment	A3153	Ground Water Hydrology
A3152	Elements of Earthquake Engineering	A3154	Finite Element Methods in Civil Engineering
Professional Elective - II			
Code	**Course**	**Code**	**Course**
A3155	Advanced Structural Analysis	A3157	Air Pollution and Control
A3156	Watershed Management	A3158	Bridge Engineering
Professional Elective - III			
Code	**Course**	**Code**	**Course**
A3159	Construction Management	A3161	Pre Stressed Concrete Structures
A3160	Ground Improvement Techniques	A3162	Industrial Structures
Professional Elective - IV			
Code	**Course**	**Code**	**Course**
A3163	Pavement Analysis and Design	A3165	Solid Waste Management
A3164	Design and Drawing of Irrigation Structures	A3166	Traffic Engineering
A3180	Advanced Technics in Civil Engineering		
Professional Elective - V			
Code	**Course**	**Code**	**Course**
A3167	Rehabilitation and Retrofitting of Structures	A3169	Urban Planning and Information Systems
A3168	Industrial waste and waste management	A3170	Advanced Foundation Engineering
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
A3076	Entrepreneurship Development	A3077	Human Resource Management
A3078	Organization Behavior	A3079	Logistics and Supply Chain Management
A3080	National Service Scheme (NSS)	A3680	Python for Data Science
A3081	Basic Program in Entrepreneurship		

Course Categories

HS	–	Humanities and Social Sciences	**BS**	–	Basic Sciences
BE	–	Basic Engineering	**CE**	–	Core Engineering
AC*	–	Audit Course	**OE**	–	Open Elective
PE	–	Professional Elective	**MP**	–	Mini Project
TS	–	Technical Seminar	**PW**	–	Project Work

Note: Open electives to be offered will be notified by each department at the time of registration.

SYLLABI FOR
I SEMESTER

B. Tech. CE 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 Electric circuit, Simple Harmonic Motion and Rate of Growth / Decay problems using differential equations.

CO2.   Define and locate the extremum of a function of several variables.

CO3.   Apply Laplace transform to solve differential equations**.**

CO4.   Find directional derivative and the gradient of vector functions

CO5.   Infer vector integral theorems to evaluate line, surface and volume integrals.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CE 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 TRANSFORMAND 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, 42nd 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, 10th *Edition,* New Jersy,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. CE I 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.   Solve real world problems using basic concepts of probability.

CO2.   Classify random variables and apply them to generate data from various distributions in real time problems.

CO3.   Identify errors occurring in various numerical methods and to apply methods to approximate unknown functions towards complex engineering problems

CO4.   Apply appropriate numerical methods to solve different types of problems related to differentiation and integration emerging as application to science and engineering

CO5.   Utilize appropriate numerical techniques to find the solutions of initial value problems that involve in majority areas of engineering

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CE I 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, 3rd 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, Hyderbad
4. M. Ratner, D. Ratner (2003), Nanotechnology, Pearson Edition, India.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CE I Semester   **VCE-R15**

ENGINEERING CHEMISTRY

Course Code: A3003   **L   T   P   C**

                                                                3   1   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.   Compare and contrast the chemical behavior, properties and applications of engineering substances.

CO2.   Develop innovate methods to produce soft water for industrial uses and potable water at lesser cost and its significance in industry and daily life

CO3.   Apply knowledge of materials, structural elements and fuels to the analysis of simple structures and make use of appropriate engineering materials

CO4.   Extrapolate the knowledge of cell, electrode, cathode, anode, electrolysis, electromotive force, reference electrode to protect different metals from corrosion

CO5.   Summarize the applications of Batteries, Fuel cells and synthesis of nano-particles in controlling pollution

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CE I Semester   **VCE-R15**

ENGINEERING CHEMISTRY

Course Code: A3003   **L   T   P   C**

                                                                                            3   1   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, (Lechlanche 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. CE I Semester   **VCE-R15**

COMPUTER PROGRAMMING

Course Code: A3501

L	T	P	C
4	1	0	4

Course Overview:

The course 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 I/O 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.   Exhibit profound knowledge how to create, debug, execute and document C programs to cater the needs of computer hardware and software problems.

CO2.   Define the programming syntax and constructs of Control Statements, Arrays, Strings, Functions and Pointers to develop elegant, legible and reusable codes.

CO3.   Differentiate among various derived data types like Structures, Unions and Enumerations and identify the potential benefits of each one over the other.

CO4.   Distinguish between Console and File I/O and apply them as per needs and specifications of the problem statements.

CO5.   Demonstrate an ability to design and develop C based novel products.

CO6.   Comprehend the habit of intelligent reading to learn data structures and java programming, to participate and succeed in competitive exams and prosper in professional career path.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CE 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, 3rd Edition, CENGAGE Learning, India.

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

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

ENGINEERING MECHANICS - I

Course Code: A3301

L	T	P	C
3	1	0	3

Course Overview:

Engineering Mechanics is the branch of science for analyzing force systems that acts upon the bodies at either at rest or in motion. The knowledge of mechanics helps us in designing the various parts of machine elements. The course content is designed in such a way that the balancing of various mechanical systems could be achieved by the calculations of center of gravity and moment of inertia. The effects of friction and the consequences of frictional forces on the mating parts will be analyzed to design various systems with negligible effort loss. The principle of virtual work helps us in designing the systems of having structural integrity.

Prerequisite(s): •Engineering Physics (A3002)

Course Outcomes:

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

CO1.   Explain the basic concepts, laws of mechanics and compute resultant forces

CO2.   Sketch the free body diagram and illustrate the governing equations of equilibrium.

CO3.   Apply laws of friction and solve problems.

CO4.   Determine centroid, center of gravity of simple and composite bodies.

CO5.   Compute area moment of inertia and mass moment of inertia of simple and composite bodies.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CE I Semester   **VCE-R15**

ENGINEERING MECHANICS - I

Course Code: A3301   **L T P C**
                                                                3 1 0 3

SYLLABUS

UNIT – I   **(10 Lectures)**
INTRODUCTION TO ENGINEERING MECHANICS: Introduction – Units and Dimensions – Laws of Mechanics – Lame's theorem - Parallelogram and triangular Law of forces – Vectors – Vectorial representation of forces and moments - Concepts of force- components of forces in a plane and in space- various systems of forces and their resultants - moment of force and its applications - and couples.

UNIT-II   **(10 Lectures)**
STATICS OF RIGID BODY: Free body diagram – Types of supports and their reactions – requirements of stable equilibrium – Moments and Couples – Moment of a force about a point and about an axis – Vectorial representation of moments and couples – Scalar components of a moment – Varignon's theorem – Equilibrium of Rigid bodies in two dimensions.

UNIT – III   **(8 Lectures)**
FRICTION: Types of Friction – Limiting Friction – Laws of Friction – Angle of repose- Equilibrium of body lying on rough inclined plane – Ladder friction – Wedge friction.

UNIT – IV   **(10 Lectures)**
CENTROID: Introduction - Centroid – Centre of gravity-difference-use of symmetry-determination of centroid of simple and composite figures from basic principles. Theorems of Pappus – guldinus.
CENTER OF GRAVITY: Centre of gravity from basic principles–Centre of gravity of composite bodies.

UNIT – V   **(10 Lectures)**
AREA MOMENTS OF INERTIA: Definition-Polar moments of inertia-Radius of gyration- Transfer theorems- Moment of inertia of regular and composite sections.
MASS MOMENTS OF INERTIA: Moment of inertia of masses- transfers formula and moment of inertia of standard and composite bodies.

TEXT BOOKS:
1. Fedinand L. Singer (1998)- Engineering Mechanics- Harper – Collins Publishers- New Delhi.
2. A. K. Tayal (2012)- Engineering Mechanics- Umesh Publications- New Delhi.

REFERENCES BOOKS:
1. Timoshenko & Young (2013)- Engineering Mechanics- Mc Graw Hill- India.
2. K. L Kumar (2009)- Engineering Mechanics- Tata Mc Graw Hill- New Delhi.
3. Irving. H. Shames (2004)- Engineering Mechanics- Prentice-Hall- India.
4. S. S. Bhavikatti- J. G. Rajasekharappa (2014)- Engineering Mechanics- New Age International- India.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

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 pre-processor 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): Computer Programming (A3501)

Course Outcomes:

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

CO1.   Demonstrate the programming skills to create, debug, execute and document C programs to cater the needs of computer hardware and software problems

CO2.   Implement the programs using the constructs such as Control Statements, Arrays, Strings, Functions and Pointers without major syntax errors, ensuring that the developed code is elegant, legible and reusable

CO3.   Differentiate among Structures, Unions and Enumerations and appropriately use them in developing C based novel products

CO4.   Design, implement programs distinguishing Console I/O and File I/O

CO5.   Demonstrate an interest towards subsequent programming concepts like data structures and java programming so as to succeed in academics and professional career path

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CE 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=$1 + x^2/2! + X^4/4! +$ ------------------------- 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 weather 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 Nth 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 rum 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 type def 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 students' records from user and store them in a file.

REFERENCE BOOKS:

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

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

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. Estimate the moment of inertia of any spinning system and apply it to find the mechanical properties of the material

CO2. Construct the sinusoidal waveforms of specific frequency and amplitude by using R-C circuit

CO3. Illustrate the importance of the diffraction phenomenon in low laser light beam experiment for application of free space optical communication

CO4. Make use of LED in verifying the total internal reflection in optical fibers and understand the importance of optical fiber benefits including the transmission of energy and low signal loss of light.

CO5. Distinguish the dispersive power for both prism spectrometer and grating spectrometer

Course Overview:

Although engineers are not expected to carry out chemical analysis by themselves it is absolutely essential for them to have appreciation regarding the principles, applications, merits and limitations of the modern techniques of instrumental chemical analysis. The objective of few instrumental techniques, namely, pH metry, potentiometry, conductometry is to inculcate the knowledge of engineering chemistry discipline. The experiments on ion selective electrodes are proved to be vital in engineering applications on industrial level.

Prerequisite(s):NIL

Course Outcomes:

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

CO1. Develop the applications of current chemical and scientific theories

CO2. Design, carry out, record and analyze the results of chemical experiments

CO3. Analyze the importance of temperature for Viscosity, Surface Tension and Explain the instrumental components and principles of operation

CO4. Examine the ethical, historical, philosophical, and environmental aspects as factual problems and issues facing chemists.

CO5. Evaluate data collected to determine the identity, purity, and percent yield of products

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CE I Semester   **VCE-R15**
ENGINEERING PHYSICS AND ENGINEERING CHEMISTRY LAB
Course Code: A3007   **L   T   P   C**
                                                                 0   0   3   2
LIST OF EXPERIMENTS

ENGINEERING PHYSICS LAB
1. Determination of Rigidity modulus (η) 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).

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. CE I Semester   **VCE-R15**

ENGINEERING DRAWING - I

Course Code: A3302

L	T	P	C
0	2	3	3

Course Overview:

This course is an introduction to the students about Engineering drawings that are usually created in accordance with standardized conventions for layout, nomenclature, interpretation, appearance (such as typefaces and line styles), size, etc. The drawing technique is emphasized on how to draw an object graphically and projection drawing from different point of view

Prerequisite(s):NIL

Course Outcomes:

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

CO1.   Name drawing instruments and show their uses

CO2.   Explain types of lines and geometrical constructions that are based on plane geometry

CO3.   Construct various types of scales and curves commonly used in engineering practice

CO4.   Distinguish between first, second, third and fourth angle projection systems

CO5.   Estimate actual dimension of drawing based on graphical scale.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CE I Semester   **VCE-R15**

ENGINEERING DRAWING - I

Course Code: A3302   **L T P C**
                                                                         0 2 3 3

LIST OF EXPERIMENTS

Note: 50 % Manual Practice and 50% CAD Practice

UNIT – I   **(24 Lectures)**

INTRODUCTION TO ENGINEERING DRAWING: Drawing instruments and accessories, types of line, lettering, rules of dimensioning, geometrical constructions, Construction of scales – Plain Scale, Diagonal Scale, Comparative Scale and Vernier Scale.
INTRODUCTION TO COMPUTER AIDED DRAFTING: CAD workstation, CAD Software, and CAD commands.

UNIT – II   **(15 Lectures)**

CURVES USED IN ENGINEERING PRACTICE: Conic Sections – construction of ellipse, parabola and hyperbola; Cycloidal curves – cycloid, epicycloid and hypocycloid; involutes.

UNIT – III   **(15 Lectures)**

ORTHOGRAPHIC PROJECTION: Principles of orthographic projections – conventions – first and third angle projections. Projection of points, projection of lines – lines inclined to single plane, lines inclined to both the planes, true lengths and traces.

UNIT – IV   **(15 Lectures)**

PROJECTION OF PLANES: Projection of regular planes – planes inclined to one plane, planes inclined to both planes, projection of planes by auxiliary plain projection method.

UNIT – V   **(15 Lectures)**

PROJECTION OF SOLIDS: Projections of regular solids – prisms, cylinders, pyramids, cones. Solids inclined to one plane, Solids inclined to both planes, projection of solid by auxiliary plain projection method.

TEXT BOOKS:
1. N. D. Bhatt (2012), Engineering Drawing, 49th Edition, Charotar Publications, New Delhi.
2. C M Agrawal, Basant Agrawal (2013) Engineering Drawing,2th Edition, Tata Mc Graw Hill, India.

REFERENCE BOOKS:
1. Venugopal (2010), Engineering Drawing and Graphics, 2nd edition, New Age Publications, New Delhi.
2. Johle (2009), Engineering Drawing, Tata Mc Graw Hill, New Delhi, India.
3. Trymbaka Murthy (2007), Computer Aided Engineering Drawing, I.K. International Publishers, New Delhi.
4. R.B. Choudary (2005), Engineering graphics with Auto CAD, Anuradha Publishers, New Delhi.

SYLLABI FOR
II SEMESTER

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CEII 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.   Interpret rank of a matrix and apply in the field of Cryptography, Electrical networks, Quantum Mechanics and Transportation problems

CO2.   Use Eigen values and Eigen vectors of a square matrix in the study of structural engineering and population dynamics.

CO3.   Apply Partial differential equations to solve diffusion equation and wave equation.

CO4.   Develop Fourier series and use in the study of heat conduction, Mechanics and acoustics.

CO5.   Represent Fourier transforms and Z- Transforms of a function in the study of signal processing and communication engineering

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CEII 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*, 42nd 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,* 10th*Edition,* New Jersy,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)

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 basic concepts of probability.

CO2.   Classify random variables and apply them to generate data from various distributions in real time problems.

CO3.   Identify errors occurring in various numerical methods and to apply methods to approximate unknown functions towards complex engineering problems.

CO4.   Apply appropriate numerical methods to solve different types of problems related to differentiation and integration emerging as application to science and engineering.

CO5.   Utilize appropriate numerical techniques to find the solutions of initial value problems that involve in majority areas of engineering.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CEII 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, 42nd 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 Bhishma 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. CE IISemester   **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.   Demonstrate an understanding of the significance of humanity, love and service to mankind and be involved in community service.

CO2.   Relate the importance of technological impact through the lives of Indian scientists

CO3.   Utilize the rules of grammar effectively (articles, prepositions, concord, tenses etc.) in writing reports, technical articles, essays and in day- to-day conversations.

CO4.   Show effective written communication skills in academic writing.

CO5.   Translate effective oral communication skills in formal contexts.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CE IISemester   **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-Oneword 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 Anonyms, 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.

REFERENCES
1. Ashraf Rizvi M, (2005). Effective Technical Communication. New Delhi: Tata Mc Graw Hill.
2. Raymond Murphy, (2004). Murphy's English Grammar with CD. 3rd edition. Cambridge University Press.

3. Wren & Martin (1936), revised by N.D.V.Prasad Rao(1999).English Grammar and Composition. S.ChandPublications
4. Mario Rinvolucri &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. CE IISemester   **VCE-R15**

ENGINEERING MECHANICS - II

Course Code: A3303

L	T	P	C
4	1	0	4

Course Overview:

This is second course in Engineering Mechanics - which is the study of the interaction of matter and forces in engineering contexts. It is evident that all objects in the world around us are composed of matter and they are all subject to forces. As such- Engineering Mechanics is a foundational tool for engineers and forms the underlying basis for understanding more advanced fields such as Solid Mechanics - Fluid Dynamics - Rigid Body Dynamics – Aerodynamics – Structures - and Control.

Prerequisite(s):NIL

Course Outcomes:

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

CO1.   Recall the basic concepts of kinematics to solve problems.

CO2.   Analyze rectilinear and curvilinear motion of particles and rigid bodies.

CO3.   Describe potential and kinetic energy and solve the problems using conservative energy principle.

CO4.   Apply the Impulse-Momentum principles to solve Problems.

CO5.   Explain the concept of vibration and analyze the problems.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CEII Semester   **VCE-R15**

ENGINEERING MECHANICS – II

Course Code: A3303

L	T	P	C
4	1	0	4

SYLLABUS

UNIT – I   **(12 Lectures)**
KINEMATICS: Rectilinear motion- curvilinear motion- velocity and acceleration- types of rigid body motion- and analysis in a plane.
PROJECTILES: Definitions-Motion of body projected horizontally-projection on inclined plane-inclined projection on level ground-problems.

UNIT – II   **(12 Lectures)**
KINETICS: Analysis as a particle- and analysis as a rigid body in translation- kinetics of rotating bodies about fixed axis - central force motion - Equations of planar motion - D' Alembert's principle – Moment of momentum –applications.

UNIT – III   **(12 Lectures)**
WORK AND ENERGY: Work done by a Force and a System of Forces - Work done by a Varying force - Energy - Potential Energy - kinetic Energy of a Particle - Kinetic Energy of a Rigid Body in Rotation and in Plane motion - Work and Energy Principle - Law of Conservation of Energy.

UNIT – IV   **(12 Lectures)**
IMPULSE AND MOMENTUM: Introduction to momentum – impulse - Principle of Linear Impulse and Linear Momentum- Conservation of Linear Momentum- Direct central Impact- Coefficient of Restitution-Angular momentum.

UNIT – V   **(10 Lectures)**
MECHANICAL VIBRATIONS: Definitions- Concepts – Simple Harmonic Motion – Damped and Un-damped Free vibrations - Simple and Compound pendulums and its applications.

TEXT BOOKS:
1. Fedinand L. Singer (1998)- Engineering Mechanics- Harper – Collins Publishers- New Delhi.
2. A. K. Tayal (2012)- Engineering Mechanics- Umesh Publications- New Delhi.

REFERENCE BOOKS:
1. Timoshenko & Young (2013)- Engineering Mechanics- Mc Graw Hill- India.
2. K. L Kumar (2009)- Engineering Mechanics- Tata Mc Graw Hill- New Delhi.
3. Irving. H. Shames (2004)- Engineering Mechanics- Prentice-Hall- India.
4. S. S. Bhavikatti- J. G. Rajasekharappa (2014)- Engineering Mechanics- New Age International- India.
5. G. K. Grover- (2009)- Mechanical Vibrations- Nem Chand & Brothers- India

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

Course Code: A3202   **L   T   P   C**
                                                                                 3   0   0   3

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. It also 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.

Prerequisite(s):NIL

Course Outcomes:

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

CO1.   Define basic electrical concepts like electric charge, current, electrical potential, electrical Power and energy.

CO2.   Apply Mesh , Nodal analysis ,Network theorems and network topology concepts to solve electrical circuits.

CO3.   Analyze the concepts of RMS, Average values of different periodic waveforms, power ,power factor of Single phase AC circuits and physical behavior of diodes and transistors

CO4.   Design regulated power supply using various rectifiers and filter circuit.

CO5.   Examine the construction, operation and characteristics of BJT, JFET and MOSFET which can be used in the design of amplifiers.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

Course Code: A3202

L	T	P	C
3	0	0	3

SYLLABUS

UNIT – I   **(12 Lectures)**
INTRODUCTION TO ELECTRICAL ENGINEERING: Essence of electricity, conductors, semiconductors and insulators (elementary treatment only); electric field; electric current, potential and potential difference, electromotive force, electric power, ohm's law, basic circuit components, electromagnetism related laws, magnetic field due to electric current flow, force on a current carrying conductor placed in a magnetic field, faradays laws of electromagnetic induction. Types of induced EMF's, Kirchhoff's laws, simple problems.

UNIT – II   **(12 Lectures)**
ALTERNATING QUANTITIES: Principle of AC voltages, waveforms and basic definitions, root mean square and average values of alternating currents and voltages, form factor and peak factor, phasor representation of alternating quantities, J operator and phasor algebra, analysis of AC circuits with single basic network element, single phase series circuits, single phase parallel circuits, single phase series parallel circuits.

UNIT – III   **(12 Lectures)**
NETWORK THEOREMS: Superposition, reciprocity, thevenin's, norton's and maximum power transfer theorems with DC excitation.

INSTRUMENTS: Basic principle of indicating instruments - permanent magnet moving coil and moving iron instruments.

CATHODE RAY OSCILLOSCOPE: Principles of CRT (Cathode Ray Tube), deflection, sensitivity, electrostatic and magnetic deflection, applications of CRO - voltage, current and frequency measurements.

UNIT – IV   **(12 Lectures)**
DIODE AND ITS CHARACTERISTICS: P-N junction diode, symbol, V-I characteristics, rectifiers - half wave, full wave and bridge rectifiers (simple Problems).

UNIT – V   **(12 Lectures)**
TRANSISTORS: P-N-P and N-P-N junction transistor, CE, CB and CC transistor configurations.

TEXT BOOKS:
1. T. K. Nagasarkar, M. S. Suhkija (2007), *BasicElectricalEngineering*, 2nd Edition, Oxford University Press, New Delhi.
2. S. Salivahanan, N Suresh Kumar, A. Vallavaraj (2007), *ElectronicDevicesandCircuits*, Tata McGraw Hill, India.
3. J. Millman, C. C. Halkias, and Satyabratha Jit (2011), *ElectronicDevicesandCircuits*, 3rd Edition, Tata McGraw Hill, New Delhi.

REFERENCE BOOKS:
1. Sudhakar Shyam Mohan S P (2005), *NetworkAnalysis*, 2ndEdition, Tata McGraw-Hill, New Delhi.
2. L. Thereja and A. K. Thereja (2008), *A Text Book of Electrical Technology*, First Edition, S. Chand & Company limited, New Delhi.
3. S. Salivahanan, N. Suresh Kumar, A. Vallavaraj (2008), *Electronic Devices and Circuits*, 2nd edition, Tata McGraw Hill, New Delhi.

B. Tech. CE IISemester   **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 your view point convincingly.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CE IISemester   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 sessionArticles, 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 IntroducingOthers – 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 SpeakingActive 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 Softwares:
- 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. CEII 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 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 tools used in various engineering workshop trades.

CO2.   Select proper tools and equipment required to process work piece.

CO3.   Demonstrate operations of Fitting, Carpentry, Foundry, Black-Smithy and Tin-Smithy trades.

CO4.   Experiment with household electrical appliances by making proper electrical connections.

CO5.   Create documents and power point slides using Microsoft office tools.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CE IISemester   VCE-R15

ENGINEERING WORKSHOP

Course Code: A3305
                      L   T   P   C
                      0   0   3   2

LIST OF EXPERIMENTS

PART – A

TRADES FOR PRACTICE:

Note: Minimum two exercises have to be practiced in each of the following trades

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

PART-B

TRADES FOR DEMONSTRATION:

a. Arc-Welding
b. Plumbing
c. Power Tools

PART-C
Note: At least two tasks have to be carried out from the following tasks

Task 1

    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

    1.   **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

    1.   **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

    1.   **Introduction toSearch 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

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

    2.   **Creating project Certificate: A**bstract 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.

3. **Creating Time Table: A**bstract 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.

1. **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.

1. **Creating project Certificate: A**bstract 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. Jeyapoovan, 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. David Anfinson and Ken, *IT Essentials PC Hardware and Software Companion Guide*,Third Edition.
6. Kate J. Chase, *PC Hardware and A Handbook*,Quamme. – CISCO Press, Pearson Education. –PHI (Microsoft)

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CE IISemester   **VCE-R15**

ENGINEERING DRAWING – II

Course Code: A3304

L	T	P	C
0	2	4	3

Course Overview:

This course is an introduction to the students about Engineering drawings that are usually created in accordance with standardized conventions for layout, nomenclature, interpretation, appearance (such as typefaces and line styles), size, etc. The drawing technique is emphasized on how to draw an object graphically and projection drawing from different point of view.

Prerequisite(s):NIL

Course Outcomes:

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

CO1.   Select CAD tools for modeling regular solids.

CO2.   Explain the concepts of isometric and perspective projections.

CO3.   Construct sectional views and curves of intersection of regular solids.

CO4.   Compare isometric and orthographic views of an object.

CO5.   Estimate sheet metal requirement for making regular solids

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CE IISemester   **VCE-R15**

ENGINEERING DRAWING – II

Course Code: A3304   **L   T   P   C**
                                                                                        0   2   4   3

LIST OF EXPERIMENTS

Note: 50 % Manual Practice and 50% CAD Practice

UNIT - I

SECTIONS OF SOLIDS: Sections of prisms, pyramids, cylinders and cones**.**

DEVELOPMENT OF SURFACES: Development of lateral surface of right regular solids – prisms, cylinders, pyramids and cones.

UNIT - II

INTERSECTION OF SOLIDS: Intersection of two cylinders, cylinder and prism, cylinder and cone, prism and prism.

UNIT – III

ISOMETRIC PROJECTIONS: Principle of isometric projection, isometric scale, isometric projections and isometric views, Isometric projections of planes, prisms, cylinders, pyramids, and cones.

UNIT - IV

TRANSFORMATION OF PROJECTIONS: Conversion of isometric views to orthographic views and conversion of orthographic views to isometric views.

UNIT - V

PERSPECTIVE PROJECTIONS: Concept of perspective projection, Terminology in perspective projection, methods of perspective projection – Vanishing Point method, Visual Ray method.

TEXT BOOKS:
1. N. D. Bhatt, V. M. Panchal (2012), *Engineering Drawing*, 49th Edition, Charotar Publishing House, Gujarat.
2. C M Agrawal, Basant Agrawal (2013) *Engineering Drawing*, 2nd Edition, Tata Mc Graw Hill, India.

REFERENCE BOOKS:
1. D. M. Kulkarni, A. P. Rastogi, and A. K. Sarkar (2009), *Engineering Graphics with AutoCAD*, PHI Learning Private Limited, New Delhi.
2. Arshad Noor Siddiquee, Zahid Akhtar Khan, Mukhtar Ahmad (2006), *Engineering Drawing with a Primer on AutoCAD*, 2nd Edition, Prentice Hall, India.
3. Jolhe, Dhananjay (2006), *Engineering Drawing: With an Introduction to CAD*, Tata Mc Graw Hill, India.

SYLLABI FOR
III SEMESTER

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CEIIISemester   **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.   Understand the fundamentals of economics such as demand & its elasticity and demand forecasting.

CO2.   Distinguish between production, cost and Break even analysis.

CO3.   Classify different types of markets and pricing methods

CO4.   Analyze how to invest adequate amount of capital in order to get maximum return from select business activity.

CO5.   Analyze accounting statements like income & expenditure statement, balance sheet apart from the fundamental knowledge to understand financial performance of the business

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CEIII 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 – Iso-quants and Iso-costs, 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, 4th 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, 4th Edition, Thomson.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

FLUID MECHANICS

Course Code: A3101

L	T	P	C
4	1	0	4

Course Overview:

The subject fluid mechanics describes all the physical laws that govern the flow of fluids and gases, and ultimately help us to recognize the causes and effects of fluid flow through the determination of characteristic parameters like pressure field, velocity field in a fluid flow, along with the different properties of the fluid like density, viscosity and mainly an inter-relation between these two, and in different situations not only in the flow of fluid, but also in cases when the fluid is addressed. To be familiar with all the basic concepts of fluids and fluid flow phenomenon, conservation equations and their applications to simple problems. This is basically the subject with mechanics deals. Now the importance of the subject I think is apparent. This is because probably you cannot find out single phenomena in the universe which is devoid of fluid as the working medium or substance or flow of fluid. For example, even our basic existence or survival depends upon breathing in and out, the circulation of the blood, this all depend on the principle of fluid flow. The basic equations of fluid mechanics are stated, with enough derivation to make them plausible but with-out rigor. The physical meanings of the terms in the equations are explained. Again, the behavior of fluids in real situations is made plausible, in the light of the fundamental equations, and explained in physical terms. Some applications relevant to life in the ocean are given

Prerequisite(s): Mathematics-I (A3001)

Engineering Mechanics(A3301)

Course Outcomes:

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

CO1.   Apply conservation laws of mass, momentum and energy to solve fluid problems

CO2.   Determine fluvial parameters like pressure, velocity, discharge at any point in a fluid flow

CO3.   Explain the fundamental fluid properties and behavior in fluid statics, kinematics and dynamics.

CO4.   Solve & Evaluate complex pipe network systems, problems occurred in those practical cases.

CO5.   Apply laws of friction in closed conduits and able to solve related variety of problems

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CEIIISemester   **VCE-R15**

FLUID MECHANICS

Course Code: A3101   **L T P C**
                                                          4 1 0 4

SYLLABUS

UNIT I   **(12 Lectures)**
INTRODUCTION: Dimensions and units - Physical properties of fluids specific gravity, viscosity, surface tension, vapour pressure and their influences on fluid motion-pressure at a point, Pascal's law, Hydrostatic law - atmospheric, gauge and vacuum pressure measurement of pressure. Pressure gauges, Manometers: differential and Micro Manometers.

HYDROSTATIC FORCES: Hydrostatic forces on submerged plane, Horizontal, Vertical, inclined and curved surfaces- Center of pressure. Derivations and problems.

UNIT – II   **(12 Lectures)**
FLUID KINEMATICS: Description of fluid flow, Stream line, path line and streak lines and stream tube. Classification of flows : Steady, unsteady, uniform, non uniform, laminar, turbulent, rotational and irrotational flows _ Equation of continuity for one, two , three dimensional flows _ stream and velocity potential functions, flow net analysis.

UNIT - III   **(12 Lectures)**
FLUID DYNAMICS: Surface and body forces - Euler's and Bernoulli's equations for flow along a stream line for 3-D flow, (Navier - stokes equations (Explanationary) Momentum equation and its application - forces on pipe bend.
Pitot tube, Venturi-meter and orifice meter - classification of orifices, flow over rectangular, triangular and trapezoidal and Stepped notches -Broad crested weirs.

UNIT - IV   **(12 Lectures)**
BOUNDARY LAYER THEORY: Approximate Solutions of Navier Stoke's Equations - Boundary layer - concepts, Prandtl contribution, Characteristics of boundary layer along a thin flat plate, Vonkarmen momentum integral equation, laminar and turbulent Boundary layers -no deviations BL in transition, separation of BL, control of BL, flow around submerged objects-Drag and Lift- Magnus effect.

UNIT - V   **(12 Lectures)**
CLOSED CONDUIT FLOW: Reynold's experiment - Characteristics of Laminar & Turbulent flows. Flow between parallel plates, Flow through long tubes, flow through inclined tubes. Laws of Fluid friction - Darcy's equation, Minor losses - pipes in series- pipes in parallel -Total energy line and hydraulic gradient line. Pipe network problems, variation of friction factor with Reynold's number _ Moody's Chart.

TEXT BOOKS:
1. Modi and Seth (2012), Fluid Mechanics,Standard book house.
2. S.K.Som& G.Biswas (2013), Introduction to Fluid Machines ,Tata Mc.Grawhill publishers Pvt. Ltd.
3. Edward J. Shaughnessy, Jr, Ira M. Katz and James P. Schaffer ,Introduction to Fluid Machines , Oxford University Press, New Delhi

REFERENCE BOOKS:
1. J.F.Douglas, J.M. Gaserek and J.A.Swaffirld , Fluid Mechanics,Longman
2. Frank.M. White, Fluid Mechanics, Tata Mc.Grawhill Pvt. Ltd.
3. A.K. Mohanty, Fluid Mehanics, Prentice Hall of India Pvt. Ltd., New Delhi
4. Dr. R.K. Bansal, A text of Fluid mechanics and hydraulic machines,LaxmiPublications (P) ltd.,New Delhi

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CE IIISemester   **VCE-R15**

BUILDING MATERIALS AND CONSTRUCITON

Course Code: A3102

L	T	P	C
3	1	0	3

Course Overview:

This course offers an introduction of structures, types of structures, force behavior in structures, and construction materials. Materials explained include concrete, steel, wood, and pavement materials. Comprehension of different concrete materials such as cement, aggregates, water, admixture/ additive, and methods of concrete mixing, pouring, and curing is also presented. For steel material, various topics including steel making, mechanical behavior, strength, ductility, toughness, fracture, fatigue, residual stress, corrosion, standardization, and mechanical test for steel are discussed. For pavement materials, knowledge on basic soil characteristics, aggregates, asphalt, and design methods, and mechanical behavior of asphalt and aggregates are presented. After this course, student should understand different types of structures, mechanical behavior of construction materials and their physical and chemical properties.

Prerequisite(s):NIL

Course Outcomes:

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

CO1.   Identify the different materials used in construction purpose.

CO2.   Explain the applications of different building materials

CO3.   Classify the behavior of building components of buildings

CO4.   Distinguish the types of masonry and foundation of buildings as well.

CO5.   Describe the process of construction formwork and finishing's.

B. Tech. CEIIISemester   VCE-R15

BUILDING MATERIALS AND CONSTRUCITON

Course Code: A3102   L   T   P   C
                                                                           3   1   0   3

SYLLABUS

UNIT – I   **(11 Lectures)**
STONES, BRICKS AND TILES: Properties of building stones, relation to their structural requirements. Classification of stones – Stone quarrying – precautions in blasting, Dressing of stone, Composition of good brick earth, various methods of manufacture of bricks. Comparison between clamp burning and kiln burning. Qualities of a good brick. Characteristics of good tile, manufacturing methods, Types of tiles. Use of Materials like aluminum, gypsum, glass and bituminous materials and their quality.

UNIT – II   **(12 Lectures)**
TIMBER, CEMENT AND ADMIXTURES: WOOD: Structure, properties, Seasoning of timber. Classification of various types of woods used in buildings, Defects in timber. Alternative materials for wood, Galvanized Iron, Fiber-reinforced plastics, steel, Aluminum and plasticizers. Various types of cement and their properties. Various field and laboratory tests for Cement. Various ingredients of Cement concrete and their importance – various tests for concrete. Types of Admixtures, mineral and chemical and its uses.

UNIT – III   **(13 Lectures)**
MASONARY: Types of Rubble and Ashlar masonry, cavity and masonry, English and Flemish bonds, partition walls.

FOUNDATIONS: Shallow foundations, Spread, combined strap and mat footings.

UNIT – IV   **(10 Lectures)**
BUILDING COMPONENTS: Lintels, Arches, and Vaults-stair cases, types. Different types of floors, Concrete, Mosaic, Terrazo floors, pitched, flat and curved Roofs. Lean-to-Roof, Coupled Roofs, Collar Roofs, Trussed roofs, King and Queen Post Trusses. RCC Roofs, Madras Terrace/Shell Roofs. Panalled Door, Panalled and glazed door, glazed windows, Panalled windows, Swing ventilator, Fixed ventilator.

UNIT – V   **(13 Lectures)**
FORMWORK AND FINISHINGS: Form work, Under Pinning and scaffolding. Damp proofing and water proofing, materials used. Plastering, pointing, white washing and distempering, Painting, Constituents of paint, Types of paints, Painting of new/old Wood, Varnish.

TEXT BOOKS:
1. B. C. Punmia, Ashok Kumar Jain, Arun Kumar Jain (2005), *Building Construction*, Laxmi Publications (P) ltd., New Delhi, India.
2. P. C. Varghese (2005), *Building materials*, Prentice Hall of India private Ltd, New Delhi, India.

REFERENCE BOOKS:
1. P. C. Varghese (2007), *Building Construction*, Prentice-Hall of India private Ltd, New Delhi, India.
2. S. K. Duggal (2008), *Building material* Second Edition, New Age International Publishers, New Delhi, India

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CEIIISemester   **VCE-R15**

SURVEYING - I

Course Code: A3103   **L T P C**
                                                         4 0 0 4

Course Overview:

This course is offered to undergraduate students it deals with a knowledge of limits of accuracy can best be obtained by making measurements with the surveying equipments employed in practice such as chain, compass, leveling instruments and plane table, as these measurements provided true concept of the theory of errors. An engineer must also know when to work to thousandths, hundredths or tenths of a meter and what precision in field data is necessary to justify carrying out computations to the desired number of decimal place. With experience he learns how the funds, equipments, time, and personnel available will govern the procedure and the results. Taking field notes under all sorts of field conditions trains a person to become an excellent engineer, capable of exercising independent judgments

Prerequisite(s): Mathematics-I (A3001)

Course Outcomes:

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

CO1. Make use of the principles and perform the calculations to prepare the map of field utilizing field data obtained by using various surveying methods.

CO2. Analyze calculations to find the elevation of field points for the preparation of contour map.

CO3. Examine instrumental, natural and personal errors in measuring and surveying, field procedures for assessing errors, and standards to determine quality of measurements and surveys

CO4. Apply professional and ethical responsibilities to record accurate field notes and to recognize and report poor survey results.

CO5. Survey details about traversing and various methods of adjustments, take the levels of existing ground and to determine the reduced level

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CEIII Semester   **VCE-R15**

SURVEYING - I

Course Code: A3103

        L T P C
        4 0 0 4

SYLLABUS

UNIT–I   **(12 Lectures)**
INTRODUCTION: surveying-objectives of surveying-Classification of surveys-Principles of Surveying
CHAIN SURVEYING: Linear measurements - Direct measurement – Ranging - offsets- errors in chaining - cross staff and optical square -obstacles in chaining –Problems – Traversing - plotting

UNIT – II   **(12 Lectures)**
COMPASS SURVEYING: Introduction to compass survey -Types of compasses–Designation of Bearings – Calculation of included angles from bearings -Magnetic Declination- Magnetic dip –Traversing -Local attraction- Problems- Errors in compass survey.

UNIT- III   **(12 Lectures)**
PLANE TABLE SURVEYING: Introduction- accessories- Methods of plane tabling- Two point problem - Three point problem – Errors in plane tabling.
STUDY OF MINOR INSTRUMENTS: Planimeter - Sextant - Pentograph - Ceylon Ghat Tracer.

UNIT- IV   **(12 Lectures)**
LEVELLING: Principles - Levels and Staves –Types of levelling - Bench Marks - Temporary and permanent adjustments – Booking – Reduction and Arithmetic checks - Fly levelling – Reciprocal levelling – check levelling - longitudinal and cross sectioning – Plotting - Errors in levelling- Introduction to Auto Level.

UNIT-V   **(12 Lectures)**
CONTOURING: Contours and contouring - Characteristics and uses – methods - Interpolation of contours -Contour gradient.
AREAS AND VOLUMES: Calculation of areas and volumes - field notes and plans - Earth work - Capacity of reservoirs - alignment of hill roads.

TEXT BOOKS:
1. Dr. K.R. Arora, *Surveying Vo.I*, Standard Book House, 6th edition, 2000
2. Punmia, *Surveying Vol.I*, Standard Book House, 9th edition, 1985

REFERENCE BOOKS:
1. S.K.Duggal, *Surveying Vol.I*, Tata Mcgraw Hill, 2nd edition
2. R.subramanian,*Surveying and levelling*, second Edition,Oxford University press-2012
3. R. Agor,*Surveying and levelling* Khanna Publishers

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

STRENGTH OF MATERIALS - I

Course Code: A3104   L   T   P   C
                                                                                     3   1   0   3

Course Overview:

This course is offered to undergraduate students and its deals with to find out the materials strength, stresses and strains and to find out the shear force and bending moments with different loading conditions and to study the cylindrical shells and to find out the stress for flexural members and to determine the deflections of different types of beams with different end conditions with different types of loading conditions.

Prerequisite(s): Mathematics-I (A3001)
Engineering Mechanics-I (A3301)

Course Outcomes:

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

CO1.   Utilize appropriate materials in design considering engineering properties, sustainability, cost and weight.

CO2.   Analyze the structural members subjected to tension, compression and bending stresses using fundamental concepts of stress, strain and elastic behavior of materials.

CO3.   Apply concepts of mechanics of materials to estimate the stresses and predict failure of components based on theories of failure.

CO4.   Solve the problems of finding shear force, bending moments and deflections in simple structural elements to safely bear the stresses developed in it.

CO5.   Compare conjugate beam with real beam to solve for the slope and deflection in structural elements.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CE IIISemester   **VCE-R15**

STRENGTH OF MATERIALS - I

Course Code: A3104

L	T	P	C
3	1	0	3

SYLLABUS

UNIT - I   **(11 Lectures)**
SIMPLE STRESSES AND STRAINS: Elasticity and plasticity, Types of stresses and strains, Hooke's law stress - strain diagram for mild steel, Working stress, Factor of safety, Lateral strain, Poisson's ratio and volumetric strain, Elastic moduli and the relationship between them Bars of varying section composite bars Temperature stresses.

STRAIN ENERGY: Resilience Gradual, sudden, impact and shock loadings simple applications.

UNIT - II   **(12 Lectures)**
SHEAR FORCE AND BENDING MOMENT: Definition of beam, Types of beams, Concept of shear force and bending moment S.F and B.M diagrams for cantilever, simply supported and overhanging beams subjected to point loads, U.D.L., uniformly varying loads and combination of these loads Point of contra flexure Relation between S.F., B.M and rate of loading at a section of a beam

UNIT - III   **(10 Lectures)**
FLEXURAL STRESSES & SHEAR STRESSES FLEXURAL STRESSES: Theory of simple bending, Assumptions Derivation of bending equation: M/I = f/y =E/R Neutral axis, Determination of bending stresses, section modulus of rectangular and circular sections (Solid and Hollow), I,T, Angle and Channel sections, Design of simple beam sections.

SHEAR STRESSES: Derivation of formula Shear stress distribution across various beam sections like rectangular, circular, triangular, I, T, angle sections.

UNIT - IV   **(13 Lectures)**
DEFLECTION OF BEAMS: Bending into a circular arc slope, deflection and radius of curvature, Differential equation for the elastic line of a beam Double integration and Macaulay's methods. Determination of slope and deflection for cantilever and simply supported beams subjected to point loads, U.D.L. uniformly varying load.-Mohr's theorems Moment area method application to simple cases including overhanging beams.

CONJUGATE BEAM METHOD:
INTRODUCTION: Concept of conjugate beam method. Difference between a real beam and conjugate beam. Deflections of determinate beams with constant and different moments of inertia.

UNIT V   **(12 Lectures)**
PRINCIPAL STRESSES AND STRAINS: Introduction: Stresses on an inclined section of a Bar under axial loading compound stresses- normal and tangential stresses on an inclined plane for biaxial stresses. Two perpendicular normal stresses accompanied by a state of simple shear Mohr's circle of stresses-Principle stresses and strains- analytical and graphical solutions

VARIOUS THEORIES OF FAILURES: Introduction, Various Theories of failures like Maximum Principal Stress theory, Maximum Principal Strain theory, Maximum shear stress theory, Maximum strain energy theory, Maximum shear strain energy theory.

TEXT BOOKS:
1. Introduction to text book of Strength of materials by R.K.Bansal _ Laxmi publications Pvt. Ltd., New Delhi.
2. Introduction to text book of Strength of Material by U.C. Jindal, Galgotia publications.

REFERENCE BOOKS:
1. Mechanics of Solid, by Ferdinand P Beer and others Tata MCGrawhill Publications 2000.
2. Strength of Materials by Schaum's out line series Mc. Grawhill International Editions.
3. Strength of Materials by S. Ramakrishna and R.Narayan _ Dhanpat Rai publications.
4. Strength of materials by R.K.Rajput, S.Chand & Co, New Delhi.

5. Strength of Materials by A.R.Basu, Dhanpat Rai & Co, Nai Sarah, New Delhi.
6. Strength of Materials by L.S.Srinath et al., Macmillan India Ltd., Delhi.
7. Strength of materials by R. Subramanian, Oxford university press, New Delhi

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CE IIISemester   **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 Honorable 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; pollution control acts .The course is divided into five chapters for convenience of academic teaching.

Prerequisite(s):NIL

Course Outcomes:

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

CO1.   Develop Knowledge about environment and its importance.

CO2.   Interpret various ecosystems and protect their biodiversity by applying new scientific methods

CO3.   Summarize the effects and control measures of different types of environment pollutions.

CO4.   Identify global environmental problems and come out with best possible solutions.

CO5.   Create awareness about environmental laws and Environmental Impact among the public.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CE IIISemester   **VCE-R15**

ENVIRONMENTAL SCIENCE

Course Code: A3010

L	T	P	C
4	1	0	4

SYLLABUS

UNIT - I   **(09 Lectures)**

ENVIRONMENTAL SCIENCE INTRODUCTION AND NATURAL RESOURCES

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   **(08 Lectures)**

ECOSYSTEM AND BIODIVERSITY

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   **(11 Lectures)**

ENVIRONMENTAL POLLUTION, GLOBAL ENVIRONMENTAL ISSUES AND CONTROL MEASURESENVIRONMENTAL 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   **(07 Lectures)**

GREEN ENVIRONMENTAL ISSUES

INTRODUCTION: Clean development mechanism, carbon foot printing, carbon credits, carbon sequestration, polluter pay principle. Green building practices. Approaches to green computing and nanotechnology.IS014000. Role of information Technology in Environment and human health. Case Studies

UNIT – V: (07 Lectures)
ENVIRONMENTAL ETHICS, ENVIRONMENTAL IMPACT ASSESMENT & ROLE OF NGOs. ENVIRONMENTAL ETHICS: 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 date 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*, 3rd 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. CEIIISemester   **VCE-R15**

STRENGTH OF MATERIALS LAB

Course Code: A3105   **L   T   P   C**

                                                                            0   0   3   2

Course Overview:

This course covers the demonstration of the basic principles in the area of strength and mechanics of materials and structural analysis to the undergraduate students through a series of experiments. In this lab the experiments are performed to measure the properties of the materials such as impact strength, tensile strength, compressive strength, hardness ductility etc.

Prerequisite(s): Engineering Mechanics-I (A3301)
            Strength of Materials-I (A3104)

Course Outcomes:

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

CO1.   Estimate young's modulus of different determinate beams experimentally.

CO2.   Evaluate Direct and indirect stress tests on different materials.

CO3.   Test for basic mechanical properties of materials.

CO4.   Apply Maxwell's reciprocal theorem on beams.

CO5.   Experiment with spring with different loading conditions and identify performance

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CE IIISemester   **VCE-R15**

STRENGTH OF MATERIALS LAB

Course Code: A3105

L	T	P	C
0	0	3	2

LIST OF EXPERIMENTS

1. Tension test
2. Bending test on (Steel / Wood) Cantilever beam.
3. Bending test on simple support beam.
4. Torsion test
5. Hardness test
6. Spring test
7. Compression test on wood or concrete
8. Impact test
9. Shear test
10. Verification of Maxwell's Reciprocal theorem on beams.
11. Use of electrical resistance strain gauges
12. Continuous beam - deflection test.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CEIII Semester   **VCE-R15**

SURVEYING – I LAB

Course Code: A3106

L	T	P	C
0	0	3	2

Course Overview:

This course is offered to undergraduate students and it deals with Theodolite survey   in which horizontal and vertical angles can be measured. Trigonometric leveling to determine heights and elevations. Tachometry apply field procedures in basic types of surveys, as part of a surveying team employ drawing techniques in the development of a topographic map and Setting of curves

Prerequisite(s): Surveying-I (A3103)

Course Outcomes:

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

CO1.   Make use of conventional surveying tools such as chain/tape, compass, plane table, level in the field of civil engineering applications such as structural plotting and highway profiling.

CO2.   Apply the procedures involved in field work and to work as a surveying team.

CO3.   Organize survey and collect field data.

CO4.   Determine the location of points present on field on a piece of paper by plotting.

CO5.   Interpret survey data and compute areas and volumes.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CE IIISemester   **VCE-R15**

SURVEYING – I LAB

Course Code: A3106   **L   T   P   C**
                                                                                     0   0   3   2

LIST OF EXPERIMENTS

1. Survey of an area by chain survey (closed traverse) & Plotting
2. Chaining across pond
3. Chaining across a building
4. Chaining across a river
5. Determination of distance between two inaccessible points with compass.
6. Surveying of a given area by prismatic compass (closed traverse) and plotting after adjustment.
7. Radiation method by plane Table survey
8. Intersection methods by plane Table survey
9. Two point and three point problems in plane table survey
10. Traversing by plane table survey
11. Fly leveling (differential leveling)
12. An exercise of Longitudinal profile
13. An exercise of cross sectional profile.
14. Two exercises on contouring.

B. Tech. CE IIISemester

SYLLABI FOR
IV SEMESTER

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CEIVSemester   **VCE-R15**

CONCRETE TECHNOLOGY

Course Code: A3107   **L   T   P   C**

                                                               3   1   0   3

Course Overview:

The course concrete technology describes all materials, properties and techniques which we are using in concrete. Concrete id defined as mixture of coarse aggregate, fine aggregate, cement and water. In some special cases we can use admixtures. The grade of concrete is defined as the compressive strength of a specimen after 28 days of curing. The grade of concrete is used to structural design. In this course we have to discuss all properties and specifications of coarse aggregate and fine aggregate. If we go through on cement we have to discuss the types, grades and properties of cement. Water is one of the major ingredients   in concrete. The strength of the concrete is highly depends upon the water-cement ratio. Workability is used to describe the consistency and cohesiveness of the fresh concrete. An admixture is materials which control the properties of concrete other than conventional materials. We have to conduct the tests on all materials of concrete. The mix design of the concrete is a process of calculation of exact quantities of materials by some standard methods. The final output of the mix design should be satisfied with the strength of initial assumptions.

Prerequisite(s):NIL

Course Outcomes:

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

CO1.   Evaluate properties of concrete manufacturing materials to check their quality

CO2.   Measure properties of fresh and hardened state of concrete.

CO3.   Understand properties of various types of Admixtures and their applications.

CO4.   Design Concrete Mixes for various field applications.

CO5.   Explain various types of special concrete and their use.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CEIV Semester   VCE-R15

CONCRETE TECHNOLOGY

Course Code: A3107   L   T   P   C
                                                                                         3   1   0   3

SYLLABUS

UNIT-I   **(10 Lectures)**
CEMENT: Portland cement- chemical composition- Hydration of cement-Structure of Hydrated cement-Test on physical properties- Different grades of cement.
ADMIXTURES: Types of admixtures- mineral and chemical admixtures- properties-dosages- effects-usage.
AGGREGATES: classification of aggregate- Particle shape & texture – Bond, Strength & other mechanical properties of aggregate- Specific gravity, Bulk Density, porosity, adsorption & moisture content of aggregate – Bulking of sand- Deleterious substance in aggregate- Soundness of aggregate- Alkali aggregate reaction –Thermal properties – Sieve analysis – Fineness modulus –Grading curves – Grading of fine & coarse aggregates- Gap graded aggregate- Maximum aggregate size

UNIT- II   **(11 Lectures)**
FRESH CONCRETE; Workability- Factors affecting workability –Measurement of workability by different tests- Setting times of concrete- Effect of time and temperature on workability- Segregation &bleeding- Mixing and vibration of concrete- steps in manufacture of concrete- Quality of mixing water.

UNIT- III   **(13 Lectures)**
HARDENED CONCRETE-: water/cement ratio- Abram's law- Gel space ration- Nature of strength of concrete- Maturity concept- Strength in tension & compression- Factors affecting strength- Relation between compression & tensile strength- Curing
TESTING OF HARDENED CONCRETE: Compression tests- Tension tests- Factors affecting strength-flexure tests- Split tensile test- Pull-out test, Non destructive testing methods-codal provisions for NDT.
Elasticity, Creep& Shrinkage-Modulus of elasticity- Dynamic modulus of elasticity- Poisson's ratio-Creep of concrete- Factors influencing creep- Relation between creep& time- Effects of creep- Shrinkage- types of shrinkage.

UNIT- IV   **(13 Lectures)**
MIXED DESIGN: Factors, the choice of mix proportions- Durability of concrete-Quality Control of concrete- Statistical Quality Control- Acceptance criteria- Proportioning of concrete mix by normal and pumpable concretes by BIS method of mix design.

UNIT-V   **(10 Lectures)**
SPECIAL CONCRETES: Light weight concrete-Light weight aggregate concrete- Cellular concrete- No-fines Concrete- Fibre reinforced concrete- Polymer concrete- Types of polymer concrete- Self compacting concrete.

TEXT BOOKS:
1. A.M Neville ,*Properties of Concrete* low priced Edition- 4th edition
2. M.S.Shetty, *Concrete Technology*- S. Chand& Co

REFERENCE BOOKS:
1. Job Thomas, *Concrete Technology*Cengage Learning
2. M.L.Gamghir, *Concrete Technology*Tata McGraw Hill publishers, New Delhi
3. A.R.Santakumar, *Concrete Technology*Oxford University Press, New Delhi
4. P.K. Mehta and J.M.Monterio,*Concrete Micro structure, Properties and Materials*, McGraw Hill publishers

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CEIV Semester   **VCE-R15**

STRENGTH OF MATERIALS - II

Course Code: A3108   **L   T   P   C**

                                                                                    3   1   0   3

Course Overview:

This course is offered to undergraduate students and its deals with to find the calculate principal stress and strains and to determine the column loads for short and long columns and also deals with the torsion and circular shafts, and calculate the direct and bending stress in retaining walls, chimneys and dams and also to analysis the pin-jointed plane frames with different loading conditions and method of sections.

Prerequisite(s): NIL

Course Outcomes:

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

CO1.   Estimate the failure load for simple structural elements subjected to various end conditions to know load carrying capacity

CO2.   Interpret the distribution of different types of stresses across the thickness of cylindrical elements.

CO3.   Determine the core of a given section of structure to have only compressive stresses acting on the member.

CO4.   Design a shaft element subjected to combined bending and torsion in order to safely transmit required power with reasonable diameter.

CO5.   Analyze the structural members subjected to tension, compression, bending and combined stresses using concepts of stress, strain and elastic behavior of materials.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CEIV Semester   **VCE-R15**

STRENGTH OF MATERIALS - II

Course Code: A3108

L	T	P	C
4	1	0	4

SYLLABUSUNIT- I   **(12 Lectures)**

TORSION OF CIRCULAR SHAFTS: Theory of pure torsion, Derivation of Torsion equations: $T/J = q/r = N\Theta/L$, Assumptions made in the theory of pure torsion, Torsional moment of resistance, Polar section modulus Power transmitted by shafts Combined bending and torsion and end thrust, Design of shafts according to theories of failure.

SPRINGS: INTRODUCTION: Types of springs, deflection of close and open coiled helical springs under axial pull and axial couple, springs in series and parallel, Carriage or leaf springs.

UNIT – II   **(12 Lectures)**
COLUMNS AND STRUTS:

INTRODUCTION, TYPES OF COLUMNS: Short, medium and long columns, Axially loaded compression members, Crushing load, Euler's theorem for long columns assumptions- derivation of Euler's critical load formulae for various end conditions, Equivalent length of a column slenderness ratio, Euler's critical stress, Limitations of Euler's theory, Rankine Gordon formula Long columns subjected to eccentric loading, Secant formula, Empirical formulae, Straight line formula Prof. Perry's Formula. Beam columns; laterally loaded struts, subjected to uniformly distributed and concentrated loads Maximum B.M. and stress due to transverse and lateral loading.

BEAM COLUMNS: Laterally loaded struts-subjected to uniformly distributed and concentrated loads—maximum B.M. and stress due to transverse and lateral loading.

UNIT –III   **(12 Lectures)**
DIRECT AND BENDING STRESSES: Stresses under the combined action of direct loading and B.M, Core of a section determination of stresses in the case of chimneys, retaining walls and dams conditions for stability stresses due to direct loading and B.M. about both axis.

BEAMS CURVED IN PLAN: Introduction, circular beams loaded uniformly and supported on symmetrically placed Columns, Semi-circular beam simply-supported on three equally spaced supports.

UNIT - IV   **(12 Lectures)**
UNSYMMETRICAL BENDING: Introduction- Centroidal principal Axis of section- Graphical Method for locating Principal axis – Moment of Inertia referred to any set of rectangular axis- Stresses in beams subjected to Unsymmetrical bending- Principal Axis-Resolution of bending movements in to two rectangular axis through the Centriod – Location of N.A –Deflection of Beams under Unsymmetrical bending. Shear centre: Introduction –Shear centre for symmetrical and Unsymmetrical (Channel, I, T and L) sections

UNIT- V   **(12 Lectures)**
THIN CYLINDERS: Thin seamless cylindrical shells- Derivation of the formula for longitudinal and circumferential stress-hoop, longitudinal and volumetric strains- change in diameter and volume of thin cylinders- Thin spherical shells

THICK CYLINDERS: Introduction, Lame's theory for thick cylinders- Derivation lame's formula- Distribution of hoop and radial Stresses across thickness-design of thick cylinders- Compound cylinders- Necessary difference of radii for shrinkage- Thick spherical shells.

TEXT BOOKS:
1. R.K.Bansal, *A Text book of Strength of materials,*Laxmi Publications (P) ltd., New Delhi
2. U.C. Jindal,*Introduction to Strength of Materials*, Galgotia publications.
3. B.C. Punmia,*Strength of Materials,*Laxmi Publications (P) ltd., New Delhi

REFERENCE BOOKS:
1. Ferdinand P Beer and others, *Mechanics of Solid,*Tata Mc.Graw-Hill Publications 2000.
2. Schaums, *Strength of Materials*, *out line series,*Mc. Graw Hill International Editions.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CEIV Semester   **VCE-R15**

STRUCTURAL ANALYSIS - I

Course Code: A3109

L	T	P	C
3	1	0	3

Course Overview:

This course is offered to undergraduate students and it deals with analysis of propped cantilevers and fixed beams, continuous beams which are statically indeterminate with different loading conditions and also deals with the moving loads, influence lines and energy theorems and to finding out the moments by using slope deflection equations and also draw the shear force and bending moment diagrams and to find out indeterminate structures by adding different loading conditions in the structural system.

Prerequisite(s): Strength of Materials-II (A3108)

Course Outcomes:

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

CO1.   Categorize the perfect frames and three hinged arches under different loading conditions.

CO2.   Apply Castigliano's first theorem to plane trusses under different loading conditions.

CO3.   Analyze indeterminate beams using Slope-deflection and Moment distribution methods.

CO4.   Construct shear force and bending moment diagrams for various types of beams.

CO5.   Develop influence line diagram under kinematic loading for different loading systems.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CEIV Semester   VCE-R15

STRUCTURAL ANALYSIS - I

Course Code: A3109   L   T   P   C
                                                                              3   1   0   3

SYLLABUS

UNIT – I   **(12 Lectures)**
ANALYSIS OF PERFECT FRAMES: Types of frames - Perfect. Imperfect and redundant pin jointed frames. - Analysis of determinate pin jointed frames - Analysis of determinate pin jointed frames using method of joints, method of sections and tension coefficient method for vertical loads, horizontal loads and inclined loads

UNIT – II   **(11 Lectures)**
ENERGY THEOREMS: Introduction - Strain energy in linear elastic system, expression of strain energy due to axial load, bending moment and shear forces - Castigliano's first theorem - Unit load Method. Definitions of simple beams and pin- jointed plane trusses. Definitions of statically determinate bent frames.
THREE HINGED ARCHES: Introduction- Types of Arches - Comparison between three hinged and two hinged arches. Normal Thrust and radial shear in an arch. Geometrical properties of parabolic and circular arch. Three hinged circular arch at different levels. Absolute maximum bending moment diagram for a three hinged arch.

UNIT – III   **(10 Lectures)**
PROPPED CANTILEVER AND FIXED BEAMS: Analysis of propped cantilever and fixed beams, including the beams with varying moments of inertia, subjected to uniformly distributed load, central point load, eccentric point load, number of point loads, uniformly varying load, couple and combination of loads - Shear force and Bending moment diagrams for propped Cantilever and Fixed Beams - Deflection of propped cantilever and fixed beams; effect of rotation of a support.

UNIT –IV   **(13 Lectures)**
SLOPE - DEFLECTION METHOD AND MOMENT DISTRIBUTION METHOD: Introduction - Continuous beams. Clapeyron's theorem of three moments- Analysis of continuous beams with constant and variable moments of inertia with one or both ends fixed - continuous beams with overhang. Effects of sinking of supports. Derivation of slope- deflection equation, application to continuous beams with and without settlement of supports using Moment Distribution Method. Shear force and bending moment diagrams, Elastic curve.

UNIT – V   **(12 Lectures)**
MOVING LOADS AND INFLUENCE LINES: Introduction maximum SF and BM at a given section and absolute maximum SF and B.M due to single concentrated load U.D load longer than the span, U.D load shorter than the span, two point loads with fixed distance between and them and several point loads - Equivalent uniformly distributed load - Focal length. Definition of influence line for SF, Influence line for BM- load position for maximum SF at a section- Load position for maximum BM at a section - point loads, UDL longer than the span, UDL shorter than the span- influence lines for forces in members of pratt and Warren trusses.

TEXT BOOKS:
1.   Vazarani and Ratwani,*Structural Analysis Vol - I and II*, Khanna Publishers.
2.   Pundit and Guptha,*Structural Analysis Vol I & II*, Tata McGraw Hill Publishers.

REFERENCES:
1.   K.U.Muthu et al.,*Basic Structural Analysis*,I.K.International Publishing House Pvt.Ltd.
2.   Hibbeler,*Structural Analysis,* pearson Education Ltd

3. C.S.Reddy,*Basic Structural Analysis*, Tata McGraw Hill Publishers.
4. M.L.Gamhir,*Fundamentals of structural Analysis*, PHI.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CEIV Semester   **VCE-R15**

HYDRAULICS AND HYDRAULIC MACHINES

Course Code: A3110

L	T	P	C
4	0	0	4

Course Overview:

To get knowledge about open channel hydraulic and the working of hydraulic machinery. Knowledge regarding various theories dealing with the flow phenomenon of fluid in an open channel. To use dimensional analysis in solving fluid problems and plan hydraulic similitude studies. Understanding of basics of the hydro machinery and the components, function and use of different types of turbines and pumps.

Prerequisite(s): Fluid Mechanics (A3101)

Course Outcomes:

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

CO1.   Explain regarding various theories dealing with the flow phenomenon of fluid in an open channel

CO2.   Extend the study to the basics of hydro-machinery, its components and performance characteristics

CO3.   Outline the importance of different open channel flows and hydraulic design of channels

CO4.   Define techniques of dimensional analysis, similitude and modelling

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CEIV Semester   **VCE-R15**

HYDRAULICS AND HYDRAULIC MACHINES

Course Code: A3110

L	T	P	C
4	0	0	4

SYLLABUS

UNIT – I   **(13 Lectures)**

OPEN CHANNEL FLOW: Types of flows - Type of channels, Velocity distribution - Energy and momentum correction factors - Chezy's, Manning's; and Bazin's formulae for uniform flow - Most Economical sections. Critical flow: Specific energy-critical depth - critical sub-critical and super critical flows. Non uniform flow-Dynamic equation for G.V.F., Mild, Critical, Steep, horizontal and adverse slopes-surface profiles-direct step method- Rapidly varied flow, hydraulic jump, energy dissipation.

UNIT – II   **(11 Lectures)**

DIMENSIONAL ANALYSIS AND SIMILITUDE: Dimensional analysis, Rayleigh's method and Buckingham's pi theorem-study of Hydraulic models - Geometric, kinematic and dynamic similarities-dimensionless numbers - model and prototype relations.

UNIT – III   **(12 Lectures)**

HYDRODYNAMIC FORCE OF JETS: Hydrodynamic force of jets on stationary and moving flat, inclined and curved vanes, jet striking centrally and at tip, velocity triangles at inlet and outlet, expressions for work done and efficiency-Angular momentum principle, Applications to radial flow turbines. : Layout of a typical Hydropower installation. Heads and efficiencies

UNIT – IV   **(10 Lectures)**

HYDRAULIC TURBINES: classification of turbines-Pelton wheel-Francis turbine-Kaplan turbine-working, working proportions, velocity diagram, work done and efficiency, hydraulic design, draft tube - theory and function efficiency. Governing of turbines-surge tanks-unit and specific turbines-unit speed-unit quantity-unit power-specific speed performance characteristics geometric similarity-cavitation.

UNIT – V   **(11 Lectures)**

CENTRAIFUGAL-PUMPS: Pump installation details-classification-work done- Manometric head-minimum starting speed-losses and efficiencies-specific speed multistage pumps-pumps in parallel- performance of pumps-characteristic curves- NPSH-cavitation. Classification of Hydropower plants - Definition of terms - load factor, utilization factor, capacity factor, estimation of hydropower potential.

TEXT BOOKS:
1. K,Subramanya,*Open Channel flow*, . Tata Mc.Grawhill Publishers
2. Dr. R.K. Bansal, *A text of Fluid mechanics and hydraulic machines*,Laxmi Publications (P) ltd., New Delhi
3. D.S. Kumar,*Fluid Mechanics & Fluid Power Engineering*, Kataria & Sons.

REFERENCES:
1. Modi & Seth,*Fluid Mechanics, Hydraulic and Hydraulic Machines*, Standard book house.
2. Ranga Raju,*Elements of Open channel flow*, Tata Mc.Graw Hill Publications.
3. Rajput,*Fluid mechanics and fluid machines*, S.Chand&Co.
4. V.T.Chow,*Open Channel flow*, Mc.Graw Hill Book Company.
5. Banga & Sharma, *Hydraulic Machines*, Khanna Publishers

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CEIV Semester   **VCE-R15**

BUILDING PLANNING AND DRAWING

Course Code: A3111

L	T	P	C
2	0	4	4

Course Overview:

This course covers the study of various building bye laws to follow during construction. Also deals the planning of various buildings such as hospital, educational, commercial, residential and public buildings etc. This course also covers the drawing of various sign conventions, doors, windows, ventilators, trusses and section, plan and elevation of the buildings.

Prerequisite(s): Building Materials and Construction (A3102)

Course Outcomes:

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

CO1.   Apply the Bye laws and Principles of Planning for residential and other public buildings

CO2.   Plan, schedule and monitor the project effectively.

CO3.   Develop details of parts of building.

CO4.   Model Plan, elevation and section for sloped and flat buildings

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CEIV Semester   **VCE-R15**

BUILDING PLANNING AND DRAWING

Course Code: A3111

L	T	P	C
2	0	4	4

SYLLABUS

UNIT – I   **(12 Lectures)**
BUILDING BYELAWS AND REGULATIONS: Introduction, Terminology, Objectives of building byelaws, Floor area ratio (FAR) and Floor space Index (FSI), Principles underlying building byelaws, classification of bye buildings, Open space requirements, built up area limitations, Height of Buildings, Wall thickness, lighting and ventilation requirement.

UNIT – II   **(10 Lectures)**
RESIDENTIAL BUILDINGS: Minimum standards for various parts of buildings, requirements of different rooms and their grouping, characteristics of various types of residential buildings.
PUBLIC BUILDINGS: Planning of Educational institutions, hospitals, dispensaries, Office buildings, banks, industrial buildings, hotels and motels, buildings for recreation.

UNIT – III   **(13 Lectures)**
PLANNING OF CONSTRUCTION PROJECTS: scheduling and monitoring Bar chart, CPM and PERT Network planning, Computation of times and floats their significance.

PART-B
UNIT – IV   **(11 Lectures)**
SIGN CONVENTIONS AND BONDS: Brick, Stone, Plaster, Sand filling, Concrete, Glass, Steel, Cast iron, Copper alloys, Aluminum alloys etc., Lead, Zinc, tin, and white lead etc., Earth, Rock, Timber and Marble. English bond & Flemish bond odd & even courses for one, one and half, two and two and half brick walls in thickness at the junction of a corner.
DOORS WINDOWS, VENTILATORS AND ROOFS: Paneled Door-paneled and glazed door, glazed windows – paneled Windows, Swing ventilator and fixed ventilator, Couple roof and Collar roof, King Post truss and Queen post truss.

UNIT – V   **(10 Lectures)**
SLOPED AND FLAT ROOF BUILDINGS: Given line diagram with specification to draw plan, section and elevation

TEXT BOOKS:
1. Dr.B.C.Punmia& Khandelwal (2002), *PERT and CPM, Project planning and control*, Laxmi publications, New Delhi, India.
2. Dr. N.Kumaraswamy (1992), *Building Planning and Drawing*, Tata McGraw-Hill, New Delhi, India.

REFERENCE BOOKS:
1. R.L. Peurifoy etal (2010), *Construction Planning, Equipment and methods*, Tata Mc. Graw Hill Publications, New Delhi, India
2. *Building by laws by state and Central Governments and Municipal corporations*.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CEIV Semester   **VCE-R15**

SURVEYING - II

Course Code: A3112

L	T	P	C
3	1	0	3

Course Overview:

Surveying is of special importance and interest to a civil engineer. Surveys are required prior to and during the planning and construction of buildings, dams, highways, railways, bridges, canals, tunnels, drainage works, water supply and sewerage systems, etc. They may also be required for planning and construction of factories, assembly lines, jigs, fabrications, missile ranges, launch sites, and mine shafts. Surveying is the starting point for any project or constructional scheme under consideration. Details of the proposed work are plotted from the field notes. The reliability of the estimation of quantities and the effectiveness of the design depends upon the precision and thoroughness exercised during the survey.

Prerequisite(s): Surveying-I (A3103)

Course Outcomes:

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

CO1.   Judge which type of instrument to be used for carrying out survey for setting-out curves, vertical elevations and horizontal distances.

CO2.   Apply the principles and calculations to find the horizontal distances, heights and elevations by theodolite / tachometric /total station surveying.

CO3.   Plan project survey for bridges tunnels, building, dam, culvert etc.

CO4.   Develop survey maps for various civil engineering projects using modern equipment.

CO5.   Importance of gps and gis in surveying.

VARDHAMAN COLLEGE OF ENGINEERING
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B. Tech. CEIV Semester   **VCE-R15**

SURVEYING - II

Course Code: A3112

L	T	P	C
3	1	0	3

SYLLABUS

UNIT-I   **(10 Lectures)**

THEODOLITE: Types - Uses - Temporary Adjustments-Measurement of horizontal and vertical angles - Repetition and Reiteration - Theodolite traversing - Closing error, balancing the error - Omitted measurements - Gales traverse table – Errors in theodolite work.

SETTING OUT WORKS: Introduction-Control points-Laying Out buildings-Setting out Culverts-Bridges-Sewer lines.

UNIT-II   **(12 Lectures)**

TACHEOMETER: Principle of tachometry - Methods – Heights and distances -different systems – subtense bar

TRIGONOMETRIC LEVELLING: Basic principles-calculation of heights and distances - Determining difference in Elevation - problems.

UNIT-III   **(11 Lectures)**

CURVES: Types of curves – Elements of simple curve – Degree of curve -Methods of setting simple curves – Rankine's method – Two theodolite method – Compound curves – Elements of compound curves.– Problems.

UNIT-IV   **(10 Lectures)**

REVERSE CURVE: Elements of Reverse curve -Transition curve –Types - Vertical curves- Types - Setting out vertical curves – problems.

UNIT-V   **(10 Lectures)**

INTRODUCTION TO ADVANCED SURVEYING: Electromagnetic Spectrum – Radar -Electromagnetic Distance Measurement - EDM Equipment –Corrections – Electronic theodolite - Total stations

Remote sensing-basic concepts-applications - Introduction to Global Positioning system (GPS) - Introduction to Geographic Information System (GIS).

TEXT BOOKS:
1. R.subramanian, *Surveying and levelling*,second Edition,Oxford University press-2012.
2. Dr. B.C. Punmia, *Surveying, Vol. II*, Laxmi Publications Pvt. Ltd, Twenth edition 1994.

REFERENCE BOOKS:
1. Dr. A.M.Chandra, *Higher Surveying*, New Age International Publishers.
2. Dr. K.R. Arora, *Surveying, Vol. II*, Standard Book House, Fifth edition, 2001
3. Satheesh Gopi. Sathi Kumar and N. Madhu, *Advanced Surveying Total station GIS and Remote sensing*

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CEIV Semester   **VCE-R15**

FLUID MECHANICS AND HYDRAULIC MACHINERY LAB

Course Code: A3113   **L T P C**

                                                                                  0 0 3 2

Course Overview:

This course deals with the determination of fundamental fluid properties and performance tests for various types hydraulic machines

Prerequisite(s): Fluid Mechanics (A3101)

                        Hydraulics and Hydraulic Machines (A3110)

Course Outcomes:

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

CO1.   Determine fluid and flow properties

CO2.   Analyze a variety of practical fluid-flow devices and utilize fluid mechanics principles in design.

CO3.   Make use of the working principles, components, function of hydraulic equipment and hands-on experience in their operation and calibration.

CO4.   Design the turbines and should be able to identify suitable pumps and turbines for different working conditions.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CEIV Semester   **VCE-R15**

FLUID MECHANICS AND HYDRAULIC MACHINERY LAB

Course Code: A3113

L	T	P	C
0	0	3	2

LIST OF EXPERIMENTS

List of Exercises

1. Calibration of Venturimeter & Orifice Meter
2. Determination of Coefficient of discharge for a small orifice/mouth piece by constant head method
3. Calibration of contracted Rectangular Notch and / Triangular Notch
4. Determination of friction factor of a pipe
5. Determination of Coefficient for minor losses
6. Verification of Bernoulli's Equation
7. Impact of Jet on Vanes
8. Performance test on Pelton wheel turbine
9. Performance test on Francis turbine
10. Performance characteristics of a single stage centrifugal pump
11. Performance characteristics of a multi-stage centrifugal pump
12. Performance characteristics of a reciprocating pump

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CEIV Semester   **VCE-R15**

SURVEYING – II LAB

Course Code: A3114

L	T	P	C
0	0	3	2

Course Overview:

This course is offered to undergraduate students and it deals with Chain survey, Compass survey and Plane Table survey in which use conventional surveying tools such as chain/tape, compass, plane table, level in the field of civil engineering applications such as structural plotting and also leveling instruments such as dumpy level and auto level used for highway and railway profiling.

Prerequisite(s):NIL

Course Outcomes:

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

CO1.   Make use of latest instruments like edm, total station, gps etc.

CO2.   Determine area, contouring, traversing using total station.

CO3.   Organize survey and collect field data.

CO4.   Choose appropriate survey methods in practice.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CEIV Semester   **VCE-R15**

SURVEYING – II LAB

Course Code: A3114   **L   T   P   C**
                                                                0   0   3   2

LIST OF EXPERIMENTS

1. Study of theodolite in detail - practice for measurement of horizontal and vertical angles.
2. Measurement of horizontal angles by method of repetition and reiteration.
3. Trigonometric Leveling - Heights and distance problem (Two Exercises)
4. Heights and distance using Principles of tacheometric surveying (Two Exercises)
5. Curve setting different methods. (Two Exercises)
6. Setting out works for buildings & pipe lines.
7. Determine of area using total station
8. Traversing using total station
9. contouring using total station
10. Determination of remote height using total station
11. State-out using total station
12. Distance, gradient, Difference, height between two inaccessible points using total stations

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CEIVSemester   **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.   Demonstrate that Gender Sensitization is essential for creating sustainable development in the society.

CO2.   Examine women's work, caste, gender binary, serious issues of domestic violence, sexual harassment and violence, declining sex ratio in our country and its causes and consequences.

CO3.   Relate the fact about unethical orthodox beliefs and values pertaining to gender and beauty of togetherness.

CO4.   Match male point of view that is taken as "objective" or "universal" in most disciplines and foster substantive gender equality in education and employment.

CO5.   Develop mind setting on behavioral aspects by raising awareness on gender equality.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CE IVSemester   VCE-R15

GENDER SENSITIZATION

Course Code: A3021   **L   T   P   C**
                                                                         0   3   0   0

SYLLABUS

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

SYLLABI FOR
V SEMESTER

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CEVSemester   **VCE-R15**

DESIGN OF REINFORCED CONCRETE STRUCTURES

Course Code: A3115

L T P C
4 1 0 4

Course Overview:

The objective of this study was a reinforced concrete design a tool for civil engineering students. The tool provides basic concepts for concrete structure calculations and procedures. The graphic interface is expected to help students to understand the design process. The course delivers a good knowledge about concrete materials and design aspects of concrete structures The program has five modules: slab, beam, column, footing and stair case per Indian standard code (IS 456:2000)

Prerequisite(s):
>   Concrete Technology(A3107)

Course Outcomes:

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

CO1.   Identify and compute properties of concrete and steel.

CO2.   Classify behavior and inter relation between members

CO3.   Analyze design loads and their action according for different field conditions.

CO4.   Design reinforced concrete members according to code provisions.

CO5.   Evaluate the compression members and flexural members according to the given conditions

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CEV Semester   **VCE-R15**

DESIGN OF REINFORCED CONCRETE STRUCTURES

Course Code: A3115

L	T	P	C
4	1	0	4

SYLLABUS

UNIT - I   **(12 Lectures)**
CONCEPTS OF RC DESIGN: Limit State method - Material Stress - Strain Curves - Safety factors - Characteristic values. Stress Block parameters - IS - 456 - 2000 - Working Stress Method.
Beams: Limit state analysis and design of singly reinforced, doubly reinforced, T and L beam sections.

UNIT – II   **(10 Lectures)**
SHEAR, TORSION AND BOND: Limit state analysis and design of section for shear and torsion - concept of bond, anchorage and development length. I.S. code provisions. Design examples in simply supported and continuous beams, detailing Limit state design for serviceability for deflection, cracking and codal provision.

UNIT – III   **(12 Lectures)**
DESIGN OF SLABS: Introduction to slabs, Design of one way slab, Design of Two- way slabs, continuous slab Using I S Coefficients, Cantilever slab / Canopy slab.

UNIT – IV   **(10 Lectures)**
DESIGN OF COLUMNS: Introduction to Columns, Short column, Long column, End conditions, Design for Axial loads, uni-axial and bi-axial bending I S Code provisions.

UNIT – V   **(12 Lectures)**
DESIGN OF FOOTINGS & STAIR CASES: Introduction to Footings, Design of Isolated (square, rectangular) footings. Introduction to stair cases, types of stair case, Design of stair case,(dog legged).

TEXT BOOKS:
1. N.Krishna Raju and R.N. Pranesh, *Reinforced concrete design*, New age International Publishers, New Delhi
2. S.Unnikrishna Pillai & Devadas Menon,*Reinforced concrete design*, Tata Mc.Graw Hill, New Delhi.

REFERENCES:
1. M.L.Gambhir,*Fundamentals of Reinforced concrete design*, Prentice Hall of India Ltd., NewDelhi.
2. P.Purushotham,*Reinforced concrete structural elements - behavior, Analysis and design*,III Edition Tata Mc.Graw - Hill , 2004
3. Chen – Cengage,*Plasticity in Reinforced Concrete*, Learning Pvt.Ltd
4. P.C.Varghese,*Limit state designed of reinforced concrete*, Prentice Hall of India, New Delhi

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

STRUCTURAL ANALYSIS – II

Course Code: A3116

L	T	P	C
3	1	0	3

Course Overview:

This course is offered to undergraduate students and it deals with analysis of beams and frames by using Moment distribution method, Kani's method, Slope and deflection method and Matrix method of analysis with different loading conditions and also deals with the, influence lines and Indeterminate trusses and also draw the shear force and bending moment diagrams and indeterminate structures by adding different loading conditions in the structural system.

Prerequisite(s): Strength of Materials-II (A3108)

Course Outcomes:

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

CO1.   Classify determinate and indeterminate structures

CO2.   Analyze two hinged arches and trusses under different loading conditions

CO3.   Solve Multi-storied building frames using different methods

CO4.   Apply Matrix methods of analysis to continuous beams under different loading systems.

CO5.   Construct influence line diagram for continuous beams and propped cantilever beams.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CE V Semester   **VCE-R15**

STRUCTURAL ANALYSIS – II

Course Code: A3116   **L   T   P   C**

                                                                              3   1   0   3

SYLLABUS

UNIT – I   **(10 Lectures)**

TWO HINGED ARCHES: Introduction-classification of two hinged arches-Analysis of two hinged parabolic arches-secondary stress in two hinged arches due to temperature and elastic shortening of rib.

STATIC AND KINEMATIC INDETERMINACY: Introduction tostatic and kinematic indeterminacy- analysis the two dimensional and three-dimensional frames.

UNIT-II   **(16 Lectures)**

MOMENT DISTRIBUTION METHOD: Analysis of single Bay Single Story Portal Frames including side sway. Analysis of inclined frames.

KANI'S METHOD: Analysis of continuous beams including settlement of supports. Analysis of single bay single storey and single bay two storey Frames by Kani's Method Including Side sway. Shear force and bending moment diagrams. Elastic curve.

UNIT-III   **(11 Lectures)**

SLOPE DEFLECTION METHOD: Analysis of single Bay - Single storey Portal Frames by Slope Deflection Method Including Side Sway. Shear force and bending moment diagrams. Elastic curve.

UNIT-IV   **(11 Lectures)**

MATRIX METHODS OF ANALYSIS: FLEXIBILITY METHODS: Introduction, application to continuous beams including support settlements. STIFFNESS METHOD: Introduction, application to continuous beams including support settlements.

UNIT-V   **(12 Lectures)**

INFLUENCE LINES FOR INDETERMINATE BEAMS: Introduction-ILD for two span continuous beams with constant and variable moments of inertia.ILD for propped cantilever beams.

INDETERMINATE TRUSSES: Analysis of trusses having single and two degree of internal and external indeterminacies.

TEXT BOOKS:

1. Pundit and Gupta,*Matrix Analysis of Structures*, Tata McGrew Hill Publishers.
2. B.C. Punmia,(2004),*Theory of Structures* 12th edition, Lakshmi Publications.

REFFERENCES:

1. Pundit and Guptha, *Structural Analysis Vol - I and II*, Tata McGrew Hill Publishers.
2. Aslam Kassimali,*Structural Analysis* SI edition, Cengage Learning.
3. S.S. Bhavikatti, *Structural analysis* , volume 2, 2nd edition, Vikas Publishing House Pvt Limited, 2005
4. A.K.Jain, *Advanced Structural Analysis*, Nem Chand Bros.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CEV Semester   **VCE-R15**

GEOTECHNICAL ENGINEERING - I

Course Code: A3117   **L   T   P   C**

                                                                         3   1   0   3

Course Overview:

The aim of the subject is to introduce the basic concepts of soil mechanics. The basic soil-water interactions and the stress distribution within the soil masses are brought into picture. The classical theories of soil mechanics is used to explain the index and the engineering properties of the soil. These include the density index, the grain size analysis and the consistency characteristics of the soil used for the preliminary classification of the soils and for the primary estimation of the engineering properties. The engineering properties such as shear strength, compressibility and permeability characteristics are introduced with detailed laboratory and field tests.

Prerequisite(s):NIL

Course Outcomes:

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

CO1.   Understand the theories of classical soil mechanics

CO2.   Estimate the index properties of the soil to classify them.

CO3.   Evaluate the engineering properties of the soil

CO4.   Minimize the stress distributions in the founded soil with the theories of stress distribution

CO5.   Analyze the compressibility of soils and evaluate design parameters

CO6.   Contrast between shear strength of soils under different drainage conditions

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CEV Semester   **VCE-R15**

GEOTECHNICAL ENGINEERING - I

Course Code: A3117

L	T	P	C
4	1	0	4

SYLLABUS

UNIT – I   **(10 Lectures)**
INTRODUCTION: Origin- Soil formation – soil structure and clay mineralogy –Diffused double layer theory – Mass- volume relationships.
INDEX PROPERTIES OF SOILS: Grain size analysis – Sieve and Hydrometer methods – consistency limits and indices –I.S. Classification of soils, Relative density.

UNIT –II   **(10 Lectures)**
PERMEABILITY: Soil water – capillary rise – flow of water through soils – Darcy's law- permeability – Factors affecting –laboratory determination of coefficient of permeability –Permeability of layered systems. In-situ permeability tests (pumping-in and pumping-out tests)
SEEPAGE THROUGH SOILS: Total, neutral and effective stresses –quick sand condition – Seepage through soils –Flownets: Characteristics and Uses.

UNIT – III   **(10 Lectures)**
STRESS DISTRIBUTION IN SOILS: Boussinesq's and Westergaard's theories for point loads and areas of different shapes – Newmark's influence chart.
COMPACTION: Mechanism of compaction – factors affecting compaction – effects of compaction on soil properties. – Field compaction Equipment – compaction quality control.

UNIT – IV   **(12 Lectures)**
CONSOLIDATION: Spring Analogy-Void ratio and effective stress (e vs log p relationship- Tergaghi's theory of one-dimensional consolidation – Assumptions and derivation of Governing Differential Equation (GDE)-Computation of magnitude of settlement and time rate of settlement

UNIT – V   **(12 Lectures)**
SHEAR STRENGTH OF SOILS: Importance of shear strength-Mohr's – Coulomb's Failure theories – Shear Parameters-Laboratory tests for determination of strength tests –Direct shear test, Tri-axial compression test(UU,CU and CD) unconfined compression tests- Vane shear test. Factors affecting shear strength of cohesion less and cohesive soils- Determination of elastic moduli

TEXT BOOKS:
1. K.R. Arora, Soil Mechanics and Foundation Engineering., Standard Publishers and Distributors, Delhi. Ltd., New Delhi
2. B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, Soil Mechanics and Foundation, Laxmi, publications Pvt.

REFERENCES:
1. T.W. Lambe and Whitman, Soil Mechanics, Mc-Graw Hill Publishing Company, Newyork.
2. Purushotham Raj, Geotechnical Engineering
3. Manoj Dutta & Gulati S. K, Geotechnical Engineering, Tata Mc.Grawhill Publishers New Delhi.
4. Gopal Ranjan & ASR Rao, Basic and Applied Soil Mechanics, New age International Pvt . Ltd, New Delhi

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CEV Semester   **VCE-R15**

ENGINEERING GEOLOGY

Course Code: A3118

L	T	P	C
4	0	0	4

Course Overview:

In this course, emphasis is placed on the origin and nature of Earth materials and on geologic environments which affect site conditions, engineering designs and waste disposal sites. Topics such as rocks and minerals, soils, slope stability, permafrost, flood control and earthquake activity are discussed with special reference to local geological problems

Prerequisite(s):NIL

Course Outcomes:

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

CO1.   Identify the minerals based on their physical properties

CO2.   Outline the importance of geology in civil engineering.

CO3.   Distinguish weathered rocks from fresh rocks

CO4.   Explain the effects of weathering on structures.

CO5.   Classify the rocks by their properties

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CEV Semester   **VCE-R15**

ENGINEERING GEOLOGY

Course Code: A3118

L	T	P	C
4	0	0	4

SYLLABUS

UNIT – I   **(12 Lectures)**
INTRODUCTION: Importance of geology from Civil Engineering point of view. Brief study of case histories of failure of some Civil Engineering constructions due to geological draw backs. Importance of Physical geology, Petrology and Structural geology.
WEATHERING OF ROCKS: Its effect over the properties of rocks importance of weathering with REFERENCE to dams, reservoirs and tunnels weathering of common rock like "Granite"

UNIT – II   **(12 Lectures)**
MINERALOGY: Definition of mineral, Importance of study of minerals, Different methods of study of minerals. Advantages of study of minerals by physical properties. Role of study of physical properties of minerals in the identification of minerals. Study of physical properties of common rock forming minerals and Economic minerals.
PETROLOGY: Definition of rock: Geological classification of rocks into igneous, Sedimentary and metamorphic rocks. Dykes and sills, common structures and textures of igneous. Sedimentary and metamorphic rocks. Their distinguishing features, megascopic study of Granite, Dolerite, Basalt, Pegmatite, Laterite, Conglomerate, Sand Stone, Shale, Limestone, Gneiss, Schist, Quartzite, Marble and Slate.

UNIT –III   **(12 Lectures)**
STRUCTURAL GEOLOGY: Out crop, strike and dip study of common geological structures associating with the rocks such as folds, faults unconformities, and joints - their important types
EARTHQUAKE: Earth quakes, their causes and effects, shield areas and seismic belts. Seismic waves, Richter scale, precautions to be taken for building construction in seismic areas. Landslides, their causes and effect; measures to be taken to prevent their occurrence. Importance of study of ground water, earth quakes and landslides.

UNIT –IV   **(12 Lectures)**
GEOLOGY OF DAMS & RESERVOIRS: Types of dams, Geological Considerations in the selection of a dam site. Analysis of dam failures of the past. Factor's contributing to the success of a reservoir. Geological factors influencing water Lightness and life of reservoirs.
GEOPHYSICAL INVESTIGATIONS: Importance of Geophysical studies Principles of geophysical study by Gravity methods. Magnetic methods, Electrical methods. Seismic methods, Radio metric methods and geothermal method. Special importance of Electrical resistivity methods, and seismic refraction methods. Improvement of competence of sites by grouting etc.

UNIT – V   **(12 Lectures)**
TUNNELS: Purposes of tunneling, Effects of Tunneling on the ground Role of Geological Considerations (lithological, structural and ground water) in tunneling over break and lining in tunnels.

TEXT BOOKS:
1.   N. Chennkesavulu,*Engineering Geology*, McMillan, India Ltd. 2nd addition
2.   D. Venkat reddy;*Engineeringgeology*, Vikas publishing House Pvt. Ltd, Noida

REFERENCES:
1.   P.C.Varghese,*EngineeringGeology* for Civil Engineering,PHI Learning& private Limited
2.   K.V.G.K. Gokhale,*PrincipalsofEngineeringGeology*,B.S publications
3.   Subinoy Gangopadhyay, *EngineeringGeology*, Oxford University press

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CEV Semester   **VCE-R15**

WATER RESOURCES ENGINEERING - I

Course Code: A3119

L	T	P	C
3	1	0	3

Course Overview:

To get knowledge about Engineering Hydrology, Hydrologic cycle and its applications, measurement of precipitation, rainfall, run off, evapotranspiration and infiltration. Understand about the occurrence, movement of groundwater and safe yield of a groundwater basin. Understanding the necessity and importance of irrigation, crop rotation and irrigation efficiencies. To get knowledge about the design procedure for Irrigation canals and canal lining.

Prerequisite(s):NIL

Course Outcomes:

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

CO1.   Define hydrology and hydraulics and understand water resources system

CO2.   Outline the quantitative relationship that explains the understanding of hydrological processes in answering scientific and water-resources- management questions.

CO3.   Analyze the basic aquifer parameters and groundwater resources for different hydro-geological boundary conditions.

CO4.   Build the knowledge of irrigation water, use of irrigation water in farm lands and understand different irrigation techniques.

CO5.   Construct skills to design a canal and canal lining and also the knowledge of measurement and calculation of design discharge.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CEV Semester   VCE-R15

WATER RESOURCES ENGINEERING - I

Course Code: A3119   L   T   P   C
                                                                         3   1   0   3

SYLLABUS

UNIT-I   (13 Lectures)
INTRODUCTION TO HYDROLOGY
Introduction to engineering hydrology and it's applications, Hydrologic cycle, types and forms of precipitation, rainfall measurement, types of rain gauges, computation of average rainfall over a basin, processing of rainfall data – Adjustment of record – Rainfall Double Mass Curve. Runoff – Factors affecting Runoff-Runoff over a Catchment – Empirical and Rational Formulae. Evaporation, factors affecting evaporation, measurement of evaporation – Evapotranspiration – penman and Blaney & Criddle Methods – Infiltration, factors affecting infiltration, measurement of infiltration, infiltration indices.

UNIT – II   (12 Lectures)
HYDROLOGY
Distribution of Runoff – Hydrograph Analysis Flood Hydrograph – Effective Rainfall – Base Flow – Base Flow Separation – Direct Runoff Hydrograph – Unit Hydrograph, definition, and limitations of applications of Unit hydrograph , derivation of Unit Hydrograph from Direct Runoff Hydrograph, Unit Hydrograph and S – hydrograph.

UNIT – III   (11 Lectures)
GROUND WATER HYDROLOGY
Ground water Occurrence, types of aquifers, aquifer parameters, porosity, specific yield, permeability, Transmissivity and storage coefficient, Darcy's law, radical flow to wells in confined and unconfined aquifers. Types of wells

UNIT – IV   (13 Lectures)
IRRIAGATION
 Necessity and Importance of Irrigation, advantages and ill effects of Irrigation, types of Irrigation, methods of application of Irrigation water, Indian agricultural soils, methods of improving soil fertility – Crop Rotation, preparation of land for Irrigation, standards of quality for Irrigation water.
Soil – water – plant relationship, vertical distribution of soil moisture, consumptive use, Duty and delta factors affecting duty – Design discharge for a water course. Depth and frequency of Irrigation, irrigation efficiencies – Water Logging.

UNIT – V   (10 Lectures)
FLOW IRRIGATION
Classification of canals, Design of Irrigation canal by Kennedy's and Lacey's theories, balancing depth of cutting, canal lining. Design Discharge over a catchment, computation of design discharge – rational formula,

TEXT BOOKS:
1. Jayaram Reddy,*EngineeringHydrology*, Laxmi publication pvt.Ltd., New Delhi
2. Punmia & Lal,*Irrigation and water power engineering,*Laxmi publications pvt. Ltd., New Delhi

REFERENCES:
1. P.N.Modi,*Irrigation and water Resources & Water power*, Standard Book House.
2. D.K. Majundar,*Irrigation water Management*, Printice Hall of India.
3. S.K. Grag, *Irrigation and Hydraulic structures*
4. Ventte chow, David R. Maidment larry W.Mays,*Applied hydrology*, Tata MC. Graw Hill

5. Warren Viessvann, Jr. Garryl. Lewis,*Introduction to hydrology*, PHI

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CEV Semester   **VCE-R15**

ESTIMATING AND COSTING

Course Code: A3120

L	T	P	C
3	1	0	3

Course Overview:

This course is offered to undergraduate students and it deals with estimation and costing of various types of structures and to determine quantities for approximate and detailed estimates. And this course involves in calculation of earthwork quantities for roads and canals. Students will learn to draw bar bending diagrams and bar schedules. Rates analysis is studied for various specifications. Valuation of buildings is also studied in this course.

Prerequisite(s):NIL

Course Outcomes:

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

CO1.   Identify various components of buildings and materials for given specifications

CO2.   Develop approximate and detailed estimates of building, and bar bending schedules.

CO3.   Explain the various types of contracts documents.

CO4.   Evaluate the earthwork for road and canals, rates of various items of works and the actual value of any property.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CEV Semester   **VCE-R15**

ESTIMATING AND COSTING

Course Code: A3120   **L   T   P   C**

                                                                          3   1   0   3

SYLLABUS

UNIT – I   **(12 Lectures)**
General items of work in building - Standard Units Principles of working out quantities for detailed and abstract estimates - Approximate method of Estimating. Detailed Estimates of Buildings.

UNIT - II   **(12 Lectures)**
Earthwork for roads and canals. Rate analysis. Standard specifications for different items of building construction.

UNIT –III   **(12 Lectures)**
Rate Analysis - Working out data for various items of work over head and contingent charges.

UNIT – IV   **(10 Lectures)**
Bar Bending Schedules. Contracts - Type of Contracts - Contract Documents - Conditions of contract.

UNIT – V   **(10 Lectures)**
Valuation of Buildings-Methods of valuation. Outgoings-sinking fund, Depreciation-Methods of depreciation. Annuity.

TEXT BOOKS:
1. B.N.Dutta,*Estimation and Costing*, USB publishers, 2000
2. G.S.Birdie,*Estimation and costing*
3. Rangawala,*Estmating and costing and valuation*

REFERENCES:
1. *Standard Schedule of rates and standard data book* by public works department.
2. *I.S.1200* (Parts I to XXV - 1974/method of measurement of building and Civil Engineering works - B.I.S).
3. M.Chakraborthi;*Estimating, costing and specifications*, Laxmi publications.
4. *National Building Code.*

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CEV Semester   **VCE-R15**

ENGINEERING GEOLOGY LAB

Course Code: A3121

L	T	P	C
0	0	3	2

Course Overview:

In this course, emphasis is placed on the origin and nature of Earth materials and on geologic environments which affect site conditions, engineering designs and waste disposal sites. Topics such as rocks and minerals, soils, slope stability, permafrost, flood control and earthquake activity are discussed with special reference to local geological problems.

Prerequisite(s):NIL

Course Outcomes:

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

CO1.   Identify the minerals based on their physical properties

CO2.   Outline the importance of geology in civil engineering.

CO3.   Distinguish weathered rocks from fresh rocks

CO4.   Classify the rocks by their properties

CO5.   Interpret Geographical maps and models

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CEV Semester   **VCE-R15**

ENGINEERING GEOLOGY LAB

Course Code: A3121

L	T	P	C
0	0	3	2

LIST OF EXPERIMENTS

1. Study of physical properties and identification of rock forming minerals referred under theory.
2. Study of physical properties and identification of economic minerals referred under theory.
3. Megascopic and microscopic identification of rocks & minerals
4. Megascopic and microscopic description and identification of igneous rocks referred under theory.
5. Megascopic and microscopic description and identification of sedimentary rocks referred under theory.
6. Megascopic and microscopic description and identification of metamorphic rocks referred under theory.
7. Interpretation and drawing of sections for geological maps showing tilted beds, faults, unconformities etc.
8. Geological cross sections and study of geological maps
9. Simple Structural Geology problems
10. Simple strike and Dip problems
11. Study of models of geological structures and out crops patterns of different types of rocks and land forms

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CEV Semester   **VCE-R15**

GEOTECHNICAL ENGINEERING LAB

Course Code: A3122

L	T	P	C
0	0	3	2

Course Overview:

To impart a firsthand experience in analyzing and determining the index and the engineering properties of the soil. The index properties assist as a preliminary indicator of the engineering property of the soil. The index properties are determined for the classification of the soils. While the engineering properties are used in the design and analysis for various works like earth retaining walls and foundation design. The basic parameters needed for the selection of type of foundations are determined by simple laboratory experiments. The in-situ tests conducted will help in understanding the field condition at site and helps to take the necessary engineering measures

Prerequisite(s): Geotechnical engineering I

Course Outcomes:

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

CO1.   Determine the index properties of the soil

CO2.   Classify the soil based on the index properties of the soil.

CO3.   Evaluate the field quality control of embankments ad subgrades.

CO4.   Determine the engineering properties of the soil.

CO5.   Estimate the shear strength under controlled drainage conditions.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CEV Semester   **VCE-R15**

GEOTECHNICAL ENGINEERING LAB

Course Code: A3122   **L   T   P   C**

                                                    0   0   3   2

LIST OF EXPERIMENTS

1. Sieve analysis Method
2. Hydrometer Method
3. Atterberg's Limits
4. Field density-core cutter method
5. Sand replacement method
6. Permeability of soil constant head test
7. Permeability of soil variable head test
8. Compaction test
9. Consolidation test
10. Unconfined compression test
11. Tri-axial Compression test
12. Direct shear test.
13. Vane shear test
14. CBR Test

SYLLABI FOR
VI SEMESTER

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CEVI Semester   **VCE-R15**

DESIGN OF STEEL STRUCTURES

Course Code: A3123

L	T	P	C
3	1	0	3

Course Overview:

This course provides foundation knowledge and skills relevant to the concepts, principles and components of structural design. It introduces the design of steel structures using the limit state design philosophy. You will gain an understanding of statutory requirements, design standards, steel industry practices and design documentation. Steel structural members, structural design principles and evaluation of loads and estimation of member capacities for steel structures will all be addressed. The course content builds on your knowledge of force systems in equilibrium, analysis of simple structures and structural mechanics. You will gain experience in the design of a low-rise steel building via a group design project.

Prerequisite(s):NIL

Course Outcomes:

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

CO1.   Define basic elements of a steel structure

CO2.   Explain fundamentals of structural steel

CO3.   Analyze elements of steel structures

CO4.   Design basic elements of steel structure like tension members, compression members, beams and beam-columns.

CO5.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CEVI Semester   VCE-R15

DESIGN OF STEEL STRUCTURES

Course Code: A3123

L	T	P	C
3	1	0	3

SYLLABUS

UNIT – I   **(12 Lectures)**

MATERIALS: Making of iron and steel, Types of structural steel, mechanical properties of steel, behaviour of steel- fatigue-brittle fracture –corrosion & corrosion protection of steel structures.

DESIGN PHILOSOPHIES: Working stress method/ Allowable stress design, ultimate load method, limit state method. Introduction to limit state, Concept of limit State Design, Different Limit States as per IS 800 – 2007, Concepts of plasticity, yield strength. Types Loads and combinations loading. Design Strengths, deflection limits, serviceability.

CONNECTIONS: Introduction Bolted Connections-Types of failure, Design specifications, High- strength bolts, Efficiency of joint - Prying action. Welded connections-Specifications for welding - Design Strength - Efficiency of joint. Design of eccentric connections with brackets, Beam end connections, Web angle, Un-stiffened seated connections (bolted and welded types). Design of truss joints

UNIT –II   **(12 Lectures)**

COMPRESSION MEMBERS: Introduction, Euler's buckling theory, Behavior of real columns, Types of sections Design of compression members, Buckling class, slenderness ratio, strength design. Laced - battened columns, column splice, column bases - slab base, gusset base. Built-up compression members.

UNIT –III   **(10 Lectures)**

TENSION MEMBERS: Introduction. Types of tension member, types of failures, Design of Tension members - Design Strength of members

BEAMS: Introduction, Plastic moment, Bending and shear strength. Design of laterally supported / unsupported beams. Built up sections - large plates, Web Buckling, Crippling and Deflection of Beams. Design strength in bending, Design strength in shear. Limit state serviceability - Deflection

UNIT –IV   **(10 Lectures)**

ROOF TRUSSES: Introduction, Components of a roof truss, and Types of trusses. Types of loads- Dead, Live and wind loads. Design of purlins. Design of members of a roof truss. Design of connections. Design of end bearings.

UNIT – V   **(10 Lectures)**

WELDED PLATE GIRDER: component of plate girders, optimum depth. Design of main section. Design of end bearing stiffness and intermediate stiffness. Connection between web and flange and Design splice and web splices.

TEXT BOOKS:
1. S.K.Duggal(2014),*Limit State Design of steel structures*, Tata McGraw- Hill
2. K.S.Sai Ram(2015),Design of steel structures, Person Education

REFERENCE BOOKS:
1. N. Krishna Raju ,*Structural Design and Drawing: Reinforced Concrete and Steel*,Universities press
2. Edwin H.Gaylord, Jr.CharlesN.Gaylord and James Stallmeyer,*Design of Steel Structures*, Tata McGraw-Hill Education Pvt.Ltd.
3. S.S.Bhavikatti(2014),*Design of steel structures: by limit state method as per IS: 800:2007*; 4th revised edition, , I.K international Publishing house.
4. N.Subramanian(2010),*Design of steel structures*, Oxford University Press

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CEVI Semester   **VCE-R15**

GEOTECHNICAL ENGINEERING - II

Course Code: A3124

L	T	P	C
3	1	0	3

Course Overview:

The aim of the course is to introduce the concepts of major geo technical problems and how to take necessary actions to evaluate and to quantify the problems and also to identify and evaluate the design parameters. The successful implementation of the design is not complete without the due considerations to the various factors of safety involved in geo technical engineering. A variety of the problems encountered within the soil masses are manifested as slope failure, foundation failure etc. the theories of earth pressure and slope stability provides the necessary insight into these difficulties. The necessary principles and requirements for the selection of foundations, both deep and shallow foundations are dealt with in detail together with the required design practices.

Prerequisite(s):NIL

Course Outcomes:

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

CO1.   Analyze, evaluate and solve complex geotechnical problems and also be able to provide and suggest apt and relevant remedial measures.

CO2.   Summarize the need and importance of field reconnaissance and the role it plays in the design of the geotechnical projects and planning.

CO3.   Determine in both magnitude and directions the earth pressures and analyses the stability of earth slopes under the most critical conditions

CO4.   Estimate parameters for the design by applying the principles of geotechnical engineering critically, subjectively and quantitatively for the successful design of foundations, earth retaining walls and hydraulic structures with due considerations to the necessary factors of safety.

CO5.   Compare the classical soil-mechanics to the new age techniques and solutions with the sound knowledge of the basics.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CE VI Semester   **VCE-R15**

GEOTECHNICAL ENGINEERING - II

Course Code: A3124

L	T	P	C
3	1	0	3

SYLLABUS

UNIT – I   **(10 Lectures)**
SOIL EXPLORATION: Need – Methods of soil exploration – Boring and Sampling methods – Field tests – Penetration Tests, Plate load test – Pressure meter – Planning of Program and preparation of soil investigation report.

UNIT – II   **(12 Lectures)**
EARTH SLOPE STABILITY: Infinite and finite earth slopes – Types of failures – Factor of safety of infinite slopes – Stability analysis by Swedish arc method, standard method of slices, Bishop's Simplified method – Taylor's Stability Number-Stability of slopes of earth dams under different conditions.

UNIT – III   **(12 Lectures)**
EARTH PRESSURE THEORIES: States of earth pressures-Active, Passive and at rest conditions-Rankine's theory-Computation of Active and Passive Earth Pressures in Cohesion less and Cohesive soils, Coloumb's wedge theory– Culmann's graphical method
RETAINING WALLS: Types of retaining walls – Stability of retaining walls against overturning, Sliding, bearing capacity.

UNIT – IV   **(12 Lectures)**
SHALLOW FOUNDATIONS-: Types-Choice of foundation-Location of depth-Safe bearing capacity-Terzaghi, Meyrhoff, Skempton and IS methods– Settlement criteria – Safe bearing pressure based on N value-Allowable bearing pressure: Safe bearing capacity- Allowable settlement of structures

UNIT-V   **(12 Lectures)**
PILE FOUNDATION: Types of piles – Load carrying capacity of piles based on static pile formulae in different soils – Dynamic pile formulae – Pile load tests - Load carrying capacity of pile groups in sands and clays – Settlement of pile groups.
WELL FOUNDATIONS: Types – Different shapes of wells – Components of wells –
functions and design Criteria – Sinking of wells – Tilts and shifts.

TEXT BOOKS:
1. K.R. Arora, Soil Mechanics and Foundation Engineering, Standard Publishers and Distributors, Delhi
2. Gopal Ranjan & ASR Rao (2004), Basic and Applied Soil Mechanics, New Age International Pvt. Ltd
REFERENCES:
1. B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, Soil Mechanics and Foundations , Laxmi, publications Pvt. Ltd., New Delhi
2. C. Venkataramiah, Geotechnical Engineering, New age International Pvt . Ltd, (2002).
3. S. K.Gulhati & Manoj Datta (2005)., Geotechnical Engineering, Tata Mc.Graw Hill Publishing company New Delhi.
4. Varghese,P.C., Foundation Engineering, Prentice Hall of India., New Delhi.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CEVI Semester   **VCE-R15**

ENVIRONMENTAL ENGINEERING

Course Code: A3125

L	T	P	C
3	1	0	3

Course Overview:

Environmental Engineering is concerned with the regulation of the natural environment, including one of the most fundamental requirements of human living - the provision of clean water. The environmental engineer is involved in all aspects of the cycle of water supply and purification and is also concerned with the treatment and safe disposal of waste water and other effluents generated, as well as clean air and land. This programme reflects the industry's need for a greater number of graduates in this area.

If you have a passion for the natural environment and for optimising the use of natural resources, this course will appeal to you.

Prerequisite(s):NIL

Course Outcomes:

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

CO1.   Identify various water supply schemes, water demands, and sources of water available for consumption and water quality parameter testing and drinking water standards.

CO2.   Choose the different water treatment units, water treatment process along with different water distribution system designs.

CO3.   Classify conservancy and water carriage system, sewage characteristics and estimate stream flow

CO4.   Examine various units in primary and secondary treatments of waste water treatment process and imparts knowledge on treatment and disposal of sewage and sludge.

CO5.   Design sewers, water and wastewater treatment units along with its components.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CEVI Semester   **VCE-R15**

ENVIRONMENTAL ENGINEERING

Course Code: A3125   **L   T   P   C**
                                                                        3   1   0   3

SYLLABUS

UNIT-I   **(10 Lectures)**

Introduction: Water supply Schemes- Protected water supply- Population forecasts, design period- water demand- Types of demand – factors affecting-fluctuations- fire demand –Sources of Water- intakes- infiltration galleries, water quality parameters and testing- drinking water standards

UNIT-II   **(14 Lectures)**

Layout and general outline of water treatment units- sedimentation, uniform setting velocity- principles- design factors- surface loading- jar test –optimum dosage of coagulant- coagulation- flocculation, clarifier design-coagulants –feeding arrangements. Filtration- theory- working of slow and rapid gravity filters- multimedia filters- design of filters-troubles in operation comparison of filters –disinfection- types of disinfection – theory of chlorination –chlorine demand- other disinfection treatment methods.

Distribution systems- Types of layouts of Distribution systems – design of distribution systems- Hardy Cross and equivalent pipe methods-service reservoirs- Determination of Storage Capacity.

UNIT-III   **(14 Lectures)**

Conservancy and water carriage systems- sewage and storm water estimation- time of concentration- storm water overflows combined flow- characteristics of sewage – examination of sewage-B.O.D.- C.O.D .equations .

Shapes and materials- Sewer appurtenances manholes- inverted siphon- catch basins-flushing tanks- ejectors, pumps and pumping houses- house drainage- components requirements – sanitary fittings- traps-one pipe and two pipe systems of plumbing.

UNIT-IV   **(10 Lectures)**

Layout and general outline of various units in a waste water treatment plant-primary treatment design of screens- grit chambers- skimming tanks- sedimentation tanks- principle and design of biological treatment- trickling filters- standard and high rate- Filters-ASP- Asp modification- Aeration.

UNIT-V   **(12 Lectures)**

Construction and design of oxidation ponds- Oxidation ditches- Sludge Treatment- Sludge digestion tanks-design of digestion tank- Factors affecting sludge digestion- sludge disposal by drying- septic tanks- working principles and design- soak pits. Ultimate disposal of waste water- self-purification of rivers- Sewage farming.

TEXT BOOKS:

1. G.S.Bindie,*Water supply& Sanitary Engineering*
2. B.C.Punmia, Ashok Kumar Jain and Arun Kumar.Jain, *Water supply Engineering, waste water Engineering*.,Laxmi, publications Pvt. Ltd., New Delhi

REFERENCES:

1. Mark J Hammer and Mark J Hammer Jr.*Waste Water Technology*
2. Steel,*Water and Waste Water Technology*

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CEVI Semester   **VCE-R15**

ENVIRONMENTAL POLLUTION AND MANAGEMENT
(Open Elective – I)

Course Code: A3176

L	T	P	C
4	0	0	4

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. CEVI Semester   **VCE-R15**

ENVIRONMENTAL POLLUTION AND MANAGEMENT
(Open Elective – I)

Course Code: A3176

	L	T	P	C
	4	0	0	4

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 –greenhouse 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.

REFERENCES
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. Vasanthy (2004) Environmental Studies (A Text Book for All Under Graduate Students) Bharathidasan University Publications.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

REMOTE SENSING AND GIS
(Open Elective – I)

Course Code: A3177

L	T	P	C
4	0	0	4

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. CEVI Semester   **VCE-R15**

REMOTE SENSING AND GIS
(Open Elective – I)

Course Code: A3177

L	T	P	C
4	0	0	4

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-vectordata 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. Burragh, 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. CEVI Semester   **VCE-R15**

DISASTER MANAGEMENT
(Open Elective-I)

Course Code: A3178   **L   T   P   C**

                                                                    4   0   0   4

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 Emergingapproaches in Disaster management.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CEVI Semester   **VCE-R15**

DISASTER MANAGEMENT
(Open Elective-I)

Course Code: A3178   **L T P C**
                                                                                           4 0 0 4

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 - Heal 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 7 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
1. Pre-disaster Stage (preparedness)
2. Emergency Stage
3. Post Disaster stage – Rehabilitation

TEXT BOOKS:

1. Pradeep Sahni, Disaster Mitigation: Experiences And Reflections
2. Donald Hyndman & David Hyndman, Natural Hazards &Disasters,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. A. 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. CEVI Semester   **VCE-R15**

CONSTRUCTION PLANNING AND MANAGEMENT
(Open Elective-I)

Course Code: A3179

L	T	P	C
4	0	0	4

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. CEVI Semester   **VCE-R15**

CONSTRUCTION PLANNING AND MANAGEMENT
(Open Elective-I)

Course Code: A3179   **L   T   P   C**
                                                                                4   0   0   4

SYLLABUS

UNIT –I   **(10Lectures)**
Contract management, project estimation, types of estimation, contract document, classification, bidding, and procurement process.

UNIT-II   **10 Lectures)**
PERTANDCPM:Introduction,originofPERTandCPM,planning,schedulingandcontrolling,barcharts,milestonecharts,weaknessesinbarcharts,PERTandCPMnetworkscomparison,event,activity,rulesfordrawingnetworks,numberingtheevents(Fulkerson'slaw),dummyactivities.

UNIT –III   **(12Lectures)**
CPM - PERT NETWORK ANALYSIS: Time estimate, expected time, earliest allowable occurrence time, latest allowableoccurrencetime,slack,projectduration,probabilityofcompletion,startandfinish t i m e estimates,floats,projectscheduling,criticalandsub-criticalpath.Updating-processofupdating,whentoupdate.

UNIT –IV   **(12Lectures)**
CPMCOSTMODEL&RESOURCESALLOCATIONS,RESOURCESCHEDULING: Costanalysis,directandindirectcosts,operationtime,normalandcrashtimesandcosts,optimizingprojectcost,crashlimit,freefloatlimit,optimization.Resource smoothening, resourcelevelling.

UNIT –V   **(10Lectures)**
Construction claims, dispute and dispute resolution, and, source of claim, claim management, arbitration, project closure,construction closure and contract closure.
TEXTBOOKS:
1. Punmia, Khandelwal (2006), *Project planning and control with PERT and CPM*, 3rd edition, Laxmi Publications, New Delhi, India.
2. Nirajjha(2010),*Construction project management-theory and practice*, Pearson education
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., NewDelhi
3. subir k. Sarkar, subhajit Saraswathi (2009), Construction technology, oxford university press

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CEVI Semester   **VCE-R15**

ENVIRONMENTAL IMPACT ASSESSMENT
(Professional Elective - I)

Course Code: A3151

	L	T	P	C
	4	0	0	4

Course Overview:

This course introduces the methodology of environmental impact assessment (EIA) as a vital tool for sound environmental management and decision-making. The course provides an overview of the concepts, methods, issues and various forms and stages of the EIA process. It examines the development of EIA overseas. It mainly draws on case studies of EIA in India but also focuses on the EIA process in other countries, including developing countries. Different levels and systems of EIA are examined to highlight the diversity of approach and impact of the EIA process.

Prerequisite(s):NIL

Course Outcomes:

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

CO1.   Understand the basic concepts and methodologies of environmental impact assessment

CO2.   Identify impact of developmental activities and land use and select suitable methodology for the assessment of soil and ground water.

CO3.   Predict and assess the EIA of surface water, Air and Biological environment and select appropriate mitigation measures.

CO4.   Develop environmental audit report and suggest Post Audit activities.

CO5.   Discuss the implications of current environmental legislation and institutional arrangements in relation to environmental impact assessment

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CEVI Semester   **VCE-R15**

ENVIRONMENTAL IMPACT ASSESSMENT
(Professional Elective - I)

Course Code: A3151

L	T	P	C
4	0	0	4

SYLLABUS

UNIT – I   **(12Lectures)**
BASIC CONCEPT OF EIA: Initial environmental Examination, Elements of EIA, factors affecting E-I-A Impact evaluation and analysis, preparation of Environmental Base map, Classification of environmental parameters.
E I A METHODOLOGIES: introduction, Criteria for the selection of EIA Methodology, E I A methods, Ad-hoc methods, matrix methods, Network method Environmental Media Quality Index method, overlay methods, cost/benefit Analysis.

UNIT – II   **(10Lectures)**
IMPACT OF DEVELOPMENTAL ACTIVITIES AND LAND USE: Introduction and Methodology for the assessment of soil and ground water, Delineation of study area, Identification of actives.

UNIT – III   **(12Lectures)**
EIA OF WATER, AIR & BIOLOGICAL ENVIRONMENT: Impact prediction, Assessment of Impact significance, Identification and Incorporation of mitigation measures. E I A of surface water, Air and Biological environment: Methodology for the assessment of Impacts on surface water environment.
EIA OF VEGETATION & WILD LIFE: Assessment of Impact of development Activities on Vegetation and wildlife, environmental Impact of Deforestation, Causes and effects of deforestation.

UNIT – IV   **(10Lectures)**
ENVIRONMENTAL AUDITING: Environmental Audit & Environmental legislation objectives of Environmental Audit, Types of environmental Audit, stages of Environmental Audit, onsite activities, evaluation of Audit data and preparation of Audit report. Post Audit activities.

UNIT-V   **(10Lectures)**
ENVIRONMENTAL LEGISLATION: The Environmental protection Act, The water Act, The Air (Prevention & Control of pollution Act.), Motor Act, Wild life Act.

TEXT BOOKS:
1. Y. Anjaneyulu (2011), *Environmental Impact Assessment Methodologies*, B.S. Publication, Sultan Bazar, Hyderabad.
2. J. Glynn and Gary W. Hein Ke (1989), *Environmental Science and Engineering*, Prentice Hall of India Publishers, New Delhi, India.

REFERENCE BOOKS:

1. Suresh K. Dhaneja (2009), *Environmental Science and Engineering*, S.K. Katania & Sons Publication, New Delhi, India.
2. Larry W. Canter (1997), *Environmental Impact Assessment*, Tata McGraw Hill, New Delhi, India.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

ELEMENTS OF EARTHQUAKE ENGINEERING
(Professional Elective - I)

Course Code: A3152

L	T	P	C
4	0	0	4

Course Overview:

Earthquake engineeringis an interdisciplinary branch of engineering that designs and analyzes structures, such as buildings and bridges, with earthquakes in mind. Its overall goal is to make such structures more resistant to earthquakes. An earthquake (or seismic) engineer aims to construct structures that will not be damaged in minor shaking and will avoid serious damage or collapse in a major earthquake. Earthquake engineering is the scientific field concerned with protecting society, the natural environment, and the man-made environment from earthquakes by limiting the seismic risk to socio-economically acceptable levels.Traditionally, it has been narrowly defined as the study of the behavior of structures and geo-structures subject to seismic loading.

Prerequisite(s):NIL

Course Outcomes:

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

CO1.   Define the phenomenon of earthquake.

CO2.   Design the structural elements of a Reinforced concrete framed buildings, Masonry buildings under different load combinations.

CO3.   Demonstrate the ductility requirements for structural and non-structural walls.

CO4.   Explain the behavior of open ground storey buildings during earthquakes

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CEVI Semester   VCE-R15

ELEMENTS OF EARTHQUAKE ENGINEERING
(Professional Elective - I)

Course Code: A3152   **L   T   P   C**
                                                                                         4   0   0   4

SYLLABUS

UNIT-I   **(12 Lectures)**
ENGINEERING SEISMOLOGY: Earthquake phenomenon, Faults-Plate tectonics –Seismic waves-Terms associated with earthquakes-Magnitude/Intensity of an earthquake-scales-Energy released –Earthquake measuring instruments- Seismograph, accelerograph-strong ground motions- Seismic Zones of India.
THEORY OF VIBRATIONS: Degrees of Freedom-Continuous system- Lumped mass idealization – Oscillatory motion-Simple Harmonic Motion- Free vibration of single degree of freedom (SDOF) system – undamped and damped –critical damping-Logarithmic decrement-Forced vibrations-Harmonic excitation-Dynamic magnification factor-Excitation by rigid based translation for SDOF system-Earthquake ground motion.

UNIT-II   **(12 Lectures)**
CONCEPTUAL DESIGN: Introduction- Functional planning-Continuous load path- Overall form-simplicity and strength-Horizontal and Vertical members-Twisting of building-Ductility- definition- ductility relationships- flexible buildings-framing systems-choice of construction materials- Unconfined concrete-confined concrete-masonry-reinforcing steel.
INTRODUCTION TO EARTHQUAKE RESISTANT DESIGN: Seismic design requirements- regular and irregular configurations-basic assumptions- design earthquake loads-basic load combinations-permissible stresses- seismic methods of analysis-factors in seismic analysis-equivalent lateral force method.

UNIT-III   **(10 Lectures)**
REINFORCED CONCRETE BUILDINGS: Principles of earthquake resistant design of RC members-Structural models of frame buildings-Seismic methods of analysis- Seismic design methods- IS code based methods for seismic design-Seismic evaluation and retrofitting-Vertical irregularities-Plan configuration problems –lateral load resisting systems-Determination of design lateral forces –Equivalent lateral force procedure-Lateral distribution of base shear.

UNIT-IV   **(12 Lectures)**
MASONRY BUILDINGS: Introduction-Elastic properties of masonry assemblage-Categories of masonry buildings-Behaviour of unreinforced and reinforced masonry walls-Behaviour of walls-Box action and bands –Behaviour of infill walls-Improving seismic behaviour of masonry buildings-Load combinations and permissible stresses-Seismic design requirements –Lateral load analysis of masonry buildings.

UNIT-V   **(12 Lectures)**
STRUCTURAL WALLS AND NON- STRUCTURAL WALLS- sectional walls- sectional shapes-variations in elevation-cantilever walls without openings- failure mechanism of non- structures- Effects of non-structural elements on structural systems-Analysis of non-structural elements-Prevention of non-structural damage- Isolation of non- structures. Ductility Considerations in Earthquake Resistant design of RC buildings: Introduction –Impact of Ductility-Requirements for Ductility-Assessment of Ductility-Factors affecting Ductility- Ductile detailing considerations as per IS 13920. Behavior of beams, columns and joints in Rc buildings during earthquakes- Vulnerability of open ground storey and columns during earthquakes.

TEXT BOOKS:
1.   S.K. Duggal, *Earthquake Resistant Design of Structures*, Oxford University Press.

2. Pankai Agarwal and Manish Shrikhande, *Earthquake Resistant Design of Structures*-, Prentice Hall of India Pvt. Ltd.

REFERENCES:

1. T. Paulay and M.JNPriestly,*Sesmic Design of Reinforced Concrete and Masonry Bilding*, John Wiley &Sons.
2. Vinod Hosur,*Earthquake ResistantDesign of Building structures*, Wiley India Pvt.Ltd.
3. R.N.Iyengar,*Elements of Mechanical Vibration*, I.K.International Publishing House Pvt.L;td
4. AnandS.Arya,*Masonry and Timber structures including earthquake Resistant Design* ,Nemchand&Bros.
5. C.V.R.Murthy,*Earthquake Tips Learning Earthquake Design and Construction*.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CEVI Semester   **VCE-R15**

GROUND WATER HYDROLOGY
(Professional Elective – I)

Course Code: A3153

L	**T**	**P**	**C**
4	**0**	**0**	**4**

Course Overview:

This course covers fundamentals of subsurface flow and transport, emphasizing the role of groundwater in the hydrologic cycle, the relation of groundwater flow to geologic structure, and the management of contaminated groundwater. The course will cover the following topics: Darcy equation, mass conservation, the aquifer flow equation, heterogeneity and anisotropy, storage properties, regional circulation, unsaturated flow, recharge, stream-aquifer interaction, well hydraulics, flow through fractured rock, numerical models, groundwater quality,

Prerequisite(s): Mathematics-I

Course Outcomes:

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

CO1.   Estimate aquifer parameters and yield of wells

CO2.   Analyze radial flow towards wells in confined and unconfined aquifers.

CO3.   Design wells and understand the construction practices.

CO4.   Interpret geophysical exploration data for scientific source finding of aquifers.

CO5.   Determine the process of artificial recharge for increasing groundwater potential.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CEVI Semester   **VCE-R15**

GROUND WATER HYDROLOGY
(Professional Elective – I)

Course Code: A3153   **L T P C**

                                                                                          4 0 0 4

SYLLABUS

UNIT–I   **(12 Lectures)**

GROUNDWATER: Ground Water Occurrence: Ground water hydrologic cycle, origin of ground water, rock properties effecting ground water, vertical distribution of ground water, zone of aeration and zone of saturation, geologic formation as Aquifers, types of aquifers, porosity, Specific yield and Specific retention.

UNIT – II   **(12 Lectures)**

GROUND WATER MOVEMENT: Permeability, Darcy's law, storage coefficient, Transmissivity, differential equation governing ground water flow in three dimensions derivation, Ground water flow contours their applications.

UNIT- III   **(12 Lectures)**

HYDROLOGY : Hydrologic cycle; Precipitation types; Rain gauges; Computation of average rain fall over a basin; Abstraction from rainfall; evaporation, factors affecting evaporation, measurement of evaporation; Infiltration, factors affecting infiltration, measurement of infiltration, infiltration indices; Run off; Factors affecting run off; Computation of run-off; Design flood, Estimation of maximum rate of run-off.

UNIT- IV   **(12 Lectures)**

HYDROGRAPHS : Hydrograph analysis; Unit hydrograph; Construction of UH for an isolated storm, Application of UH to the construction of a flood hydrograph resulting from rainfall of unit duration; Construction of unit hydrograph of different unit duration from a unit hydrograph of some given unit duration by superposition method and S-curve method.

UNIT-V   **(12 Lectures)**

Analysis of Pumping Test Data: Steady flow towards a well in confined and unconfined aquifers - Dupit's and Theim's equations, Assumptions, Formation constants, yield of an open well interface and well tests. Unsteady flow towards a well - Non equilibrium equations - Theis solution - Jocob and Chow's simplifications, Leaky aquifers.

TEXT BOOKS:
1. P. Jayarami Reddy,*Engineering Hydrology*, Laxmi Publications
2. Ven Te Chow,Maidenment and Mays, *Applied Hydrology*, McGraw Hill Publications.
3. K. Subramanya,*Engineering Hydrology 3rd Edition*, Tata McGraw-Hills

REFERENCE BOOKS:

1. P.N. Modi(2008),*Irrigation, Water Resources and Water Power Engineering 7th Edition*, Standard Book House
2. K R Arora (2010),*Irrigation, water power and water resources Engineering*, Standard Publishers
3. B.C. Punmia and Pande B.B. Lal,*Irrigation and water power Engineering 16th Edition*, Laxmi Publications Pvt. Ltd., New Delhi.
4. S. K. Garg(2011),*Irrigation Engineering and Hydraulic structures*, Khanna Publishers, Delhi

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

FINITE ELEMENT METHODS IN CIVIL ENGINEERING
(Professional Elective - I)

Course Code: A3154

L	T	P	C
4	0	0	4

Course Overview:

The basics of the Finite Element Method (FEM) will be discussed at length in this introductory course. Applicability of the method and different types of formulation procedures will be explained. Complete step-by-step details will be presented for typical one, two and three - dimensional analyses. Moreover, FEM formulations will be elaborated for various fields of Civil Engineering such as structural, hydraulics, geotechnical, environmental engineering etc. Computer implementation of the methods and use of various packages will be introduced. Course notes, source code, analysis software and the accompanying manuals will enable the participants to perform routine analyses

Prerequisite(s): NIL

Course Outcomes:

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

CO1.   Derive the stress equilibrium relations of a 3D body

CO2.   Apply the strain displacement and stress strain relations in the development of field equations

CO3.   Solve the 1D problems with linear and quadratic shape functions

CO4.   Formulate the finite element equations using potential energy approach and Galerkin method

CO5.   Explain 2D stress analysis and the concept of constant strain triangles

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CEVI Semester **VCE-R15**

FINITE ELEMENT METHODS IN CIVIL ENGINEERING
(Professional Elective - I)

Course Code: A3154

L	T	P	C
4	0	0	4

SYLLABUS

UNIT – I **(10 Lectures)**

INTRODUCTION: Concepts of FEM, Steps involved merits & demerits, energy principles, Discretization, Rayleigh - Ritz method of functional approximation.

UNIT – II **15 Lectures)**

PRINCIPLES OF ELASTICITY: Equilibrium equations, strain displacement relationships in matrix form, Constitutive relationships for plane stress, plane strain and Axi-symmetric bodies of revolution with axi-symmetric loading. One Dimensional FEM: Stiffness matrix for bar element, shape functions for one dimensional element, one dimensional problem.
ANALYSIS OF TRUSSES: Stiffness Matrix for plane truss and space truss elements, stress calculations.

UNIT – III **(13 Lectures)**

TWO DIMENSIONAL FEM: Different types of elements for plane stress and plane strain analysis, Displacement models generalized coordinates, shape functions, convergent and compatibility requirements. Geometric invariance, Natural coordinate system, area and volume coordinates.

UNIT – IV **(13 Lectures)**

ELEMENT STIFFNESS AND NODAL LOAD MATRICES: Generation of element stiffness and nodal load matrices for 3- node triangular element and four node rectangular elements. Isoperimetric formulation, Concepts of isoperimetric elements for 2D analysis -formulation of CST element, 4 - noded and 8 -noded iso-parametric quadrilateral elements, Lagrangian and Serendipity elements.

UNIT – V **(10 Lectures)**

AXI-SYMMETRIC ANALYSIS: Basic principles-Formulation of 4-node iso-parametric axi-symmetric element Solution Techniques: Numerical Integration, Static condensation, assembly of elements and solution techniques for static loads.

TEXT BOOKS:

1. Tirupati. R. Chandrepatla, Ashok D. Belegundu (1997), *Finite Elements Methods in Engineering*, Pearson Education Publications, New Delhi, India.
2. S. S. Bhavakatti (2007), *Finite element analysis*, New age international publishers, New Delhi, India.

REFERENCE BOOKS:

1. Robert D. Cook, David (2001), *Concepts and Applications of Finite Element Analysis*, Wiley publications, New Delhi, India.
2. David V. Hutton (2003), *Finite element analysis*, Tata McGraw- Hill, New Delhi, India.
3. S. Malkus, Michael E. Plesha (2002), *concepts and applications of Finite Element Analysis*, John Wiley & Sons, India.
4. C. S. Krishna (1995), *Finite Element analysis Theory & Programming*, Tata McGraw- Hill Publishers, New Delhi, India.
5. P. Seshu (2004), *Text book of Finite Element analysis*, Prentice Hall of India, New Delhi, India.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CSEVI Semester   **VCE-R15**

ADVANCED STRUCTURAL ANALYSIS
(Professional Elective - II)

Course Code: A3155

L	T	P	C
4	0	0	4

Course Overview:

This course is offered to undergraduate students it deals with frames, Trusses analysis in Matrix analysis method of stiffness and flexibility methods and also deals with the shape factors for various sections and moment curvature relationship, in continues beams

Prerequisite(s):NIL

Course Outcomes:

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

CO1.   Classify determinate and indeterminate structures.

CO2.   Solve portal frames using different matrix methods.

CO3.   Apply Matrix methods of analysis to continuous beams under different loading systems.

CO4.   Analyze fixed and continuous beams by using plastic analysis.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CSEVI Semester **VCE-R15**

ADVANCED STRUCTURAL ANALYSIS
(Professional Elective - II)

Course Code: A3155

L T P C
4 0 0 4

SYLLABUS

UNIT-I **(12 Lectures)**
Flexibility matrix method: Basics, Introduction, Review of matrix algebra, Force method, Basic concepts, Internal forces, external loads and redundant, Relation between internal forces and deformation, Determination of static indeterminacy for different types of structures.
Continuous Beams: Determination of redundant forces, various load conditions for continuous beams with and without settlement of supports.

UNIT II **(12 Lectures)**
Rigid jointed frames: Application of Flexibility method rigid jointed plane frames.
Pin Jointed structures: Application of Flexibility method to pin jointed and stresses.

UNIT III **(12 Lectures)**
Stiffness matrix method: Basics, Introduction stiffness matrix method, kinematic indeterminacy, Determination kinematic indeterminacy for different types of structures.
Analysis of Continuous Beams – Stiffness Method: Determination of unknown displacements, various load conditions for continuous beams with and without settlement of supports.

UNIT IV **(10 Lectures)**
Analysis OF frames – Stiffness method: Application of Stiffness method rigid jointed plane frames.
Analysis OF Trusses – Stiffness methodApplication of Stiffness method to pin jointed trusses.

Unit-V **(14 Lectures)**
PLASTIC ANALYSIS: Introduction, Idealized stress, Strain diagram, shape factors for various sections. Moment curvature relationship, ultimate moment, Plastic hinge, lower and upper bound theorems, ultimate strength of fixed and continuous beams.

TEXT BOOKS:

1. Vizarani and Ratwani,*Structural Analysis Vol - I & II*, Khanna Publishers.
2. Pundit and Guptha,*Structural Analysis Vol - I and II*, Tata McGrew Hill Publishers.
3. Aslam Kassimali,*Structural Analysis SI edition*, Cengage Learning.

REFFERENCES:

1. Singh,*Matrix Analysis of Structures*, Cengage Learning Pvt.Ltd.
2. Hibbeler., *Structural Analysis*
3. C.S.Reddy,*Basic Structural Analysis*,Tata McGrew Hill Publishers.
4. Pundit and Gupta,*Matrix Analysis of Structures*, Tata McGrew Hill Publishers.
5. A.K.Jain,*Advanced Structural Analysis*, Nem Chand Bros.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

WATERSHED MANAGEMENT
(Professional Elective - II)

Course Code: A3156

L	T	P	C
4	0	0	4

Course Overview:

Watershed management is the study of the relevant characteristics of a watershed aimed at the sustainable distribution of its resources and the process of creating and implementing plans, programs, and projects to sustain and enhance watershed functions that affect the plant, animal, and human communities within a watershed boundary. Features of a watershed that agencies seek to manage include water supply,water quality,drainage,storm waterrunoff,water rights, and the overall planning and utilization of watersheds.Landowners, land useagencies, storm water management experts, environmental specialists, water use surveyors and communities all play an integral part in watershed management.

Prerequisite(s):NIL

Course Outcomes:

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

CO1.   Outline the basic concepts and characteristics of water resource management.

CO2.   Demonstrate proper use of watershed resources for optimum production with minimum hazards.

CO3.   Develop skills of flood frequency analysis.

CO4.   Explain the social aspects and methods of water harvesting.

CO5.   Make use of the principles and measures to control erosion.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CSEVI Semester   **VCE-R15**

WATERSHED MANAGEMENT
(Professional Elective - II)

Course Code: A3156   **L   T   P   C**

                                                                                                4   0   0   4

SYLLABUS

UNIT-I   **(10 Lectures)**
INTRODUCTION: Concept of watershed development, objectives of watershed development, need for watershed development in, India, Integrated and multidisc plenary approach for watershed management.

UNIT.II   **(12 Lectures)**
CHARACTERISUCS OF WATERSHED: size, shape; physiographic, slope, climate, drainage, land use, vegetation, geology and soils, hydrology and hydrogeology, socio-economic characteristics, basic data on watersheds.

UNIT.III   **(12 Lectures)**
Watershed delineation - Runoff Computations from a watershed - Flood Frequency Analysis - Gumbell, Log Pearson and Weibull Methods of Analysis.

UNIT.IV   **(10 Lectures)**
PRINCIPLES OFEROSION: Types of erosion, factors affecting erosion, effects of erosion on land fertility and land capability, estimation of soil loss due to erosion, Universal soil loss equation.
MEASUR-ES TO CONTROL EROSION: Contour techniques, ploughing, furrowing, trenching, bunding, terracing, gully control, rock fill dams, brushwood dam, Gabion.

UNIT.V   **(10 Lectures)**
WATER HARVESTING: Rainwater Harvesting, catchment harvesting, harvesting structures, soil moisture conservation, check dams, artificial recharge, farm ponds, percolation tanks.
FOREST AND GRASS LAND MANAGEMENT: Interpretation of Satellite Imageries- Land use and Land Cover. Land capability classification, management of forest, agricultural, grassland and wild land. Reclamation of saline and alkaline soils.

TEXT BOOKS
1.   JVS Murthy,*Watershed Management*, New Age International Publishers.
2.   R.Awurbs and Wp James,*Water Resource Engineering*,prentice Hall Publishers.

REFERNCES
1.   VVN Murthy,*Land and Water Management*, Kalyani publications.
2.   D.K.Majumdar,*Irrigation and Water Management*, Prentice Hall ofIndia.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CSEVI Semester   **VCE-R15**

AIR POLLUTION AND CONTROL
(Professional Elective - II)

Course Code: A3157

L	T	P	C
4	0	0	4

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 air pollution. The course will also be dealing about the sources of air pollution, the impact of these sources on the environment and health.

Prerequisite(s):Environmental Science

Course Outcomes:

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

CO1.   Identify various methods of air pollution analysis.

CO2.   Develop air pollution sampling and measurement

CO3.   Interpret air pollution related regulations

CO4.   Create the mechanisms of pollutant transport/dispersion in the atmosphere - use air dispersion models to predict pollution impact.

CO5.   Design sampling methods for air sampling - design/select systems for controlling particulate pollutants - design/select systems for controlling gaseous pollutant

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CSEVI Semester   **VCE-R15**

AIR POLLUTION AND CONTROL
(Professional Elective - II)

Course Code: A3157   **L   T   P   C**
                                                                                    4   0   0   4

SYLLABUS

UNIT – I   **(12 Lectures)**
AIR POLLUTION: Definitions, scope, significance and episodes, air pollutants – classifications - natural and artificial -primary and secondary, point and non- point, line and areal sources of air pollution-stationary and mobile sources. Effects of air pollutants on man, material and vegetation: global effects of air pollution - greenhouse effect, air pollution indices, heat islands, acid rains, ozone holes etc.

UNIT – II   **(10 Lectures)**
THERMODYNAMICS AND KINETICS OF AIR - POLLUTION: Applications in the removal of gases like SOx, NOx, CO, HCetc., air-fuel ratio. Computation and Control of products of combustion. Meteorology and plume Dispersion,

UNIT – III   **(10 Lectures)**
PROPERTIES OF ATMOSPHERE: Heat, Pressure, Wind forces, Moisture and relative Humidity, Influence ofMeteorological phenomena on Air Quality-wind rose diagrams.

LAPSE RATES: Pressure Systems, Winds and moisture plume behavior and plume Rise Models; Gaussian Model forPlume Dispersion.

UNIT – IV   **(12 Lectures)**
CONTROL OF PARTICULATES: Control at Sources, Process Changes, Equipment modifications, Design and operation ofcontrol. Equipment's – Settling Chambers, Centrifugal separators, filters Dry and Wet scrubbers, Electrostatic precipitators. General Methods of Control of NOx and Sox emissions – In-plant Control Measures, process changes, dry and wet methods of removal and recycling.

UNIT – V   **(10 Lectures)**
AIR QUALITY MANAGEMENT: Monitoring of SPM, SO; NO and CO Emission Standards. Air pollution laws and standards.

TEXT BOOKS:
1. M. N. Rao, H. V. N. Rao (1988), *Air pollution*, Tata McGraw Hill Education, New Delhi, India.
2. C. S. Rao (2006), *Environmental Pollution control Engineering*, New age international, New Delhi, India.

REFERENCE BOOKS:

1. R. K. Trivedy, P. K. Goel (2003), *Introduction to Air pollution*, ABD Publications, New Delhi, India.
2. Wark, Warner (1998), *Air pollution its origin and control*, Addison-Wesley, New York.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

BRIDGE ENGINEERING
(Professional Elective II)

Course Code: A3158

L	T	P	C
4	0	0	4

Course Overview:

Introduction to bridge engineering. Historical background of bridges and types. Bridge aesthetics and proportioning. Design process. Loads on bridges and force distribution as per Indian Road Congress. Bridge geometry. Conceptual design of different types of bridges. Analysis of slab bridge. T-Beam bridge. Introduction to piers and abutments, well foundation

Prerequisite(s): Structural Analysis

Course Outcomes:

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

CO1. Know the structural Behaviour of different components of a reinforced concrete and steel bridge.

CO2. Analyse and design different components of a highway and railway bridge, to meet desired needs within realistic constraints such as economy, environment friendly, safety, viable construction and its sustainability under loads.

CO3. Design the slab culvert, Box culvert, T Beam Bridge and substructures.

CO4. Carry out the construction and maintenance of bridges.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CSEVI Semester   **VCE-R15**

BRIDGE ENGINEERING
(Professional Elective - II)

Course Code: A3158   **L   T   P   C**
                                              4   0   0   4

SYLLABUS

UNIT – I   **(10 Lectures)**
LOADING STANDARDS AS PER IRC: Railway load, Equivalent Uniformly Distributed live load, Types of bridges, Economic span length, types of loading dead load, live load, General design consideration.

UNIT – II   **(12 Lectures)**
DESIGN OF BRIDGES: Slab Bridge, T-Beam Bridge. Working stress design and detailing of slab bridges for IRC loading, Pigaud's theory, Courbon's theory of analysis of longitudinal girder.

UNIT – III   **(12 Lectures)**
DESIGN OF T-BEAM BRIDGES: Introduction, Wheel load analysis, Bending moments in slab, , Working stress design and detailing of reinforced concrete T- beam bridges for IRC loading.

UNIT-IV   **(10 Lectures)**
DESIGN OF BOX CULVERTS: General aspects, Design loads, Design moment, shear and thrust, Design of critical section.

UNIT – V   **(10 Lectures)**
PIERS AND ABUTMENTS: Piers, abutments, wing walls factors effecting and stability, well foundations, Caissons foundations.

TEXT BOOKS:

1. N. Krishna Raju (2010), *Design of Bridges*, 4th Edition, Oxford & IBH, New Delhi.
REFERENCE BOOKS:

1. S. Ponnu Swamy(2008), *Bridge Engineering*, Tata McGraw Hill, New Delhi, India.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

4
(Professional Elective - II)

Course Code: A3001   **L   T   P   C**

                                                           4   0   0   4

Course Overview:

Prerequisite(s):NIL

Course Outcomes:

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

CO1.

CO2.

CO3.

CO4.

CO5.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

4
(Professional Elective - II)

Course Code: A3001

L	T	P	C
4	0	0	4

SYLLABUS

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CEVI Semester   **VCE-R15**

ENVIRONMENTAL ENGINEERING LAB

Course Code: A3126   **L   T   P   C**
                                                            0   0   3   2

Course Overview:

Environmental Engineering is concerned with the regulation of the natural environment, including one of the most fundamental requirements of human living - the provision of clean water. The environmental engineer is involved in all aspects of the cycle of water supply and purification and is also concerned with the treatment and safe disposal of waste water and other effluents generated, as well as clean air and land. This programme reflects the industry's need for a greater number of graduates in this area.

If you have a passion for the natural environment and for optimising the use of natural resources, this course will appeal to you.

Prerequisite(s):NIL

Course Outcomes:

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

CO1.   Determine physical, chemical and biological characteristics of water and wastewater.

CO2.   Estimate optimum dosage of coagulant

CO3.   Evaluate the quantity of Chlorine demand.

CO4.   Assess the quality of water and wastewater.

CO5.   Statistically analyse and interpret laboratorial results.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CEVI Semester   **VCE-R15**

ENVIRONMENTAL ENGINEERING LAB

Course Code: A3126   **L   T   P   C**

                                                                          0   0   3   2

LIST OF EXPERIMENTS

1. Determination of pH and Turbidity
2. Determination of Conductivity and Total dissolved solids.
3. Determination of Alkalinity/Acidity.
4. Determination of Chlorides.
5. Determination and Estimation of total solids, organic solids and inorganic solids.
6. Determination of iron.
7. Determination of Dissolved Oxygen.
8. Determination of Nitrogen.
9. Determination of total Phosphorous.
10. Determination of B.O.D
11. Determination of C.O.D
12. Determination of Optimum coagulant dose.
13. Determination of Chlorine demand.
14. Presumptive coli form test.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CEVI Semester   **VCE-R15**

COMPUTER AIDED DRAFTING OF BUILDINGS LAB

Course Code: A3127

L	T	P	C
0	0	3	2

Course Overview:

Modern Computer Aided Design (CAD) tools have significantly changed the way we design mechanical products or machines. CAD techniques offers benefits such as rapid prototyping, less revisions in design, automatic update of drawings, rapid turnaround time and low operating cost. One of the most popular tools used in manufacturing industry is AutoCAD by Autodesk Inc. With AutoCAD you get the best 2D and 3D design modules in one package which renders a central 3D model to clearly visualize the final product. AutoCAD software facilitates faster digital prototyping by allowing direct read and write of native DWG files. This results in accurate format translations and greatly improves overall efficiency of mechanical design.

AutoCAD comes with variety of comprehensive and customized set of 3Dmodeling modules for generating/documenting/visualizing different 3D digital prototypes. The 3D model allows manufacturer or product designer to check design, possible interference and relevant data across all design stages. This feature eliminates the need of physical prototypes and helps avoid costly revisions usually discover dafter the design has been sent to the fabricator or manufacturer

Prerequisite(s):NIL

Course Outcomes:

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

CO1.   Interpret and Decide how to apply computer software to prepare civil engineering drawing

CO2.   Design typical reinforced concrete structural and steel members detailing.

CO3.   Plan architectural floor plan

CO4.   Build geometric, multi view, dimensioning and detail drawings of typical 2-D engineered objects

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CEVI Semester   **VCE-R15**

COMPUTER AIDED DRAFTING OF BUILDINGS LAB

Course Code: A3127   **L   T   P   C**

0   0   3   2

LIST OF EXPERIMENTS

1. Introduction to various CAD commands with simple examples
2. Line diagrams of different structures
3. Isometric exercises
4. Doors and Windows
5. Calculation of area of closed traverse.
6. Plan, section and elevation of residential building
7. Plan, section and elevation of public building
8. Plan, section and elevation of multistoried building
9. Preparation of Site plan of a Residential building

SYLLABI FOR
VII SEMESTER

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CEVII Semester   **VCE-R15**

TRANSPORTATION ENGINEERING

Course Code: A3128

L	T	P	C
3	1	0	3

Course Overview:

Transportation engineering is a specialty within civil engineering. This field deals with the planning, design and maintenance of transportation systems at local and regional levels. Transportation engineers work to ensure the safe, economical and timely movement of people and goods. They might be involved in all aspects of new private and public transportation projects, which can include addressing energy needs, budget constraints and environmental concerns, and it is also deals with the Railway engineering and airport engineering.

Prerequisite(s):NIL

Course Outcomes:

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

CO1.   APPLY the principles and practice transportation engineering that focuses on Traffic and Transportation Engineering and regulations.

CO2.   DEVELOP a strong analytical and practical knowledge of Planning, Designing and solving the transportation problems.

CO3.   Design Intersections and prepare traffic management plans.

CO4.   Analyse Traffic Engineering; Transport Planning, Highway Geometric Design and Construction.

CO5.   OUTLINE the principles of construction and maintenance of highways

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

TRANSPORTATION ENGINEERING

Course Code: A3128   **L   T   P   C**
                                                                           3   1   0   3

SYLLABUS

UNIT I   **(12 Lectures)**
HIGHWAY DEVELOPMENT AND PLANNING: Highway development in India – Necessity for Highway Planning- Different Road Development Plans- Classification of Roads- Road Network Patterns – Highway Alignment- Factors affecting Alignment- Engineering Surveys – Drawings and Reports

UNIT – II   **(12 Lectures)**
HIGHWAY GEOMETIC DESIGN: Importance of Geometric Design- Design controls and Criteria- Highway Cross Section Elements- Sight Distance Elements-Stopping sight Distance, Overtaking Sight Distance and intermediate Sight Distance- Design of Horizontal Alignment-Design of Super elevation and Extra widening- Design of Transition Curves-Design of Vertical Alignment-Gradients- Vertical curves.

UNIT – III   **(12 Lectures)**
TRAFFIC ENGINEERING & REGULATIONS: Basic Parameters of Traffic-Volume, Speed and Density- Traffic Volume Studies- Data Collection and Presentation- speed studies- Data Collection and Presentation-Origin & Destination Studies, Parking Studies – On Streets & Off-street Parking- Road Accidents- Causes and Preventive Measures- Accident Data Recording – Condition Diagram and Collision Diagrams-Traffic Signs – Types and Specifications – Road Markings- Need for Road Markings- Types of Road Markings-Design of Traffic Signals- Webster Method.

UNIT – IV   **(12 Lectures)**
INTERSECTION DESIGN: Types of Intersections – Conflicts at Intersections- Requirements of At-Grade Intersections- Types of At-Grade Intersections- Channelized and Un-channelized Intersections-–Traffic Islands -Types of Grade Separated Intersections- Rotary Intersection – Concept of Rotary – Design Factors of Rotary- Advantages and Limitations of Rotary Intersections

UNIT: V   **(12 Lectures)**
HIGHWAY MATERIAL, CONSTRUCTION AND MAINTENANCE: Highway Material Characterization: Subgrade Soil, Stone Aggregates, Bitumen Materials, and Construction of Gravel Roads- Construction of water Bound Macadam Roads- Construction of Bituminous Pavements: Surface Dressing, Bitumen Bound Macadam, and Bituminous Concrete- Construction of Cement Concrete Pavements- Construction of joints on cement Concrete Pavements-joint Filler and Seal- Pavement Failures- Maintenance of Highways- Highway Drainage.

TEXT BOOKS:
1. S.K.Khanna& C.E.G.Justo(2000)., *Highway Engineering*7th editionNemchand& Bros.,

REFERENCES:
1. S.P.Bindra(1981),*Highway Engineering*4th EditionDhanpat Rai & Sons.
2. Dr.L.R.Kadyali(1997),*Traffic Engineering*& TransportationPlanning6th Edition Khanna publications
3. L.R.Kadiyali and Lal, *Highway Engineering Design*Khanna Publications.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

WATER RESOURCES ENGINEERING-II

Course Code: A3129

L	T	P	C
3	1	0	3

Course Overview:

The student will able to develop skills in mathematical modeling of both natural and engineering water resource systems that are used to analyze system components. The student will able to incorporate these analytical abilities in planning and design of water resource systems primarily employing representative examples from urban runoff quantity/quality control systems. Study and design of works in view of river control, drainage of water-logged areas. There is a strong emphasis on engineering decision making throughout the course.

Prerequisite(s): Water Resources Engineering-I-A2117.

Course Outcomes:

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

CO1.   Demonstrate the behaviour of various irrigation structures and their design principles and construction features.

CO2.   Understand the design and construction of Gravity Dam.

CO3.   Acquires the awareness of design aspects of earth dam, spillways and dissipation of energy on the downstream side of the spillway.

CO4.   Provide knowledge on various hydraulic structures such as energy dissipaters, head and cross regulators, canal falls and structures involved in cross drainage works.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CE VII Semester   **VCE-R15**

WATER RESOURCES ENGINEERING-II

Course Code: A3129

L	T	P	C
3	1	0	3

SYLLABUS

UNIT – I   **(12 Lectures)**
Storage Works – Reservoirs – Types of reservoirs, selection of site for reservoir, zones of storage of a reservoir , reservoir yield , estimation of capacity of reservoir using mass curve – Reservoir Sedimentation – Life of Reservoir. Types of dams, factors affecting selection of type of dam, factors governing selection of site for a dam.

UNIT – II   **(10 Lectures)**
Gravity dams: Forces acting on a gravity dam, causes of failure of a gravity dam, elementary profile and practical profile of a gravity dam, limiting height of a low gravity dam, Factors of safety – stability analysis, Foundation for a Gravity Dam, drainage and inspection galleries.

UNIT- III   **(12 Lectures)**
Earth dams: Types of Earth dams, causes of failure of earth dam, criteria for safe design of earth dam, seepage through earth dam – graphical method, measures for control of seepage.
Spill ways: types of spillway, Design principles of Ogee spillways – spillway gates. Energy Dissipaters and stilling basins significance of Jump Height Curve and tail water Rating curve – USBR and Indian types of stilling Basins.

UNIT – IV   **(15 Lectures)**
Diversion Head works: Types of Diversion head works – weirs and barrages, layout of diversion head work – components. Causes and failure of weirs and Barrages on permeable foundations – silt Ejectors and silt Excluders Weirs on permeable Foundations – Creep Theories – Bligh's Lane's and Khosla's theories, Determination of uplift pressure – various Correction Factors – Design principles of weirs on permeable foundations using Creep theories – exit gradient, U/S and D/S Sheet piles- Launching Apron.

UNIT – V   **(12 Lectures)**
Canal Falls – types of falls and their location, Design principles of Notch fall and sarada type Fall. Canal regulation works, principles of design of distributory and head regulators, Canal Cross Regulators – Canal outlets, types of canal modules, proportionality, sensitivity and flexibility. Cross Drainage works: Types, selection of site, Design principles of aqueduct, siphon aqueduct and super passage.

TEXT BOOKS
1. S.K. Garg, *Irrigation engineering and structures*, Khanna publications pvt.Ltd., New Delhi
2. Punmia & Lal, *Irrigation and water power engineering*, Laxmi publications pvt.Ltd., New Delhi

REFERENCES:
1. G.L.Asawa,*Irrigation and resources engineering*, New Age International publishers
2. Varshney, Gupta & Gupta*Theory and Design of Hydraulic structures*
3. K.R.Arora, *Irrigation engineering*

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CEVII Semester   **VCE-R15**

REMOTE SENSING AND GIS APPLICATIONS

Course Code: A3130

L	T	P	C
3	1	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 photogrammetry 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 are incorporated

Prerequisite(s):NIL

Course Outcomes:

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

CO1.   Identify the earth surface features from satellite images

CO2.   Analyze the energy interactions in the atmosphere and earth surface features

CO3.   Classify the photogrammetry methods and their applications

CO4.   Select the type of remote sensing technique or data for required purpose.

CO5.   Analyze the basic components of GIS, to formulate and solve geospatial problems

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CEVII Semester   VCE-R15

REMOTE SENSING AND GIS APPLICATIONS

Course Code: A3130   **L   T   P   C**
                                                                                3   1   0   3

SYLLABUS

UNIT - I   **(12 Lectures)**
REMOTE SENSING -I: Basic concepts and foundation of remote sensing, elements involved in remote sensing, electromagnetic spectrum, remote sensing terminology and units.
REMOTE SENSING –II : Energy resources, energy interactions with earth surface features and atmosphere, resolution, sensors and satellite visual interpretation techniques, basic elements, converging evidence, interpretation for terrain evaluation, spectral properties of water bodies, introduction to digital data analysis.

UNIT - II   **(10 Lectures)**
INTRODUCTION TO PHOTOGRAMMETRY : Principle and types of aerial photographs, stereoscopy, Map Vs Mosaic, ground control, Parallax measurements for height, determinations Geographic Information System: Introduction, GIS definition and terminology, GIS categories, components of GIS, fundamental operations of GIS, A theoretical framework for GIS.

UNIT - III   **(10 Lectures)**
DATA COLLECTION: Data collection and input overview, data input and output. Keyboard entry and coordinate geometry procedure, manual digitizing and scanning.
TYPES OF DATA REPRESENTATION: Raster GIS, Vector GIS, File management, Spatial data, Layer based GIS, Feature based GIS mapping.

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   **(12 Lectures)**
WATER RESOURCES APPLICATIONS –I: Land use/Land cover in water resources, Surface water mapping and inventory, Rainfall – Runoff relations and runoff potential indices of watersheds, Flood and Drought impact assessment and Monitoring, Watershed management for sustainable development and Watershed characteristics.
WATER RESOURCES APPLICATIONS –II: Reservoir sedimentation, Fluvial Geomorphology, water resources management and monitoring, Ground Water Targeting, Identification of sites for artificial Recharge structures, Drainage Morphometry, Inland water quality survey and management, water depth estimation and bathymetry.

TEXT BOOKS:
1. James B. Campbell, Randolph H. Wynne (2011), *Introduction to Remote Sensing*, 5thedition, Guilford Publications Inc., New York, USA.
2. M. Anji Reddy (2011), *Remote Sensing and Geographical Information systems*, BS Publications, Hyderabad. ISBN: 81- 7800-112-8

REFERENCE BOOKS:
1. Thomas M. Lillesand, Ralph W. Kiefer (1994), *Remote Sensing and Image Interpretation*, Wiley & Sons, New Delhi, India.
2. Peter A. Burragh, Rachael (2011), *Principals of Geo physical Information Systems*, Oxford Press, India.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CEVII Semester   **VCE-R15**

CONSTRUCTION MANAGEMENT
(Professional Elective - III)

Course Code: A3159

L	T	P	C
4	0	0	4

Course Overview:

The Construction Management program at Centennial College focuses on the study of the management and technological aspects of residential, industrial, commercial and institutional construction projects as well as engineering and infrastructure construction.Construction Management courses provide practical training for you to acquire a unique combination of construction and project management skills in conjunction with the added dimension of protecting the environment and sustainability.

Prerequisite(s): Building Materials, Construction and Planning

Course Outcomes:

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

CO1.   Adapt Critical thinking and creativity in problem solving and decision making in construction.

CO2.   Understand effectively and professional oral and written communications through the use of information and communication technology

CO3.   Develop Principles of leadership in business and management including advanced construction management practices, complex project decision making, and associated risk management.

CO4.   Build Professional ethics including application to construction situations and choices

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CEVII Semester   **VCE-R15**

CONSTRUCTION MANAGEMENT
(Professional Elective - III)

Course Code: A3159

	L	T	P	C
	4	0	0	4

SYLLABUS

UNIT – I   **(10 Lectures)**
CONSTRUCTION PLANNING AND MANAGEMENT : Significance of Construction Management, Objectives and Functions of Construction Management, Types of Construction, Resources for Construction Industry, Various stages in Construction, Construction Management Team & Types of Organization.

UNIT - II   **(12 Lectures)**
PERT & CPM: Time estimate- Optimistic time estimate, Most likely time estimate, Pessimistic time estimate & Expected time. Project Scheduling, Resource Allocation/Leveling, Network Analysis, Cost-Time Analysis in Network Planning, FloatTotal float, free float & Independent float

UNIT – III   **(12lectures)**
CONTRACT MANAGEMENT: Types of Construction Contracts and their advantages and disadvantages, Contract Document and conditions of contract. Estimation and its types. Significance of Safety & Quality in construction work.
BIDDING : Definition and Process, Various steps in Bidding, M Book- Muster Roll, Earnest money & Security Deposit,

UNIT – IV   **(14 Lectures)**
CLAIM MANAGEMENT: Construction claims, Disputes and project closure- Source of claim, Claim Management, Dispute resolution, Arbitration and its advantages, Arbitration Clause, Construction closure, Contract closure.
CONSTRUCTION PLANNING: Project Planning Techniques, Planning of Manpower, Materials, Equipment and Finance, Work Breakdown Structure, Scheduling by Bar Charts, Limitations of Bar Charts

UNIT –V   **(12 Lectures)**
TENDERS, CONTRACTS AND SPECIFICATIONS: Methods of tendering for projects. Different types of contracts. Importance of specifications. Design and construct Tenders, Build operate and transfer contracts – Turn key contracts. Legal problems. Arbitration. Payment schedule. Quality Control in Construction, Construction Disputes and there settlement.

TEXT BOOKS:

1. P.S. GAHLOT, B.M. DHIR.(2014), *Construction Planning and Management*, Wiley Eastern Limited.
2. Chitkara, K.K,(2014)*Construction Project Management, Planning, Scheduling and Controlling*,Tata McGraw Hill Publishing Co., New Delhi
REFERENCES:

1. Stephen A. Robbins & David A. Decenzo & Mary Coulter (2011),Fundamentals of Management7 th Edition, Pearson Education
2. Robert Kreitner & Mamata Mohapatra,(2008). Management, Biztantra.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CEVII Semester   **VCE-R15**

GROUND IMPROVEMENT TECHNIQUES
(Professional Elective - III)

Course Code: A3160

L	T	P	C
4	0	0	4

Course Overview:

The subject, in detail describes about the various problematic soils present around the world and the engineering measures taken either to replace, modify and/or stabilize its behaviour to best suit its purpose as a founding soil or a back fill material. The theory of the expansive soils is dealt with in detail. The principles of reinforced earth are introduced along with the design philosophies. Various geosynthetics used are briefly described explaining the types and their functions

Prerequisite(s):NIL

Course Outcomes:

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

CO1.   Understand the failures of geotechnical problems

CO2.   Analyse the compressibility of soils and evaluate design parameters

CO3.   Estimate the geotechnical properties of the soil and adopting suitable solutions to improve the soil properties.

CO4.   Make use of the geotechnical theories and design of reinforced earth Structures

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CEVII Semester **VCE-R15**

GROUND IMPROVEMENT TECHNIQUES
(Professional Elective - III)

Course Code: A3160

L   T   P   C
4   0   0   4

SYLLABUS

UNIT – I **(12 Lectures)**
DEWATERING: Methods of de-watering- sumps and interceptor ditches- single, multi stage well points, vacuum wellpoints, Horizontal wells, foundation drains, blanket drains, criteria for selection of fill material around drains, Electro-osmosis.

UNIT – II **(12 Lectures)**
GROUTING: Objectives of grouting, grouts and their properties, grouting methods, ascending, descending and stagegrouting, hydraulic fracturing in soils and rocks- post grout test. In - situ densification methods in granular Soils. Vibration at the ground surface, Impact at the Ground Surface, Vibration at depth, Impact at depth. In - situ densification methods in cohesive soils,

UNIT – III **(12 Lectures)**
STABILISATION: Methods of stabilization, cement, lime, bituminous, chemical stabilization with calcium chloride,sodium silicate and gypsum.
REINFORCED EARTH: Principles, Components of reinforced earth, factors governing design of reinforced earth walls,design principles of reinforced earth walls.

UNIT – IV **(12 Lectures)**
GEOSYNTHETICS: Geo textiles, Types, Functions and applications, geo grids, geo foams and geo membranes, functionsand applications.

UNIT – V **(12 Lectures)**
EXPANSIVE SOILS: Problems of expansive soils, tests for identification, and methods of determination of swellpressure. Improvement of expansive soils, Foundation techniques in expansive soils, under reamed piles.

TEXT BOOKS:
1. Purushotham Raj (2005), *Ground Improvement Techniques*, Laxmi Publications, New Delhi, India.
2. Hausmann M.R. (2011), *Engineering Principles of Ground Modification*, Tata McGraw-Hill International Edition, New Delhi, India.

REFERENCE BOOKS:
1. Xanthakos P. P, Abramson L. W, Brucwe D.A (1994), *Ground Control and Improvement*, John Wiley and Sons, New York, USA.
2. Robert M. Koerner (1986), *Designing with Geosynthetics*, Prentice Hall, New Jersey, USA.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CEVII Semester   **VCE-R15**

PRE STRESSED CONCRETE STRUCTURES
(Professional Elective - III)

Course Code: A3161

L	T	P	C
4	0	0	4

Course Overview:

To introduce the need for pre-stressing as well as the methods, types and advantages of pre-stressing to the students. Students will be introduced to the design of pre-stressed concrete structures subjected to flexure and shear.

Prerequisite(s):NIL

Course Outcomes:

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

CO1.   Apply the principle of pre stressing for different types in practice.

CO2.   Analyze the stress, deflections, flexural and shear strength and apply it for the design of bridges.

CO3.   Design the tension and compression members and apply it for prestressed elements.

CO4.   Utilize the concepts of prestressed which helps in execution of prestressed concrete elements and construction process in the field.

CO5.   Analyze transfer and development length as well as prestress losses.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CEVII Semester   **VCE-R15**

PRE STRESSED CONCRETE STRUCTURES
(Professional Elective - III)

Course Code: A3161   **L   T   P   C**
                                                               4   0   0   4

SYLLABUS

UNIT – I   **(10 Lectures)**
INTRODUCTION: Historic development, General principles of pre stressing pre tensioning and post tensioning.Advantages and limitations of pre stressed concrete, Materials, High strength concrete and high tensile steel their characteristics. I.S. Code provisions, Methods and Systems of Pre stressing; Pre-tensioning and post tensioning methods, Analysis of post tensioning. Different systems of pre stressing like Hoyer System, Magnel System Freyssinet system and Gifford – Udall System.

UNIT – II   **(11 Lectures)**
LOSSES OF PRESTRESS: Loss of pre stress in pre-tensioned and post-tensioned members due to various causes likeelastic shortage of concrete, shrinkage of concrete, creep of concrete, Relaxation of steel, slip in anchorage bending of member and frictional losses.

UNIT – III   **(13 Lectures)**
ANALYSIS OF SECTIONS FOR FLEXURE; Elastic analysis of concrete beams pre stressed with straight, concentric,eccentric, bent and parabolic tendons.
DESIGN OF SECTIONS FOR FLEXURE AND SHEAR: Allowable stress, Design criteria as per I.S. Code. Elastic design ofsimple rectangular and I-section for flexure, shear, and principal stresses, design for shear in beams, Kern - lines, cable profile.

UNIT – IV   **(12 Lectures)**
ANALYSIS OF END BLOCKS: Analysis of end blocks by Guyon's method and Mugnel method, Anchorage zone trusses,approximate method of design, Anchorage zone reinforcement, Transfer of pre stress pre-tensioned members.
COMPOSITE SECTION: Introduction, Analysis of stress, Differential shrinkage, General designs considerations.

UNIT – V   **(12 Lectures)**
DEFLECTIONS OF PRESTRESSED CONCRETE BEAMS: Importance of control of deflections, factors influencingdeflections, short term deflections of un cracked members prediction of long term deflections.

TEXT BOOKS:
1. Krishna Raju (2006), *Pre stressed Concrete*, Tata Mc. Graw Hill Publications, New Delhi, India.
2. S. Ramamrutham(1994), *Pre stressed Concrete*, 2nd edition, Dhanpat Rai & Sons, New Delhi, India.
3. Pandit.G.S. and Gupta.S.P(2012), "Prestressed Concrete", CBS Publishers and Distributers Pvt. Ltd

REFERENCE BOOKS:
1. T. Y. Lin, Ned H. Burns (1981), Design of Pre stressed concrete structures, 3rd Edition, John Wiley & Sons, United States of America.
2. Dayartatnam (1985), Prestressed Concrete Structures, Oxford IBH Publishing Company, New Delhi, India.
3. Rajagopalan.N(2002), "Prestressed Concrete", Narosa Publishing House.
4. IS1343:1980, Code of Practice for Prestressed Concrete, Bureau of Indian Standards, New Delhi

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CEVII Semester   **VCE-R15**

INDUSTRIAL STRUCTURES
(Professional Elective - III)

Course Code: A3162

L	T	P	C
4	0	0	4

Course Overview:

Commercial construction can take many forms and often includes a multitude of complex systems with specific plant and equipment requirements. These commercial buildings can include high, medium or low rise office or apartment buildings, hospitals and institutional buildings, shopping centers, sporting facilities and warehouse industrial sheds. Each project has characteristic structural forms and resultant methods of construction. This subject investigates the various structural design concepts and their influence on construction

Prerequisite(s):NIL

Course Outcomes:

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

CO1.   Discuss the planning and functional requirements of Industrial structures.

CO2.   Discover the need to learn about the design concepts, and constructional aspects of Industrial structures.

CO3.   Evaluate the importance of various construction materials for Industrial constructions.

CO4.   Design portal frames, tower cranes and bracing system in Industrial buildings.

CO5.   Analyze structural elements used in pre-cast construction including fabrication, erection and installation.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CEVII Semester   **VCE-R15**

INDUSTRIAL STRUCTURES
(Professional Elective - III)

Course Code: A3162

L	T	P	C
4	0	0	4

SYLLABUS

UNIT – I   **(10 Lectures)**
CONNECTIONS: Design of Frame, seated moment resisting connections (both welded and bolted).

UNIT – II   **(12 Lectures)**
ANALYSIS OF FRAMES: Analysis of Pitched (Gable) Portal frames, Assumptions, Bending Moment and Shear Forcediagrams.

UNIT – III   **(13 Lectures)**
GIRDERS: Analysis and design of gantry girders, Steel Bracket design.
DESIGN OF FRAMES: Design of portal frame (dead live and wind loads).

UNIT – IV   **(12 Lectures)**
TOWERS: Towers, Principles of Analysis and Design of Lattice towers, Transmission towers. Design of latic towers andtransmission towers (only sessional work).

UNIT – V   **(10 Lectures)**
ANALYSIS OF MILL BLENDS: Introduction, Analysis of Mill Bends.

TEXT BOOKS:
1. Purushothaman,P.(2004), "Reinforced Concrete Structural Elements", 3 rd Edition, Tata Mc Graw-Hill Publishing Co

REFERENCE BOOKS:
1. M. Raghupati (2000), Design of Steel Structures, Mc Graw Hill Education Pvt. Ltd, New Delhi, India.

B. Tech. CEVII Semester   **VCE-R15**

PAVEMENT ANALYSIS AND DESIGN
(Professional Elective - IV)

Course Code: A3163

L	T	P	C
4	0	0	4

Course Overview:

In structural design the stresses due traffic loading and temperature are estimated, and the thickness of the pavement is designed in such a way that these developed stresses/ strains are below the allowable values. The current practice of pavement design, more popularly, is known as Mechanistic-Empirical pavement design and is followed by a number of organizations around the world (Asphalt Institute 1999, Shell 1978, Austroads 1992, NCHRP 2005, IRC 2001). It is mechanistic pavement design because it uses stress/ strain of a pavement structure using mechanics based principle, and, as well, it is empirical because the expected life for a given stress/ strain level is estimated from empirical relationships obtained from laboratory or field performance studies. The pavement design approach is not governed by the maximum amount of load that the pavement can sustain, rather, it estimates the number of standard load repetitions that can cause failure

Prerequisite(s): Transportation Engineering

Course Outcomes:

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

CO1. Design a system to meet the needs within the realistic constraints such as environment, safety, sustainability and economic viability

CO2. Utilize the techniques, skills, and modern engineering tools necessary for engineering practice

CO3. Identify, analyze, and solve problems related to structural design of the flexible and the rigid runway and taxiway pavements

CO4. Discuss necessity and introduce various ground improvement methods.

CO5. Understand concept of soil modification and its suitability as ground improvement method.

CO6. Relate knowledge on various types of properties, uses, and variety of materials important in Construction

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CEVII Semester   VCE-R15

1
(Professional Elective - IV)

Course Code: A3001   L   T   P   C

4   0   0   4

SYLLABUS

UNIT – I   **(10 Lectures)**
Types of pavement, Factors affecting design of pavements, wheel loads. ESWL Concept - tyre pressure, contact pressure, Material characteristics. Environmental and other factors. Traffic Analysis: ADT, AADT, Truck Factor, Growth Factor, Lane, Directional Distributions & Vehicle Damage Factors, Effect of Transient & Moving Loads.

UNIT – II   **(11 Lectures)**
Stresses in pavements: flexible pavement, layered systems concept, one layer system, Bossiness Two layer system, Burmister Theory for Pavement Design. Stresses in rigid pavements, relative stiffness of slab, modulus of sub-grade reaction, stresses due to warping, stresses due to loads, stresses due to friction.

UNIT – III   **(12 Lectures)**
PAVEMENT DESIGN: CBR Method of Flexible Pavement Design, IRC method of flexible pavement design. AASHO Method of Flexible Pavement design and IRC method of rigid pavement design. Importance of Joints in Rigid Pavements, Types of Joints, Use of Tie Bars and Dowell Bars.

UNIT – IV   **(13 Lectures)**
HIGHWAY MATERIALS: Soil, Aggregate and Bitumen- Tests on aggregates – Aggregate Properties and their Importance, Tests on Bitumen, Bituminous Concrete, Requirements of Design Mix, Marshall's Method of Bituminous Mix design.
Highway construction – Construction of Earth Roads, Gravel Roads, WBM Roads, Bituminous Pavements and Cement Concrete Roads, Reinforced Concrete Pavements. Super pave pavements
DESIGN OF PAVEMENT FOR LOW/ HIGH VOLUME ROADS: Pavement design for low volume roads, Rural road designs – code of practices.

UNIT – V   **(12 Lectures)**
Need for Highway Maintenance, Pavement Failures - Failures in Flexible Pavements - Types and Causes. Rigid Pavement Failures - Types and causes, Pavement Evaluation, Benkelman Beam method, Strengthening of Existing Pavements, Types of Overlays, Suitability, Design of Overlays

TEXT BOOKS:
1. S. K. Khanna & C. J. Justo (2000), *Highway Engineering*, 7th Edition, Nemchand & Bros, New Delhi, India.
2. Rangwala (2011), *Highway Engineering*, Charotar, India.

REFERENCE BOOKS:
1. Yoder & wit zorac (2001), *Principles of pavement design*, John Wiley & Sons, New Delhi, India.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

DESIGN AND DRAWING OF IRRIGATION STRUCTURES
(Professional Elective - IV)

Course Code: A3164

L	T	P	C
4	0	0	4

Course Overview:

A structural drawing, a type of engineering drawing, is a plan or set of plans for how a building ... The structural drawings communicate the design of the building's structure to the building authority to review.

This subject gives an insight into the various hydraulic structures in civil engineering. The subject is divided into two parts. Part A deals with reservoir planning, gravity and earthen dams. This part is having both theory and problems. Part B consists of design and drawing of minor irrigation structures namely surplus weir, canal regulator, tank sluice, canal drop and aqueduct.

Prerequisite(s): NIL

Course Outcomes:

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

CO1.   Make use of the knowledge and skills in fluid mechanics, hydraulics and hydrology.

CO2.   Show the importance, location, components and types of irrigation structures.

CO3.   Select the most appropriate hydraulic structure for a specific problem with location into consideration.

CO4.   Design safe and economical hydraulic structure.

CO5.   Adapt students to professional practice and design codes.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CEVII Semester   **VCE-R15**

DESIGN AND DRAWING OF IRRIGATION STRUCTURES
(Professional Elective - IV)

Course Code: A3164

L	T	P	C
4	0	0	4

SYLLABUS

UNIT – I   **(12 Lectures)**
SLOPING GLACIS WEIR: Design and Drawing of Sloping glacis weir

UNIT – II   **(12 Lectures)**
TANK SLUICE WITH TOWER HEAD: Design and drawing of tank sluice with tower head.

UNIT – III   **(13 Lectures)**
TYPE - III SIPHON AQUEDUCT: Design and drawing of Type - III siphon aqueduct.
CANAL REGULATOR: Design and drawing of Canal regulator.

UNIT – IV   **(12 Lectures)**
SURPLUS WEIR: Design and drawing of surplus weir.

UNIT – V   **(11 Lectures)**
NOTCH FALL: Design and drawing of trapezoidal notch fall.

TEXT BOOKS:

1. C. Satyanarayana Murthy (2006), *Water Resources engineering principles and practices*, New Age International, New Delhi, India.
2. S. K. Garg (1991), *Irrigation engineering and Hydraulic structures*, Standard Book House, India.

REFERENCE BOOKS:

1. Satyanarayana Murthy C.(1990),*Design of minor irrigation and canal structures, (3rd edition)* Wiley eastern Ltd.
2. Garg S.K.,*Irrigation engineering and Hydraulic structures, (1st edition)* Standard Book House, 2006.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

SOLID WASTE MANAGEMENT
(Professional Elective - IV)

Course Code: A3165   **L   T   P   C**
                                                                           4   0   0   4

Course Overview:

Due to rapid increase in the production and consumption processes, societies generate as well as reject solid materials regularly from various sectors - agricultural, commercial, domestic, industrial and institutional. The considerable volume of wastes thus generated and rejected is called solid wastes. In other words, solid wastes are the wastes arising from human and animal activities that are normally solid and are discarded as useless or unwanted. This inevitably places an enormous strain on natural resources and seriously undermines efficient and sustainable development

Prerequisite(s): Environmental science, Environmental engineering

Course Outcomes:

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

CO1.   Identify sources of solid waste and interpret the criteria for the classification of a substance as solid/hazardous wastes.

CO2.   Find routes for collection and transfer solid waste using different collection services, transport means and methods

CO3.   Assess and develop various waste processing, treatment options for the control of solid, hazardous wastes and select reuse options of solid waste

CO4.   Recognize and choose waste minimization, source reduction practices using 5R's Technique and understand the Solid waste management rules and regulations.

CO5.   Define and explain diverse waste disposal techniques including composting and landfill operations.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CEVII Semester   **VCE-R15**

SOLID WASTE MANAGEMENT
(Professional Elective - IV)

Course Code: A3165   **L   T   P   C**

                                                                        4   0   0   4

SYLLABUS

UNIT- I   **(12 Lectures)**
INTRODUCTION TO MUNICIPAL SOLID WASTE: Definition - Sources and Impacts of solid waste on environment, Classification of solid waste- composition and its determinants of Solid waste-factors influencing generation quantity assessment of solid wastes-methods of sampling and characterization.

UNIT- II   **(12 Lectures)**
COLLECTION AND TRANSFER SOLID WASTE: Collection: Collection of Solid waste – collection services – collection system, equipments – time and frequency of collection – labor requirement – factors affecting collection – analysis of collection system – collection routes – preparation of master schedules. Transfer and Transport: Need for transfer operation – transfer stations – types – transport means and methods – location of transport stations - Manpower requirement – collection routes: Transfer stations – selection of location, types & design requirements, operation & maintenance.

UNIT- III   **(12 Lectures)**
WASTE PROCESSING AND REUSE: Processing Technologies Biological, chemical conversion technologies and Thermal conversion technologies B: Reuse of Solid Waste [6 Periods] Energy recovery – Incineration – Solidification and stabilization of hazardous wastes – treatment of biomedical wastes.

UNIT- IV   **(12 Lectures)**
WASTE DISPOSAL TECHNIQUES: Introduction, composting, principles of composting, factors affecting composting, vermi composting, waste to energy techniques- Landfill technique, and design and operating procedure of landfill

UNIT- V   **(12 Lectures)**
SOLID WASTE MANAGEMENT TECHNIQUES: Solid waste management Hierarchy, waste avoidance /waste prevention, Definition of source Reduction, waste reduction at source using 5R's Technique, Solid waste management rules and regulations.

TEXT BOOKS:
1.   D.Bhide and B.B.Sundaresan(2001),*Solid Waste ManagementCollection, Processing and disposal*, 1 st edition Mudrashilpa Offset Printers, Nagpur

REFERENCES:
1.   K. Sasi Kumar & S. Gopi Krishna, *Solid waste management*.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CEVII Semester   **VCE-R15**

TRAFFIC ENGINEERING
(Professional Elective - IV)

Course Code: A3166   **L   T   P   C**

4   0   0   4

Course Overview:

This subject is deals with traffic planning and characteristics of roads and traffic surveys and various intersection designs and safety of environment and also deals with the traffic management**.**

Prerequisite(s):NIL

Course Outcomes:

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

CO1.   Analyze traffic problems and plan for traffic systems various uses.

CO2.   Design Channels, Intersections, signals and parking arrangements.

CO3.   Develop Traffic management Systems.

CO4.   Assess societal needs and plan suitable infrastructure

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CEVII Semester   VCE-R15

TRAFFIC ENGINEERING
(Professional Elective - IV)

Course Code: A3166

L   T   P   C
4   0   0   4

SYLLABUS

UNIT -I **(12 Lectures)**
TRAFFIC PLANNING AND CHARACTERISTICS: Road Characteristics – Road user characteristics – PIEV theory – Vehicle – Performance characteristics – Fundamentals of Traffic Flow – Urban Traffic problems in India – Integrated planning of town ,country ,regional and all urban infrastructure – Towards Sustainable approach. – Land use & transport and modal integration.

UNIY-II **(12 Lectures)**
TRAFFIC SURVEYS : Traffic Surveys – Speed, journey time and delay surveys – Vehicles Volume Survey including non-motorized transports – Methods and interpretation – Origin Destination Survey – Methods and presentation – Parking Survey – Accident analyses -Methods, interpretation and presentation – Statistical applications in traffic studies and traffic forecasting – Level of service – Concept, applications and significance.

UNIT- III **(12 Lectures)**
TRAFFIC DESIGN AND VISUAL AIDS : Intersection Design – channelization, Rotary intersection design – Signal design – Coordination of signals –– Grade separation – Traffic signs including VMS and road markings – Significant roles of traffic control personnel – Networking pedestrian facilities & cycle tracks.

UNIT-IV **(12 Lectures)**
TRAFFIC SAFETY AND ENVIRONMENT : Road accidents – Causes, effect, prevention, and cost – Street lighting – Traffic and environment hazards – Air and Noise Pollution, causes, abatement measures – Promotion and integration of public transportation – Promotion of non-motorized transport.

UNIT-V **(12 Lectures)**
TRAFFIC MANAGEMENT : Area Traffic Management System – Traffic System Management (TSM) with IRC standards –- Traffic Regulatory Measures-Travel Demand Management (TDM) – Direct and indirect methods – Congestion and parking pricing – All segregation methods- Coordination among different agencies – Intelligent Transport System for traffic management, enforcement and education.

TEXT BOOKS:

1. Kadiyali.L.R.(2013)*Traffic Engineering and Transport Planning*, Khanna Publishers, Delhi
2. Indian Roads Congress (IRC) Specifications: Guidelines and Special Publications on Traffic Planning and Management.
3. Salter. R.I and Hounsell N.B(1996), *Highway Traffic Analysis and design*, Macmillan Press Ltd

REFERENCES:

1. Fred L. Mannering, Scott S. Washburn and Walter P.Kilareski(2011), *Principles of Highway Engineering and Traffic Analysis*, Wiley India Pvt. Ltd., New Delhi
2. Garber and Hoel(2010), *Principles of Traffic and Highway Engineering*, CENGAGE Learning, New Delhi
3. SP:43-1994, IRC Specification, Guidelines on Low-cost Traffic Management Techniques for Urban Areas, 1994
4. John E Tyworth(1996), *Traffic Management Planning, Operations and control*, Addison Wesly Publishing Company

5. Hobbs.F.D(2005). *Traffic Planning and Engineering*, University of Brimingham, Peragamon Press Ltd
6. 6. Taylor MAP and Young W(1998), *Traffic Analysis – New Technology and New Solutions*, Hargreen Publishing Company

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CEVII Semester   **VCE-R15**

ADVANCED TECHNICS IN CIVIL ENGINEERING
(Professional Elective - IV)

Course Code: A3180

L	T	P	C
4	0	0	4

Course Overview:

This subject is deals with traffic planning and characteristics of roads and traffic surveys and various intersection designs and safety of environment and also deals with the traffic management**.**

Prerequisite(s):NIL

Course Outcomes:

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

CO1.   Analyze traffic problems and plan for traffic systems various uses.

CO2.   Design Channels, Intersections, signals and parking arrangements.

CO3.   Develop Traffic management Systems.

CO4.   Assess societal needs and plan suitable infrastructure

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CEVII Semester   **VCE-R15**

ADVANCED TECHNICS IN CIVIL ENGINEERING
(Professional Elective - IV)

Course Code: A3180   **L   T   P   C**

                                                                                                   4   0   0   4

SYLLABUS

Unit I. Design of Structural Elements by using MatLab   **(12 Lectures)**

Design of beam, Design of slab, Design of column, Design of footing

Unit II. FRP strengthening   **(12 Lectures)**

Overview of FRP composites, Strengthening design with FRP composites.

Unit III. Site Investigation using Non-Destructive Tests   **(12 Lectures)**

Multi Channel Assessment of Seismic Waves (MASW)-Ground Penetrating Radar (GPR)-Dynamic cone penetration test-Nuclear gauge method- Light weight deflectometer test.

Unit IV. 3D Printing   **(12 Lectures)**

Introduction to 3D printing, Rapid Prototyping, 3D Printing, Additive Manufacturing, Synonyms of Additive Manufacturing, Additive Manufacturing Process Flow, Additive Manufacturing cabilities, Additive manufacturing Limitations, STL File creation and correction.

Unit V. Environmental Auditing.   **(12 Lectures)**

Environmental Audit & Environmental legislation objectives of Environmental Audit, Types of environmental Audit, stages of Environmental Audit, onsite activities, evaluation of Audit data and preparation of Audit report. Post Audit activities.

TEXT BOOKS:

1. Y. Anjaneyulu (2011), *Environmental Impact Assessment Methodologies*, B.S. Publication, Sultan Bazar, Hyderabad.
2. Ian Gibson, David Rosen, Brent Stucker (2015),*Additive ManufacturingTechnologies3D Printing, Rapid Prototyping and Direct Digital Manufacturing Second Edition*, Springer Publication.
3. Hayder A. Rasheed, *Strengthening Design of Reinforced concrete with FRP*, CRC press, Taylor &Francis group

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CEVII Semester   **VCE-R15**

CONCRETE AND HIGHWAY ENGINEERING LAB

Course Code: A3131

L	T	P	C
0	0	3	2

Course Overview:

The behavior and properties of structural materials, e.g. concrete, asphalt and steel can be better understood by detailed, well-designed, firsthand experience with these materials. The students will become familiar with the nature and properties of these materials by conducting laboratory tests. These tests have been selected to illustrate the basic properties and methods of testing of cement, aggregates, paste, mortar, concrete, asphalt and steel. Test procedures, sometimes simplified because of time limitation, are mostly those outlined by the Indian Standards.

Prerequisite(s):NIL

Course Outcomes:

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

CO1.   Experiment with highway materials and interpret results

CO2.   Examine the properties of bitumen.

CO3.   Find the fresh and hardened properties of concrete.

CO4.   Analyze the mechanical properties of concrete.

CO5.   Demonstrate the non-destructive testing methods.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CEVII Semester   **VCE-R15**

CONCRETE AND HIGHWAY ENGINEERING LAB

Course Code: A3131   **L   T   P   C**

                                                                           0   0   3   2

LIST OF EXPERIMENTS

I.   ROAD AGGREGATES:

1. Aggregate Crushing value.
2. Aggregate Impact Test
3. Specific Gravity and Water Absorption.
4. Attrition Test.
5. Abrasion Test.
6. Shape tests.

II.   BITUMINOUS MATERIALS:

7. Penetration Test.
8. Ductility Test.
9. Softening Point Test.
10. Flash and fire point tests.

III.   CEMENT AND CONCRETES:
TEST ON CEMENTS:

11. Normal Consistency of fineness of cement.
12. Initial setting time and final setting time of cement.
13. Specific gravity and soundness of cement.
14. Compressive strength of cement.
15. Workability test on concrete by compaction factor, Slump and Vee-bee.
16. Young's modulus and compressive strength of concrete.
17. Bulking of sand.
18. Non- Destructive testing on concrete (for demonstration).

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CEVII Semester   **VCE-R15**

GEOGRAPHICAL INFORMATION SYSTEMS LAB

Course Code: A3132

L	T	P	C
0	0	3	2

Course Overview:

GIS (Geographic Information Systems) is a computer-based tool that uses spatial (geographic) data to analyze and solve real-world problems. This course is designed to introduce the student to the basic principles and techniques of GIS. The lab material will emphasize GIS data collection, entry, storage, analysis, and output using ArcGIS.

Prerequisite(s):NIL

Course Outcomes:

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

CO1.   Interpret images and prepare thematic maps.

CO2.   Identify the different features from imageries and understand the map languages.

CO3.   Prepare the different geospatial layers.

CO4.   Compute geometric measurements and perform spatial analysis.

CO5.   Plan reservoirs and any water storage structure for particular area

B. Tech. CEVII Semester   **VCE-R15**

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CEVII Semester   **VCE-R15**

GEOGRAPHICAL INFORMATION SYSTEMS LAB

Course Code: A3132   **L   T   P   C**

                                                                                  0   0   3   2

LIST OF EXPERIMENTS

1. Familiarization with GIS Software, Data Input
2. Geo Referencing and Projections
3. Digitizationof Map/Toposheet
4. Creation of Thematic Maps
5. Base Map Preparation
6. Data Conversion – Vector to Raster, Raster to Vector
7. Adding Attribute Data – Querying On Attribute Data
8. Vector Analysis
9. Raster Analysis
10. Map Composition
11. Developing Digital Elevation Model
12. Simple Applications of GIS inWater Resources Engineering& Transportation Engineering

SYLLABI FOR
VIII SEMESTER

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CEVIII Semester   **VCE-R15**

MANAGEMENT SCIENCE

Course Code: A3014   L   T   P   C
                                                                                                3   1   0   3

Course Overview:

Prerequisite(s):NIL

Course Outcomes:

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

CO1.

CO2.

CO3.

CO4.

CO5.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CEVIII Semester   **VCE-R15**

MANAGEMENT SCIENCE

Course Code: A3014

L	T	P	C
3	1	0	3

SYLLABUS

UNIT I   **(12 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 - Organization structures (Line organization, Line and staff organization, Functional organization, Committee organization, Matrix organization)

UNIT II   **(12 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   **(12 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   **(12 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   **(12 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(2009), *Management Science 4th edition*, TMH,

REFERENCES:
1. Koontz &weihrich(2010), *Essentials of management*, TMH
2. Stoner, Freeman, Gilbert(2004), *Management*, 6th edition Pearson education, New Delhi
3. O.P. Khana, *Industrial engineering and Management*
4. L.S.Srinath, *PERT & CPM* .

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CEVIII Semester   **VCE-R15**

REHABILITATION AND RETROFITTING STRUCTURES
(Professional Elective - V)

Course Code: A3167   **L   T   P   C**

                                                                     4   0   0   4

Course Overview:

This course is offered to undergraduate students it deals with a knowledge of Distress and deterioration of concrete may be caused by many different factors such as accidental loading, chemical reactions, corrosion of embedded metal, freezing and thawing, and inadequate construction or design. This course provides guidance on evaluating the condition of the concrete in a structure, relating the condition of the concrete to the underlying cause or causes of that condition, selecting an appropriate repair material and method for any deficiency found, using the selected materials and methods to repair or rehabilitate the structure, and preparing concrete investigation reports for repair and rehabilitation projects. The purpose of this course is to provide guidance on evaluation and repair of concrete structures

Prerequisite(s): Design of reinforced concrete structures , concrete technology

Course Outcomes:

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

CO1.   Develop various maintenance and repair strategies.

CO2.   Categorize the causes and prevention mechanisms of corrosion in steel reinforcement and fire induced damages.

CO3.   Estimate the structural damage and recommend suitable repair and strengthening methods.

CO4.   Understand and use the different techniques for structural retrofitting.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CEVIII Semester   **VCE-R15**

REHABILITATION AND RETROFITTING STRUCTURES
(Professional Elective - V)

Course Code: A3001

L	T	P	C
4	0	0	4

SYLLABUS

Unit– I   **(12 Lectures)**
INTRODUCTION: rehabilitation, repair, retrofit and strengthening, need for rehabilitation of structures, Deterioration of Structures, Distress in Structures, causes and Prevention.
CRACKS IN R.C. BUILDINGS: Various cracks in R.C. buildings, causes and effects, Mechanism of Damageand Types of Damage.
MAINTENANCE: Maintenance importance of maintenance, routine and preventive maintenance.
DAMAGES TO MASONRY STRUCTURES: Various damages to masonry structures and causes

UNIT – II   **(12 Lectures)**
REPAIR MATERIALS: Various repair materials, Criteria for material selection, Methodology of selection, Health and safety precautions for handling and applications of repair materials

SPECIAL MORTARS AND CONCRETES: Polymer Concrete and Mortar, Quick setting compounds
GROUTING MATERIALS: Gas forming grouts, Salfo-alumate grouts, Polymer grouts, Acrylate grouts and Urethane grouts.
BONDING AGENTS: Latex emulsions, Epoxy bonding agents.
PROTECTIVE COATINGS: Protective coatings for Concrete and Steel FRP sheets
CORROSION OF STEEL REINFORCEMENT: Corrosion of embedded steel in concrete, Mechanism, Stages of corrosion damage, Repair of various corrosion damaged of structural elements (slab, beam and columns). Damage of Structures due to Fire - FireRating of Structures, Phenomena of Desiccation.

UNIT – III   **(12 Lectures)**
SUBSTRATE PREPARATION: Importance of substrate/surface preparation, General surface preparation methods and procedure, Reinforcing steel cleaning
CRACK REPAIR: Various methods of crack repair, Grouting, Routing and sealing, Stitching, Dry packing, Autogenous healing, Overlays, Repair to active cracks, Repair to dormant cracks
REPAIRS AND MAINTENANCE: Repair of Structure, Common Types of Repairs, Repair in Concrete Structures, Repairsin Under Water Structures, Guniting, Shot Create, Underpinning. Inspection and Testing - Symptoms and Diagnosis of Distress, Damage assessment, NDT.

UNIT - IV   **(12 Lectures)**
STRENGTHENING OF STRUCTURES: Strengthening Methods- Beam shear strengthening, Flexural strengthening, retrofitting, Jacketing- Column jacketing, Beam jacketing, Beam Column joint jacketing, reinforced concrete jacketing, Steel jacketing, FRP jacketing.

UNIT - V   **(12 Lectures)**
DAMAGE DIAGNOSIS AND ASSESSMENT: Visual inspection, Non-Destructive Testing using Rebound hammer, ultra sonic pulse velocity, Semi destructive testing, Probe test, Pull out test, Chloride penetration test, Carbonation, Carbonation depth testing, Corrosion activity measurement
HEALTH MONITORING OF STRUCTURES: Use of Sensors, Building instrumentation.

TEXT BOOKS:

1. James Douglas, Bill Ransom (2007), *Understanding Building Failures*, 3rd edition, Taylor and Francis, USA.
2. B. A. Richardson (1991), *Building Failures: Diagnosis and Avoidance*, EF & N Spon, London.

REFERENCE BOOKS:

1. Barry A. Richardson (2001),*Defects and Deterioration in Buildings*, E F & N Spon, London.

2. B. L. Gupta, Amit Gupta (2007), *Maintenance and Repair of CIVIL Structures*, Standard Publications, India.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

INDUSTRIAL WASTE AND WASTE MANAGEMENT
(Professional Elective - V)

Course Code: A3168

L	T	P	C
4	0	0	4

Course Overview:

To protect the environment pollution should be prevented and controlled". With Industrialization the pollution has enormously increased. Different ways – Solid, Liquid and Gaseous are generated.

This course incorporates the Management of Industrial Wastes viz. Liquid wastes. The Industrial processes and the sources of their wastes are discussed. Treatment and proper disposal of Industrial waste water have been discussed

Prerequisite(s):NIL

Course Outcomes:

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

CO1.   Understand quality requirements of water in various industries and Basic Theories of Industrial Waste water Management.

CO2.   Identify Problems of Industrial waste water discharges into environment and water.

CO3.   Explain manufacturing Process and origin of liquid waste from different industries and inspect Special Characteristics, Effects and treatment methods.

CO4.   Examine advantages, suitability and limitations of Common effluent treatment plants.

CO5.   Propose possible Effluent Disposal Methods.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CEVIII Semester   **VCE-R15**

INDUSTRIAL WASTE AND WASTE MANAGEMENT
(Professional Elective - IV)

Course Code: A3168   **L   T   P   C**
                                                                            4   0   0   4

SYLLABUS

UNIT – I   **(12 Lectures)**
QUALITY OF WATER AND WATER MANGEMENT: Quality requirements of boiler and cooling waters, Quality requirements of process water for Textiles, Food processing and Brewery Industries, Boiler and cooling water treatment methods. Basic Theories of Industrial Waste water Management, Volume reduction and Strength
Reduction. Neutralization, Equalization and proportioning. Joint treatment of industrial wastes, consequent problems.

UNIT – II   **(12 Lectures)**
EFFLUENT DISCHARGE AND ITS PROBLEMS: Industrial waste water discharges into streams, Lakes and oceans and problems, Recirculation of Industrial Wastes, Use of Municipal Waste Water in Industries.

UNIT – III   **(12 Lectures)**
TEXTILE, PAPER AND PULP, THERMAL POWER PLANTS: Manufacturing Process and origin of liquid waste from Textiles, Paper and Pulp industries, Thermal Power Plants and Tanneries, Special Characteristics, Effects and treatment methods.
FERTILIZER, DISTILLERY AND DAIRY INDUSTRIES: Manufacturing Process and origin of liquid waste from Fertilizers, Distillers, and Dairy, Special Characteristics, Effects and treatment methods.

UNIT – IV   **(12 Lectures)**
SUGAR, STEEL, REFINERY AND PHARMACEUTICAL PLANTS: Manufacturing Process and design origin of liquid waste from Sugar Mills, Steel Plants, Oil Refineries, and Pharmaceutical Plants, Special Characteristics, Effects and treatment methods.

UNIT – V   **(12 Lectures)**
COMMON EFFLUENT TREATMENT PLANTS: Advantages and Suitability, Limitations, Effluent Disposal Methods.

TEXT BOOKS:
1. M. N. Rao, Dutta (2009), *Waste Water Treatment*, Oxford & IBH, New Delhi.

REFERENCE BOOKS:
1. Met Calf, Eddi (1979), *waste water engineering*, Mc Graw-Hill Publications, New Delhi, India.
2. Mark J. Hammer, Mark J. Hammer (2008), *Water and Waste Water technology*, Prentice Hall, New York.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

URBAN PLANNING AND INFORMATION SYSTEMS
(Professional Elective - IV)

Course Code: A3169   **L   T   P   C**
                                                                                        4   0   0   4

Course Overview:

This course explores important substantive areas and concepts in the field of urban and regional planning and current urban planning and policy issues and debates

Prerequisite(s): Transportation engineering

Course Outcomes:

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

CO1.   DEVELOP their skills in conducting research, applying source material, discussing general information, and APPLYING logical process when writing.

CO2.   Oral presentations and debating arguments will be PRIORITISED as a tool of coming to a personal conclusion in regard to policy proposals based on educated and research substantiated ground.

CO3.   RELATE various fields within planning, such as housing, community development, transportation, environmental planning, urban sprawl and growth management.

CO4.   BUILD an understanding of and commitment to ethical standards for conducting research, for reporting findings, and implementing the results of those findings, including

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

URBAN PLANNING AND INFORMATION SYSTEMS
(Professional Elective - V)

Course Code: A3169   **L   T   P   C**
                                                                                            4   0   0   4

SYLLABUS

UNIT - I   **(12 Lectures)**
INTRODUCTION TO PLANNING: background and principles; Need for planning; Urbanization and its impact, Distribution of land use/land cover; Town planning in ancient India and new towns of India; Requirements and possible types of development of towns; Geo informatics application in Urban Planning

UNIT – II   **(12 Lectures)**
FORMULATION OF PLANS: Objectives and contents, Regional plan, Perspective plan, Master plan, Development plan, Project (scheme) plan, Delineation of planning area, Trend analysis, Land suitability analysis, Land use planning, Zoning and principles of zoning, Building Bye-laws and its principles, Requirement of urban & regional planners, Remote sensing for different levels of development planning.

UNIT - III   **(12 Lectures)**
IMPORTANCE OF HOUSING; Urban housing demand and production, Slums and squatters, Housing problem in India. National Housing policy; Site analysis, Layout design, Housing projects / Slum housing. Urban renewal projects, urban infrastructure planning

UNIT - IV   **(12 Lectures)**
TRANSPORTATION PLANNING: Classification of urban roads, Traffic surveys: speed, time, delay surveys. Use of speed, journey time and delay studies. Traffic volume, Origin Destination surveys, Parking surveys, Utility of remote sensing in traffic and transportation studies

UNIT - V   **(12 Lectures)**
URBAN INFORMATION SYSTEM: Land; Housing; Transportation; Infrastructure; Trends in mapping using remote sensing, GIS and GPS; Database creation for Infrastructure development Decision support system for urban and regional management

TEXT BOOKS:
1. Rangwala (2009), Town Planning, Charotar Publishing House, Anand, India
2. Gallian B. Arthu and Simon Eisner (1975), The Urban Pattern, City Planning and Design, van Nostrand.
3. Margaret Roberts (1974), Introduction to Town Planning Techniques, Hutchinson, London.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CEVIII Semester   **VCE-R15**

ADVANCED FOUNDATION ENGINEERING
(Professional Elective - V)

Course Code: A3175

L	T	P	C
4	0	0	4

Course Overview:

This subject is introduced to give in depth knowledge regarding foundation engineering. The basic principles of foundation analysis are explained with the help of the classical theories. The types of foundations and its failures are explained in detail together with the necessary remedial measures to be adopted. The subject deals deeply with regard to both shallow and deep foundations and their design philosophies.

Prerequisite(s):NIL

Course Outcomes:

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

CO1.   Analyze the soil bearing capacity against different types of foundation failure.

CO2.   Design shallow foundations with settlement and bearing capacity considerations.

CO3.   Illustrate the use and field specific applications of deep foundations and to design the same.

CO4.   Explain the need, necessity and procedure of installation of well foundations.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CEVIII Semester **VCE-R15**

ADVANCED FOUNDATION ENGINEERING
(Professional Elective - V)

Course Code: A3175

L T P C
4 0 0 4

SYLLABUS

UNIT -I **(12 Lectures)**
ART OF FOUNDATION ENGINEERING: Bearing Capacity - Theories of Terzaghi, Meyerhof, Brinch Hansen. Penetration tests, Plate load tests, Factors;
Settlement Analysis - Stresses in soil, Immediate and consolidation settlement control of excessive settlement.
Foundation Failures - Types and causes of failures, Remedial measures, Shoring and Underpinning.

UNIT –II **(12 Lectures)**
SHALLOW FOUNDATIONS: Foundation classification; Choice of foundations; Isolated foundations – individual and combined foundations, Raft foundations - Necessity; Types of rafts; Bearing capacity and settlement of rafts

UNIT –III **(12 Lectures)**
PILE FOUNDATIONS: Classification and Uses, Carrying capacity of Single pile, Pile load tests, cyclic pile load test, pull out resistance, laterally loaded Piles; Pile groups – Group efficiency, Settlement of single pile and pile groups, Negative skin friction, sharing of loads

UNIT –IV **(12 Lectures)**
DESIGN OF SHALLOW AND DEEP FOUNDATIONS: Limit state design of reinforced concrete in foundations; Soil pressure for structural design; Conventional structural design of continuous footings, individual footings – Eccentrically loaded footings; combined footings; Pile foundations - Structural design of piles including pile caps; Design of pile groups.

UNIT –V **(12 Lectures)**
WELL FOUNDATIONS: CAISSONS – Types, advantages and disadvantages, Shapes and component parts, Grip length, Bearing capacity and settlement, Forces acting, Sinking of wells, Rectification of Tilts and Shifts, Lateral stability - Terzaghi's method and IRC method

TEXT BOOKS:
1. J. E. Bowles, *Foundation Analysis & Design*, McGraw Hill Book Co.
2. W. C. Teng, *Foundation Design*, Prentice Hall of India Ltd.

REFERENCE BOOKS:

1. Tomlinson, *Foundation Design and Construction*, ELBS, Longman Group Ltd.
2. Winterkorn Z and Fang, *Foundation Engineering Hand Book*, Van Nostrand Reinhold Co.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CE VI/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): Object oriented Programming
                             Discrete Mathematical Structures

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. . CE 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*, 3rd Edition, Tata McGraw-Hill, New Delhi, India.
2. Abraham Silberschatz, Henry F. Korth, S. Sudarshan (2010), *Database System Concepts,* 6th 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)

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. . CE 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. (Chapter1: T1)

UNIT – II   **(Lectures 8)**
IMAGE TRANSFORMS:
Fourier transform, DFT, DFT-properties , FFT, WALSH transform, HADAMARD transform, DCT.
(chapter2: T1,R2)

UNIT – III   **(Lectures 11)**
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. (chapter3: T1)

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. (chapter4: T1,R1)

UNIT – V   **(Lectures 13)**
IMAGE SEGMENTATION:
Detection of discontinuities, edge linking and boundary detection, thresholding, region based segmentation, use of motion in segmentation. (Chapter5: T1)
COLOR IMAGE PROCESSING:
Fundamentals, models, pseudo color image, color transformation, Fundamentals of image compression, image compression models, and color image compression. (Chapter5: T1,R1)

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. . CE 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. . CE 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 (T1: Ch-1, 2)

UNIT – II   **(12 Lectures)**
PROCESS MANAGEMENT: Process concepts- Operations on processes, IPC, Process Scheduling (T1: Ch-3, 5).
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 (T1: Ch-6).

UNIT – III   **(11 Lectures)**
DEADLOCKS: System model, deadlock characterization, deadlock prevention, avoidance, detection and recovery from deadlock. (T1: Ch-7)
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. (T1: Ch-8, 9)

UNIT – IV   **(10 Lectures)**
STORAGE MANAGEMENT: File system-Concept of a file, access methods, directory structure, file system mounting, file sharing, protection. (T1: Ch-10)
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 (T1: Ch-12).

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. (T1: Ch-13)
SECURITY: System security-The security problem, program threats, system and network threats, implementing security defenses, firewalling to protect systems(T1: Ch -18).

TEXT BOOKS:
1. Abraham Silberschatz, Peter Baer Galvin, Greg Gagne (2009), Operating System Concepts, 8th Edition, Wiley India Private Limited, New Delhi.

REFERENCE BOOKS:
1. Stallings(2006), Operating Systems, Internals and Design Principles, 5th Edition, Pearson Education, India.
2. Andrew S. Tanenbaum (2007), Modern Operating Systems, 2nd Edition, Prentice Hall of India, India.
3. Deitel & Deitel (2008), Operating systems, 3rd Edition, Pearson Education, India.
4. Dhamdhere (2008), Operating Systems, 2nd 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. CE 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): 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. CE 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, StringTokenizer, 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*, 8th 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*, 10th 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), 1st Edition, McGraw-Hill Education Publisher, USA.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CE 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

- 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.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. CE 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   **(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.

2. Rick Howard "Cyber Security Essentials" Auerbach Publications 2011

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

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CE 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-Commerce environment.

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 the web.

CO5.Understand legal and ethical issues related to E-Commerce and web marketing approaches.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CE 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   **(10 Lectures)**

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   **(10 Lectures)**
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:

2. 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, John Wiley.

3. E-Commerce, S.Jaiswal – Galgotia.

4. E-Commerce, Efrain Turbon, Jae Lee, David King, H.Michael Chang.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CE 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): 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 the right 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. Apply testing strategies for application being developed.

CO5. Find right set of umbrella activities for quality management and assurance.

CO6. Understand metrics in the process and project domains.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CE 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 ENGINEEIRNG: 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 METRICES: 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, 7th edition, McGraw Hill International Edition, New Delhi.

2. Sommerville (2001), Software Engineering, 9th edition, Pearson education, India.

REFERENCE BOOKS:

1. K. K. Agarval, Yogesh Singh (2007),Software Engineering,3rd edition, New Age International ublishers, India.

2. Lames F. Peters, WitoldPedrycz(2000), Software Engineering an Engineering approach, John Wiely& Sons, New Delhi, India.

3. Shely Cashman Rosenblatt (2006), Systems Analysis and Design, 6thedition, Thomson Publications, India.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

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. CE 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", 2nd Edition , Tata McGraw-Hill Publishing Company Limited, Indian Reprint 2009.
4.Steven Holzner, "PHP: The Complete Reference", 2nd Edition, Tata McGraw-Hill Publishing Company Limited, Indian Reprint 2009.
Vikram Vaswani, "MYSQL: The Complete Reference", 2nd Edition, Tata McGraw-Hill Publishing Company Limited, Indian Reprint 2009.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

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. CE 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*, 4th edition, Pearson Education/PHI, India.
2.Thomas L. Floyd (2006), *Digital fundamentals*, 9th 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*, 3rd edition, Pearson Education, India.
   Donald D.Givone (2002), *Digital Principles and Design*, Tata McGraw Hill, India.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CE 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 elating 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 students 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** a 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. CE 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)

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. CE 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
CHARACTERSTICS 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, Aryton 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, 18th edition, Dhanpat Rai & Co, New Delhi.
2. H.S.Kalsi, Electronic Instrumentation, 3rd 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, 2nd edition, Prentice Hall of India, New Delhi.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CE 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):

- 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. CE 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 Madisetti 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*", 1st Edition, Academic Press, 2014.
2. Francis daCosta, "*Rethinking the Internet of Things: A Scalable Approach to Connecting Everything*", 1st Edition, Apress Publications, 2013.
3. Daniel Kellmereit, "*The Silent Intelligence: The Internet of Things*", 2013.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CE 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. CE 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,* Addision 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. CE 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 componentswill be explained. The design of Precession 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. CE 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 , sped 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 Isoation schemes- opto coupling, buffer IC's - Protection schemes – circuit breakers , over current sensing , resetable 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.

REFERENCES :
1. Mechatronics Source Book by Newton C Braga, Thomson Publications, Chennai.
2. Mechatronics – N. Shanmugam / Anuradha Agencies Publisers.
3. Mechatronics System Design / Devdasshetty/Richard/Thomson.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

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 courseaims 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. CE 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 titled 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.
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. CE VI/VII/VIII Semester   **VCE-R15**

ENERGY MANAGEMENT AND AUDIT
(Open Elective)

Course Code: A3279

L	T	P	C
3	0	0	3

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): Knowledge of Energy systems

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. CE 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,* 1st 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*, 1st 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. CE 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):

- Environmental studies
- Metallurgy and Material science
- Production Technology-I
- Hydraulic Machines
- Refrigeration and Air Conditioning

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. CE 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 anvapor 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,7th Edition, 2012
3. Pravin Kumar, (2013), "Basic Mechanical Engineering", Edition, Pearson.
4. B K Singh (2012), Elements by Mechanical Engineering, Published by Ane Books Pvt. Ltd.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

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

- THERMODYNAMICS
- HEAT TRANSFER

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. CE 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 Clausiusstatements, 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 TRASFER: 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[th]edition, Tata McGraw-Hill, New Delhi, India.
2. YUNUS A CENGEL, (2016*), Heat and mass transfer: fundamentals & applications*, 5th 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)

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.

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, capacitative, ultrasonic, magnetic, Bubler level indicators.
FLOW MEASUREMENT: Rotameter, magnetic, Ultrasonic, Turbine flow meter, hot wire anemometer, Laser DopplerAnemometer (LDA).
MEASUREMENT OF SPEED: Mechanical Tachometers, Electrical tachometers, Stroboscope, Non-Contact type oftachometer.

UNIT - IV
STRESS STRAIN MEASUREMENTS: Introduction to stream and strain, electrical strain gauge, gaugefactor, 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 pointmeter.
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*, 4th edition, Metropolitan Book Co. Pvt Ltd., New Delhi, India**.**
2. A. K. Tayal (2004), *Instrumentation and mechanical Measurements,* 2nd edition, Galgotia Publications, New Delhi, India.

REFERENCE BOOKS:
1. Er. R. K. Jain (2011), *Mechanical and Industrial Measurements*, 12th edition, Khanna Publishers, New Delhi, India.
2. Chennakesava R. Alavala(2010), *Principles of Industrial Instrumentation and Control Systems*, 1st edition, Cengage Learning, New Delhi, India.
3. B. C. Nakra, K. K. Choudhary (2010*), Instrumentation, measurement and analysis*, 4th, Tata McGraw-Hill, New Delhi, India.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

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):

Mathematics, Numerical Methods

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. CE 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, Chrivariate 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, 1st Edition, I K International Publications, New Delhi.
2. Singireshel S Rao (2011), Engineering Optimizations, 4th Edition, Elsevier Butterworth, Heineman, USA.

REFERENCES:
1. Jasibir Arora (2016), Introduction to Optimum Design, 4th Edition, Academic press in an Imprint of Elsevier, USA.
2. N V S Raju (2014), Optimization Methods for Engineering, 1st edition, PHI Publications, New Delhi.
3. K V Mittal (1996), Optimization Methods in Operations research and system analysis, 3rd Edition, New age Publications, New Delhi.
4. Edwin K, P Chang, Stanislaw H. Zak (2013), An Introduction to Optimization, 3rd Edition, Jhon Wiley, New York.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CE 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. CE 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.

REFERENCES

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. Vasanthy (2004) Environmental Studies (A Text Book for All Under Graduate Students) Bharathidasan University Publications.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CE 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.

B. Tech. CE VI/VII/VIII Semester

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CE 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, 5*th 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. Burragh, 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)

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

- Environmental sciences

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. CE 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 stroms (causes, distribution human adjustment, perception & mitigation) Cumulative atmospheric hazards/ disasters :- Floods - Droughts - Cold waves - Heal 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 7 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. CE 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. CE 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   **(10 Lectures)**
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. CE VI/VII/VIII Semester   **VCE-R15**

ENTREPRENEURSHIP
(Open Elective)

Course Code: A3076

L	T	P	C
3	0	0	3

Course Overview:

The course makes the students to learn the roles, characteristics, qualities, and functions of entrepreneur. It enables the students to know various Institutional support for setting up a business enterprise. Students would also understand the role, importance and functions of women entrepreneur and women entrepreneur development.

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. CE VI/VII/VIII Semester   **VCE-R15**

ENTREPRENEURSHIP
(Open Elective)

Course Code: A3076   **L   T   P   C**

3   0   0   3

SYLLABUS

UNIT - I
ENTREPRENEURSHIP: Importance and role of entrepreneurship, Qualities of an entrepreneur, Functions of entrepreneur, Theories of entrepreneurship, Stimulants of entrepreneurship and Barriers to entrepreneurship, Ethics and Social Responsibility, Role of entrepreneur in economic development.

UNIT - II
INSTITUTIONAL SUPPORT: Role of Government: Role of IDBI, SIDBI, SIDO, NIESBUD, DIC, Entrepreneurship Development Institute, T-Hub (Telangana Hub).

UNIT - III
WOMEN ENTREPRENEURSHIP: Role & Importance, Functions of women entrepreneur, Profile of Indian Women Entrepreneur, Problems of Women Entrepreneurs, Women Entrepreneurship Development in India and in Foreign Countries.

UNIT - IV
PROJECT MANAGEMENT: Concept of project and classification of project, Project life cycle-identification, Project formulation, Project report , Project evaluation- profitability appraisal, social cost benefit analysis, feasibility analysis, financial analysis and project financing, Project implementation, Project completion.

UNIT - V
ENTREPRENEUR TRAINING: Designing appropriate training programmes to inculcate Entrepreneurial Spirit, significance of entrepreneurial training, Feedback and Performance of Trainees, NSIC, Pradhan Mantri Kaushal Vikas Yojana (PMKVY), Telangana Academy for Skill and Knowledge (TASK).

TEXT BOOKS:
3. Robert Hisrich, Michael P. Peter, Dean A. Shepherd (2010), E*ntrepreneurship*, Tata Mc Graw Hill, New Delhi.

REFERENCE BOOKS:
1. Bholanath Datta (2009), Entrepreneurship, Excel publications, India.
2. David H Holt (2010), Entrepreneurship, Prentice hall of India, New Delhi, India.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. CE 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)

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 Pattnayak (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. CE 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. Understand the importance of diversity in organizations as well as personality and perception of individual and use this knowledge for better understanding of human beings in organizations.

CO3. Understand 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. Understand 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. Understand 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. CE 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 & Polities.

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 Publictions
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. CE 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.Understand the importance of Supply chain customer service and bench mark practices   and apply them in business environment.

CO3. Understand role of Sourcing and Distribution in supply chain and apply the knowledge in decision making process of organization.

CO4. Understand the importance of Co-ordination in supply chain and role of Information Technology in supply chain and use the knowledge to run the organization successfully.

CO5.Understand 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. CE 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. CE 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 an 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. CE 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: VOLUNTTERISM 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

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.
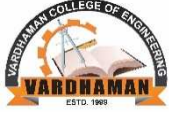
1. I will **attend** all the classes from the **joining day** of the College as per the timetable. In case, I do not turn up even after two weeks of starting of classes, I shall be **ineligible** to continue for the current academic year.

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 I **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

-- STUDENT COPY --

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

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Signature of Student   **Signature of Parent**
                                                        Name & Address with Phone Number

-- OFFICE COPY --