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-R14)

CHOICE BASED CREDIT SYSTEM

B. Tech. - Regular Four Year Degree Program
(For batches admitted from the Academic Year 2014 - 2015)
&
B. Tech. - Lateral Entry Scheme
(For batches admitted from the Academic Year 2015 - 2016)

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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, A2001: Linear Algebra and Ordinary Differential Equations, A2501: 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	**0**: H&S/MBA **1** : Civil **2** : EEE **3** : MECH **4** : ECE **5**: CSE **6** : IT	**01** **02** **..** **..**

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

FOREWORD

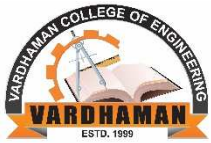
The autonomy conferred on Vardhaman College of Engineering by UGC based on its performance as well as future commitment and competency to impart quality education. It is a mark of its ability to function independently in accordance with the norms set by the monitoring bodies like UGC and AICTE. It reflects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

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

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

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

PRINCIPAL



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Vision:

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

Mission:

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

Quality Policy:

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

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DEPARTMENT OF CIVIL ENGINEERING

Department Vision:

The vision of the department of the Civil Engineering is to become an emerging centre of excellence in the field of civil engineering education and to produce innovators and integrators of ideas and technology for discovering a practical reality in what was once just imagined.

Department Mission:

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

Program Educational Objectives (PEOs)

PEO1: Graduate will establish himself/herself as effective professionals by solving real world problems using investigative and analytical skills along with the knowledge acquired in the field of Computer Science and Engineering.

PEO2: Graduate will demonstrate his/her ability to adapt to rapidly changing environment in advanced areas of Computer Science and scale new height in their profession through lifelong learning.

PEO3: Graduate will prove his/her ability to work and communicate effectively as a team member and /or leader to complete the task with minimal resources, meeting deadlines.

PEO4: Graduate will embrace professional code of ethics in the profession while deliberately being part of projects which contributes to the society at large without disturbing the ecological balance.

Program Outcomes (POs):

PO1: **Engineering Knowledge:**Apply knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems**.**

PO2: **Problem Analysis:**Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences**.**

PO3: **Design/ Development of Solutions:** Design solutions for complex engineering problems and design system components or processes that meet specified needs with appropriate consideration for the public health and safety, and cultural, societal, and environmental considerations**.**

PO4: **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions**.**

PO5: **Modern Tool Usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO6: **The Engineer and Society:**Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice**.**

PO7: **Environment and Sustainability:**Understand the impact of professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development**.**

PO8: **Ethics:**Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice**.**

PO9: **Individual and Team Work:**Function effectively as an individual, and as a member or leader in diverse teams, and in multi-disciplinary settings**.**

PO10: **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions**.**

PO11: **Project Management and Finance:**Demonstrate knowledge and understanding of engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments**.**

PO12: **Life-long Learning:** Recognize the need for, and have the preparation and ability to engage in independent and life- long learning in the broadest context of technological change.

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ACADEMIC REGULATIONS

B. Tech. - Regular Four Year Degree Program
(For batches admitted from the Academic Year 2014 - 2015)
&
B. Tech. - Lateral Entry Scheme
(For batches admitted from the Academic Year 2015 - 2016)

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 2014-2015 onwards. Any reference to "College" in these rules and regulations stands for Vardhaman College of Engineering.

2. EXTENT

All the rules and regulations, specified 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 candidate 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 theguidelines of APSCHE.

(ii) Secured a rank in the EAMCET examination conducted by A.P. State Council forHigher Education for allotment of a seat by the Convener, EAMCET, for admission.

3.1.2. Admission Procedure:

Admissions are made into the first year of four-year B.Tech. Degree programme as per the stipulations of A.P State Council of Higher Education (APSCHE), Government of Telangana.

(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 and examinations for all courses is English.

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 8 years for B.Tech. If a student fails to complete the academic program within the maximum duration as specified above, he / she will be required to withdraw from the program.

6.1.1. For students admitted under lateral entry scheme in B.Tech degree program, the maximum period within which a student must complete a full-time academic program is 6 years. If a student fails to complete the academic program within the maximum duration as specified above, he / she will be required to withdraw from the program.

6.1.2. 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 shall follow semester pattern. An academic year shall consist of a first semester and a second semester and the summer term follows in sequence. Each semester shall be of 23 weeks duration and this period includes time for course work, examination preparation, and conduct of examinations. Each semester shall have a minimum of 85 working days for conducting classes. The academic calendar is shown in Table 1 is declared at the start of the semester.

The first and second semesters shall have the duration to accommodate a minimum of 16 instructional weeks per semester.

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

Every programme of study shall be designed to have 42 - 45 theory courses and 14 - 16 laboratory courses.

The Program of instruction consists of:

(i) A general core programme comprising Basic Sciences, Mathematics, Basic Engineering, Humanities, Social Sciences and Management.
(ii) An Engineering Core programme imparting to the student the fundamentals of engineering in the branch concerned.
(iii) An elective programme enabling the students to take up a group of departmental and interdepartmental courses of interest to him / her.

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

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.

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

Table 3: Group of courses

S. NO	GROUP OF COURSES	CATEGORY	RANGE OF TOTAL CREDITS
1	Humanities, Social Sciences and Management	HS	14
2	Basic Sciences	BS	26
3	Basic Engineering	BE	32
4	Core Engineering	CE	114
5	Professional Elective	PE	12
6	Inter Departmental Elective	IE	08
7	Mini Project	MP	02
8	Technical Seminar	TS	02
9	Comprehensive Viva	CV	02
10	Project Work	PW	08
		TOTAL	220

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 periods each of 60 minutes duration.

Each course is normally assigned a certain number of credits as follows:

- 1 credit per lecture / tutorial period per week.
- credits for three (or more) period hours of practicals.
- credits for mini project.
- credits for technical seminar with 6 periods per week.
- credits for comprehensive viva examination.
- 8 credits for project work with 12 periods per week.

9.2. The four-year curriculum of any B. Tech. program of study shall have 220 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 168 credits.

9.3. For courses like mini project / project work / technical seminar / comprehensive viva, where formal contact hours are not specified, credits are assigned based on the complexity of the workto be carried out.

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 and 75 marks for practical / computer aided engineering drawing lab. In addition, mini-project, technical seminar, comprehensive viva and project work shall be evaluated for 50, 50, 50 and 200 marks respectively.

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 4: Method of Evaluation

Mid Semester Test	20 Marks
Online Objective Test	05 Marks
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 20 marks to be answered in two hours duration. The first Mid Semester Test will be held in the 09th week with the announced schedule in the first two units of syllabus. The second Mid Semester Test will be held in the 18th week with the announced schedule in the last three units of syllabus. In case a student does not appear in the Mid Semester Test due to any reason whatsoever, will get zero marks(s).

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 half an hour duration. The Online Objective Test will be held in the 18^{th} week with the announced schedule in all the units of syllabus. In case a student does not appear in the Online Objective Test due to any reason whatsoever, will get zero marks(s).

10.1.3. 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 valued both internally and externally. If the difference between the first and second valuations is less than or equal to 15% of the maximum of the paper the better of the two valuations shall be awarded and if the difference between the first and second valuation is more than 15%, the chief examiner appointed has to discuss with the two valuers and have his own assessment of the script. The marks given by the chief examiner shall be final for award.

10.2 PRACTICAL

Practicals shall be evaluated for 75 marks, out of which 50 marks are for external examination and 25 marks are for internal evaluation. The 25 internal marks are distributed as 15 marks for day-today work/attendance 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.

12 out of 14 to 16 experiments / exercises recommended are to be completed in a semester.

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 work/attendance 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, Computer Aided Aircraft 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 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 / her nominee and two faculty of the department including the project supervisor for 50 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 approved by the faculty supervisor. The other component is suggested by the supervisor and can be a reproduction of the concept in any standard research paper or an extension of concept from earlier course work. A hard copy of the information on seminar topic in the form of a report is to be submitted for evaluation along with presentation. The presentation of the seminar topics shall be made before an internal evaluation committee comprising the Head of the Department or his/her nominee, seminar supervisor and a senior faculty of the department. The two components of the seminar are distributed between two halves of the semester and are evaluated for 50 marks each. The average of the two components shall be taken as the final score. A minimum of 40% of maximum marks shall be obtained to earn the corresponding credits.

10.7 COMPREHENSIVE VIVA

The comprehensive Viva will be conducted by a committee comprising Head of the Department orhis/her nominee, two senior faculty of the respective department and an external examiner fromoutside the college. This is aimed at assessing the student's understanding of various subjectsstudied during the entire program of 4 years. The comprehensive viva shall be evaluated for 50marks at the end of VIII semester. A minimum of 40% of maximum marks shall be obtained to earnthe corresponding credits.

10.8 PROJECT WORK

The project work shall be evaluated for 200 marks out of which 50 marks for internal evaluation and 150 marks for end-semester evaluation. The project work shall be spread over in VII semester and in VIII semester. 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.At the end of VII semester, students should submit synopsis summarizing the work done in VII semester. The project is expected to be completed by the end of VIII semester.

In VIII semester a mid-course review is conducted by Head of the Department and the project supervisor on the progress for 25 marks. On completion of the project a second evaluation is conducted for award of internal marks of another 25 marks before the report is submitted making the total internal marks 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.

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. MISSING EXAMINATION

A student who fails to attend a Mid Semester Test / Online Objective Test due to hospitalization or accident shall be permitted with prior approval of the HOD and the Principal to take up missing examination of the particular course, subject to payment of a prescribed fee for each missing examination. Students deputed for official programmes of the college are exempted from paying the fee for missing test. Such missing examinations should be completed outside the regular class hours within 7 working days of the respective examinations. Attendance will not be given for taking up missing examinations. The missing examinations are allowed only for Mid Semester Test / Online Objective Test and not for end semester final theory and practical examinations.

13. EVALUATION

Following procedure governs the evaluation.

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

13.2. Performance in all the courses is tabulated course-wise and will be scrutinized by the Examination Committee and moderation is applied if needed, based on the recommendations of moderation committee and course-wise marks lists are finalized.

13.3. Student-wise tabulation is done and student-wise memorandum of marks is generated which is issued to the student.

14. PERSONAL VERIFICATION

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

15. 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.

16. 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. (REGULAR) PROGRAMME

i. A student shall be deemed to have satisfied the minimum academic requirements for each theory, practical, design, drawing subject and project, if he secures not less than 35% of marks in the end semester examination and a minimum of 40% of marks in the sum of the internal evaluation and end semester examination taken together.

ii. In case of mini project, technical seminar and comprehensive viva a student shall be deemed to have satisfied the minimum academic requirements and earned the credits allotted to each of them if he/she secures not less than 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/she 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 IV semester to V semester of programme of study only if he fulfils the academic requirement of securing 40 out of 80 credits from the regular examinations held up to the end of III semester including supplementary examinations held up to the end of IV semester.

v. A student shall be promoted from VI semester to VII semester of programme of study only if he fulfils the academic requirements of securing 68 out of 136 credits, from the regular examinations held up to the end of V semester including supplementary examinations held up to the end of VI semester.

vi. A student shall register for all the 220 credits and earn at least 212 credits. Marks obtained in all the 212 credits shall be considered for the award of the class based on aggregate of marks.

vii. A student who fails to earn 212 credits as indicated in the course structure within eight academic years from the year of their admission shall forfeit their seat in B.Tech programme and their admission stands cancelled.

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

FOR LATERAL ENTRY STUDENTS (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 or project if he secures not less than 35% of marks in the semester-end examination and a minimum of 40% of marks in the sum total of the internal evaluation and semester-end examination taken together.

ii. In case of mini project, technical seminar and comprehensive viva a student shall be deemed to have satisfied the minimum academic requirements and earned the credits allotted to each of them if he/she secures not less than 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/she 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 VI semester to VII semester only if he fulfils the academic requirements of securing 42 out of 84 credits from the regular examinations held up to the end of V semester including supplementary examinations held up to the end of VI semester.

v. A student shall register for all 168 credits and earn at least 160 credits. Marks obtained in all the 160 credits shall be considered for the award of the class based on aggregate of marks.

vi. A student who fails to earn 160 credits as indicated in the course structure within **six** academic years from the year of their admission shall forfeit their seat in B.Tech programme and their admission stands cancelled.

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

17. TRANSITORYREGULATIONS

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.

18. TRANSFER OF STUDENTS FROM OTHER COLLEGES/UNIVERSITIES

Transfer of students from the Constituent Colleges of *JNTUH* or from other Colleges/Universities shall be considered only on a case-to-case basis by the Academic Council of the Institute.

19. TRANSCRIPTS

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

20. AWARD OF DEGREE

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

20.1. For students admitted into B.Tech. program (Batches admitted from 2014-2015)

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 220 credits and secure at least 212 credits with compulsory subjects as listed in the Table below.

Serial Number	Subject Particulars
1	All First Year Theory Subjects
2	All practical subjects
3	Industry oriented mini project
4	Comprehensive Viva-voce
5	Seminar
6	Project work

- Obtained not less than 40% of marks (minimum requirement for declaring as passed).
- Has no dues to the college, hostel, and library etc. and to any other amenities provided by the College.
- No disciplinary action is pending against him.

20.2. For lateral entry students (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 three academic years and not more than six academic years.
- The candidate shall register for 168 credits and secure at least 160 credits with compulsory subjects as listed in the Table below.

Serial Number	Subject Particulars
1	All practical subjects
2	Industry oriented mini project
3	Comprehensive Viva-voce
4	Seminar
5	Project work

- Obtained not less than 40% of marks (minimum requirement for declaring as passed).
- Has no dues to the college, hostel, and library etc. and to any other amenities provided by the College.
- No disciplinary action is pending against him.

20.3. 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 5:

Table 5: Declaration of Class is based on percentage of marks to be secured

Class Awarded	Grades to be Secured	
First Class with Distinction	70% and above	From the aggregate marks secured from 212 Credits for Regular Students and 160 Credits for Lateral Entry Students.
First Class	Below 70% but not less than 60%	
Second Class	Below 60% but not less than 50%	
Pass Class	Below 50% but not less than 40%	
Fail	Below 40%	

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

Table 6: Percentage Equivalence of Grade Points (For a 10-Point Scale)

Grade Points (GP)	Percentage of Marks
4.75	≥ 40 and < 45
5.25	≥ 45 and < 50
5.75	≥ 50 and < 55
6.25	≥ 55 and < 60
6.75	≥ 60 and < 65
7.25	≥ 65 and < 70
7.75	≥ 70 and < 75
8.25	≥ 75 and < 80
8.75	≥ 80 and< 85
9.25	≥ 85 and < 90
9.75	≥ 90 and < 95
10	≥ 95

21. ADDITIONAL ACADEMIC REGULATIONS

i. Courses like projects / mini projects / seminars can be repeated only by re-registering for all the components in thatsemester.

ii. 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 doneaccordingly.

iii. When a component is cancelled as a penalty, he is awarded zero marks in thatcomponent.

22. REGISTRATION

22.1. 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.

22.2. 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.

22.3. 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.

22.4. 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.

23. 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.

24. 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.

25. 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.

26. 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.

27. 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.

28. 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.

29. 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.

30. 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.

31. AWARD OF A RANK UNDER AUTONOMOUS SCHEME

31.1. 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, 3 years for B.Tech under lateral entryscheme.

31.2. 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 attemptonly.

31.3. Academic performance will be the sole criteria for awarding the merit rank and will be based only on performance of the student from the first to the eighth semester of thecourse.

31.4. The number of Merit Ranks to be announced for any course / program / branch / specialisation will be asfollows:

3 (Three) Merit Ranks if the AICTE sanctioned intake is less than or up to60.

4 (Four) Merit Ranks if the AICTE sanctioned intake is greater than60.

5 (Five) Merit Ranks if the AICTE sanctioned intake is greater than120.

31.5. Award of prizes, scholarships, or any other Honours shall be based on the rank secured by a candidate, consistent with the guidelines of the Donor, whereverapplicable.

32. CODE OF CONDUCT

32.1. Each student shall conduct himself / herself in a manner befitting his / her association withVCE.

32.2. He / she is expected not to indulge in any activity, which is likely to bring disrepute to thecollege.

32.3. He / she should show due respect and courtesy to the teachers, administrators, officers and employees of the college and maintain cordial relationships with fellowstudents.

32.4. Lack of courtesy and decorum unbecoming of a student (both inside and outside the college), wilful damage or removal of Institute's property or belongings of fellow students, disturbing others in their studies, adoption of unfair means during examinations, breach of rules and regulations of the Institute, noisy and unruly behaviour and similar other undesirable activities shall constitute violation of code of conduct for thestudent.

32.5. Ragging in any form is strictly prohibited and is considered a serious offence. It will lead to the expulsion of the offender from the college.

32.6. 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 thecollege.

32.7. 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 collegehostel.

32.8. A student may be denied the award of degree / certificate even though he / she has satisfactorily completed all the academic requirements if the student is found guilty of offences warranting such an action.

32.9. Attendance is not given to the student during the suspensionperiod

33. 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 andsatisfying 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 mind 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.

34. 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-R14)

B. TECH - CIVIL ENGINEERING

REGULATIONS: VCE-R14

I SEMESTER

Code	Subject	Category	Periods per Week			Credits	Scheme of Examination Maximum Marks		
			L	T	P		Internal	External	Total
A2001	Mathematics–I	BS	3	1	-	4	25	75	100
A2002	Engineering Physics	BS	4	-	-	4	25	75	100
A2003	Engineering Chemistry	BS	4	-	-	4	25	75	100
A2501	Computer Programming	BE	4	-	-	4	25	75	100
A2301	Engineering Mechanics- I	BE	3	1	-	4	25	75	100
A2502	Computer ProgrammingLab	BE	-	-	3	2	25	50	75
A2008	Engineering PhysicsandEng lab	BS	-	-	3	2	25	50	75
A2302	EngineeringDrawing- I	BE	-	-	6	2	25	75	100
	TOTAL		**18**	**02**	**12**	**26**	**200**	**550**	**750**

II SEMESTER

Code	Subject	Category	Periods per Week			Credits	Scheme of Examination Maximum Marks		
			L	T	P		Internal	External	Total
A2006	Mathematics – II	BS	3	1	-	4	25	75	100
A2004	Probability Theory &NumericalMethods	BS	4	-	-	4	25	75	100
A2005	Technical English	HS	4	-	-	4	25	75	100
A2303	Engineering Mechanics- II	BE	3	1	-	4	25	75	100
A2403	Basic Electronics	BE	4	-	-	4	25	75	100
A2305	Engineering Workshop practice lab	BE	-	-	3	2	25	50	75
A2009	EnglishLanguageCommunicationSkillslab	HS	-	-	3	2	25	50	75
A2304	Engineering Drawing–II Lab	BE	-	-	6	2	25	75	100
	TOTAL		**18**	**02**	**12**	**26**	**200**	**550**	**750**

III SEMESTER

Code	Subject	Category	Periods per Week			Credits	Scheme of Examination Maximum Marks		
			L	T	P		Internal	External	Total
A2012	Managerial Economics and Financial Analysis	HS	4	-	-	4	25	75	100
A2101	FluidMechanics	CE	3	1	-	4	25	75	100
A2102	BuildingMaterialsandConstruction	CE	3	1	-	4	25	75	100
A2103	Surveying–I	CE	3	1	-	4	25	75	100
A2104	Strengthof Materials–I	CE	4	-	-	4	25	75	100
A2011	EnvironmentalScience	BS	4	-	-	4	25	75	100
A2105	Strengthof MaterialsLab	CE	-	-	3	2	25	50	75
A2106	Surveying–I Lab	CE	-	-	3	2	25	50	75
	TOTAL		**21**	**03**	**06**	**28**	**200**	**550**	**750**

B. TECH - CIVIL ENGINEERING

REGULATIONS: VCE-R14

IV SEMESTER

Code	Subject	Category	Periods per Week			Credits	Scheme of Examination Maximum Marks		
			L	T	P		Internal	External	Total
A2107	ConcreteTechnology	CE	4	-	-	4	25	75	100
A2108	Strengthof Materials-II	CE	3	1	-	4	25	75	100
A2109	Structural Analysis–I	CE	3	1	-	4	25	75	100
A2110	HydraulicsandHydraulicMachines	CE	4	-	-	4	25	75	100
A2111	BuildingPlanningandDrawing	CE	4	-	-	4	25	75	100
A2112	Surveying–II	CE	4	-	-	4	25	75	100
A2113	FluidMechanicsandHydraulicMachinery Lab	CE	-	-	3	2	25	50	75
A2114	Surveying–II Lab	CE	-	-	3	2	25	50	75
		TOTAL	**22**	**02**	**06**	**28**	**200**	**550**	**750**

V SEMESTER

Code	Subject	Category	Periods per Week			Credits	Scheme of Examination Maximum Marks		
			L	T	P		Internal	External	Total
A2115	Designof ReinforcedConcreteStructures	CE	3	1	-	4	25	75	100
A2116	Geo Technical Engineering-I	CE	4	-	-	4	25	75	100
A2117	Water ResourcesEngineering-I	CE	4	-	-	4	25	75	100
A2118	Structural Analysis-II	CE	3	1	-	4	25	75	100
A2119	Engineering Geology	CE	4	-	-	4	25	75	100
A2120	Estimating andCosting	CE	3	1	-	4	25	75	100
A2121	Computer AidedDraftingof BuildingsLab	CE	-	-	3	2	25	50	75
A2122	Engineering Geology Lab	CE	-	-	3	2	25	50	75
		TOTAL	**21**	**03**	**06**	**28**	**200**	**550**	**750**

VI SEMESTER

Code	Subject	Category	Periods per Week			Credits	Scheme of Examination Maximum Marks		
			L	T	P		Internal	External	Total
A2123	Designof Steel Structures	CE	4	-	-	4	25	75	100
A2124	Geo Technical Engineering-II	CE	3	1	-	4	25	75	100
A2125	TransportationEngineering	CE	3	1	-	4	25	75	100
A2126	Water ResourcesEngineering- II	CE	3	1	-	4	25	75	100
A2127	Environmental Engineering-I	CE	4	-	-	4	25	75	100
	INTERDEPARTMENTAL ELECTIVE - I	HS	4	-	-	4	25	75	100
A2128	Environmental EngineeringLab	CE	-	-	3	2	25	50	75
A2129	Geo Technical Engineering Lab	CE	-	-	3	2	25	50	75
		TOTAL	**21**	**03**	**06**	**28**	**200**	**550**	**750**

B. TECH - CIVIL ENGINEERING

REGULATIONS: VCE-R14

VII SEMESTER

Code	Subject	Category	Periods per Week			Credits	Scheme of Examination Maximum Marks		
			L	T	P		Internal	External	Total
A2130	Remote Sensingand GIS Applications	CE	4	-	-	4	25	75	100
A2131	DesignandDrawingof HydraulicStructures	CE	3	1	-	4	25	75	100
A2132	Environmental Engineering-II	CE	4	-	-	4	25	75	100
A2133	RehabilitationandRetrofitting Structures	CE	4	-	-	4	25	75	100
INTERDEPARTMENTAL ELECTIVE - II		IE	4	-	-	4	25	75	100
PROFESSIONAL ELECTIVE - I		PE	3	1	-	4	25	75	100
A2140	ConcreteandHighway EngineeringLab	CE	-	-	3	2	25	50	75
A2141	Geographical Information SystemsLab	CE	-	-	3	2	25	50	75
A2142	Mini Project	MP	-	2	-	2	-	50	50
		TOTAL	**22**	**04**	**06**	**30**	**200**	**600**	**800**

VIII SEMESTER

Code	Subject	Category	Periods per Week			Credits	Scheme of Examination Maximum Marks		
			L	T	P		Internal	External	Total
A2015	Professional Ethics and Intellectual Property Rights	HS	3	1	-	4	25	75	100
PROFESSIONAL ELECTIVE - II		PE	3	1	-	4	25	75	100
PROFESSIONAL ELECTIVE - III		PE	3	1	-	4	25	75	100
A2155	STAAD Pro Lab	CE	-	-	6	2	25	50	75
A2156	Technical Seminar	TS	-	-	6	2	50	-	50
A2157	Comprehensive Viva	CV	-	-	-	2	-	75	75
A2158	Project Work	PW	-	-	12	8	50	150	200
		TOTAL	**09**	**03**	**24**	**26**	**200**	**500**	**700**

B. TECH. - CIVIL ENGINEERING

REGULATIONS: VCE-R14

ELECTIVES	
INTERDEPARTMENTAL ELECTIVE - I	
Code	**Subject**
A2616	ImageProcessingandPatternRecognition
A2244	EnergyManagement
A2330	ExperimentalStressAnalysis
A2333	OperationsResearch
A2503	DataStructuresthroughC
A2448	DigitalElectronicsandMicroprocessors
INTERDEPARTMENTAL ELECTIVE – II	
A2013	ManagementScience
A2016	HumanResourceManagement
A2017	Entrepreneurship
A2018	BusinessCommunication
A2020	OrganizationalBehavior
A2019	ProjectPlanningandManagement
PROFESSIONAL ELECTIVE - I	
A2134	FiniteElementsMethodsin CIVILEngineering
A2135	AdvancedStructuralAnalysis
A2136	PavementAnalysisandDesign
A2137	Introductionto EarthquakeEngineering
A2138	EnvironmentalImpactAssessmentMethodologies
A2139	UrbanPlanningandInformationSystems
PROFESSIONAL ELECTIVE - II	
A2143	EarthQuakeResistantDesignStructures
A2144	AdvancedStructuralDesign
A2145	GroundImprovementTechniques
A2146	UrbanDisasterandIntelligentControlSystems
A2147	BridgeEngineering
A2148	IndustrialWasteandWasteManagement
PROFESSIONAL ELECTIVE - III	
A2149	PrestressedConcreteStructures
A2150	IndustrialStructures
A2151	SoilDynamicsAndMachineFoundation
A2152	TrafficEngineering
A2153	AirPollutionandControlMethodologies
A2154	GeoinformaticsforEnvironmentalMonitoring

SYLLABI FOR
I SEMESTER

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. ME I Semester **VCE-R14**

MATHEMATICS - I

Course Code: A2001

L	T	P	C
3	1	0	4

Course Overview:

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

Prerequisite(s):NIL

Course Outcomes:

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

CO1. Solve the first and higher order linear differential equations.

CO2. Make use of differential equations to solve orthogonal trajectories, rate of growth/decay, Newton's law of cooling, Electrical circuits and simple harmonic motion problems.

CO3. Examine extremum of a function of several variables and evaluate the multiple integrals.

CO4. Apply Laplace transforms to solve differential equations.

CO5. Evaluate line, surface and volume integrals using vector integral theorems.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. ME I Semester **VCE-R14**

MATHEMAICS-I

Course Code: A2001

L	T	P	C
3	1	0	4

SYLLABUS

UNIT – I

DIFFERENTIAL EQUATIONS OF FIRST ORDER AND THEIR APPLICATIONS: Formation of a differential equation – Differential equations of first order and first degree – Linear equation, Bernoulli's equation, Exact equation 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

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},sinax,cosax,x^n,$e^{ax}V(x)$,$x^nV(x)$-Equationsreducibletolinearequationswithconstant coefficients – Cauchy's homogeneous linear equation – Legendre's linear equation - Method of variation of parameters - Applications of second order linear differential equations: L□C□R Circuits - Simple HarmonicMotion.

UNIT – III

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 theorem statements and their verification). Functions of several variables – Jacobian - Functional dependence - Taylor's theorem for functions of two variables - Maxima and Minima of functions of two variables – Lagrange's method of undetermined multipliers. Multiple integrals - Double integrals - Change of variables in double integrals- Change of order of integration - Triple integrals.

UNIT – IV

LAPLACE TRANSFORM AND ITS APPLICATIONS TO ORDINARY DIFFERENTIAL EQUATIONS: Laplace transforms ofelementary functions - First shifting theorem - Change of scale property - Multiplication byt^n- Division by t -Laplace transforms of derivatives and integrals - Second shifting theorem – Laplace transforms of some special functions: Unit step function – Dirac's delta function - Periodic function - Evaluation of integrals by Laplace transforms- Inverse Laplace transforms - Method of partial fractions - Other methods of finding Inverse Laplace transforms - Convolution theorem - Applications of Laplace transforms to ordinary differential equations.

UNIT-V

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 integral - Volume integral - Vector integral theorems: Green's theorem in a plane - Stoke's theorem **–** Gauss's divergence theorem (all theorem statements and their verification).

TEXT BOOKS:

1. B S Grewal (2012), *Higher Engineering Mathematics*, 42nd Edition, New Delhi, KhannaPublishers.
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 and Co.Ltd

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. ME I Semester **VCE-R14**

Engineering Physics

Course Code: A2002

L	T	P	C
4	0	0	4

Course Overview:

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

Prerequisite(s):NIL

Course Outcomes:

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

CO1. Analyze crystal structures in terms of lattice parameters and interpret the structures using X-ray diffraction methods.

CO2. Apply the principles of quantum mechanics to analyze the properties of the semiconducting materials.

CO3. Categorize nano and dielectric materials. Discuss synthesis and react to environmental concerns due to nanotechnology.

CO4. Categorize magnetic materials and objective their role in science and technology. Apply magnetism to explain superconductivity.

CO5. Illustrate working of a laser and examine the communication systems using optical fibers.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. ME I Semester **VCE-R14**

Engineering Physics

Course Code: A2002

L	T	P	C
4	0	0	4

SYLLABUS

UNIT – I

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

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

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

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

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., 'Engineering Physics', New Age International,2007.
2. Arumugam, M, 'Engineering Physics', Anuradha Publishers,2005.

REFERENCE BOOKS:

1. Rajendran, V and Marikani A, 'Engineering Physics' Tata Mc Graw Hill Publications Ltd, III Edition,2004
2. C. Kittel (2009), 'Introduction to Solid State Physics', 8th edition, Wiley Eastern Publications,India.
3. P.Sarah and M. Geetha (2012), 'Engineering Physics and Engineering Chemistry', VGS Booklinks,Hyderabad
4. M. Ratner, D. Ratner (2003), 'Nanotechnology', Pearson Edition, India.

P. Sarah (2008), 'Lasers & Optical Fiber communications', IK International (P) Ltd, NewDelhi.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. ME I Semester **VCE-R14**

Engineering Chemistry

Course Code: A2003

L	T	P	C
4	0	0	4

Course Overview:

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

Prerequisite(s):NIL

Course Outcomes:

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

CO1. Apply the knowledge of standard electrode potentials of various metals and nonmetals to protect them from corrosion.

CO2. Identify difference and similarities of three types of Batteries.

CO3. Compare different methods of softening of hard water.

CO4. Apply the knowledge of Materials, Fuels and Nano particles in controlling pollution.

CO5. Compare and contrast the chemical behavior, properties and applications of engineering substances.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. ME I Semester **VCE-R14**

Engineering Chemistry

Course Code: A2003

L	T	P	C
4	0	0	4

SYLLABUS

UNIT-I

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

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

ENGINEERING MATERIALS:

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.

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

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 forcombustion).

UNIT – V

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- leadsystem.

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 BOOK:

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

REFERENCE BOOKS:

1. PC Jain & Monica Jain, (2008). Engineering Chemistry, Dhanpatrai PublishingCompany.
2. K.N Mishra, R.P Mani &B. Rama Devi(2009). Chemistry of Engineering Materials,CENGAGE.

J.C Kuriacase & J Raja ram (2004), Engineering Chemistry, Tata McGraw Hills Co. NewDelhi

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. ME I Semester **VCE-R14**

Computer Programming

Course Code: A2501

L	T	P	C
3	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. Write algorithm and draw corresponding flowchart for simple problems besides explaining functions of computer components

CO2. Select the right identifiers, data types and operators for effective computation.

CO3. Write programs, demonstrating use of control statements, arrays and strings.

CO4. Demonstrate use of functions and pointers by writing programs.

CO5. Write programs for simple real life problems using structures and unions.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. ME I Semester **VCE-R14**

Computer Programming

Course Code: A2501

L	T	P	C
3	1	0	4

SYLLABUS

UNIT - I

INTRODUCTION TO COMPUTERS: Introduction to computers, computer systems, computing environments, computer languages, creating and running programs, software development method, algorithms, pseudo code, flow charts, applying the software development method.

INTRODUCTION TO C LANGUAGE: Basic structures of C language, C tokens, data types and sizes, declaration of variables, assigning values

OPERATORS AND EXPRESSIONS: Statements, arithmetic, relational and logical operators, increment and decrement operators, conditional operator, bitwise operators, type conversions, expressions and evaluation, input and output statements, sampleprograms.

UNIT - II

CONTROL STATEMENTS: If and switch statements, while, do while and for statements, sample programs.

FUNCTIONS: Defining and accessing, passing arguments, function prototypes, library functions, static functions, user defined functions, recursive functions, variables and storage classes, scope rules, block structure, header files, C preprocessor, example C programs.

ARRAYS: Defining and processing, one dimensional and two dimensional arrays, initialization, passing arrays to a function, multi-dimensional arrays, command line arguments.

UNIT - III

STRINGS: Defining and operations on strings, string variables declaration, reading, writing. Basics of functions, parameter passing, string handling functions.

POINTERS: Basic Concepts, pointer to pointer, passing pointers to a function, operations on pointers, pointer arithmetic, pointers and arrays, arrays of pointers, function pointers, dynamic memory allocation.

UNIT - IV

STRUCTURES AND UNIONS: Structure definition, initializing, assigning values, passing of structures as arguments, arrays of structures, pointers to structures, self-reference to structures, unions, typedef, bit fields, sample programs.

UNIT - V

CONSOLE AND FILE I/O: File, types of files, file vs. console, file structure, file attributes, file operations, standard I/O, formatted I/O, sample programs.

TEXT BOOKS:

1. B. A. Fouruzan and R. F. Gilberg (2006), *Computer Science: A structured programming approach using C,* 3rd edition, Thomson Publications, NewDelhi.
2. Yashawanth Kanethkar (2008), *Let us C*, 8th edition, Jones & Bartlett Publishers,India.

REFERENCE BOOKS:

1. Herbert Schildt (2000), *C: The Complete Reference*, 4th Edition, New Delhi, Osborne Mc GrawHill.
2. B. W. Kerninghan, Dennis M. Ritche (1988), *The C Programming Language*, 2nd edition,

Prentice Hall Software Series,India.
Stephen G.Kochan (2004), *Programming in C*, 3rd Edition, Pearson Education PrivateLimited.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. ME I Semester **VCE-R14**

Engineering Mechanics-I

Course Code: A2301

L	T	P	C
4	0	0	4

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):NIL

Course Outcomes:

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

CO1. Apply the laws of mechanics to evaluate the resultant force.

CO2. Construct free body diagram and to solve the problems by using equations of equilibrium.

CO3. Analyze the frictional forces to maintain the equilibrium of system.

CO4. Identify the location of centre of gravity and moment of inertia of a body by using principle of moments.

CO5. Solve the structural problems by using principle of virtual work.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. ME I Semester **VCE-R14**

Engineering Mechanics-I

Course Code: A2301

L	T	P	C
4	0	0	4

SYLLABUS

UNIT - I

INTRODUCTION TO ENGINEERING MECHANICS: Basic concepts, Systems of forces – coplanar concurrent forces – Components in space – Moment of force and its application – Couples and resultant of force systems.

EQUILIBRIUM OF SYSTEMS OF FORCES: Free body diagrams, Equations of equilibrium of coplanar systems and spatial systems for concurrent forces.

UNIT - II

FRICTION: Types of Friction – Limiting Friction – Laws of Friction – Angle of repose, Equilibrium of body laying on rough inclined plane – Ladder friction – Wedgefriction.

UNIT - III

CENTROID AND CENTER OF GRAVITY: Centroid of lines – Centroid of area - Centroids of composite figures, Theorems of Pappus - Centre of gravity of bodies – Centroids of volumes, Centre of gravity of composite bodies.

UNIT - IV

AREA MOMENT OF INERTIA: Introduction, Moment of inertia – Polar moment of inertia, Radius of gyration - Transfer theorems for moment of inertia – Moment of inertia by integration – Moment of inertia of composite figures, Product of inertia, Transfer formula for product of inertia.

MASS MOMENT OF INERTIA: Introduction, Moment of inertia of masses – Radius of gyration - Transfer formula for mass moment of inertia – Mass moment of inertia by integration – Mass moment of inertia of composite bodies.

UNIT - V

VIRTUAL WORK: Introduction – Principle of virtual work – Applications – Beams, Lifting machines, Simple framed structures.

TEXT BOOKS:

1. Fedinand L. Singer (1998), *Engineering Mechanics*, Harper – Collins Publishers, NewDelhi.
2. A. K. Tayal (2012), *Engineering Mechanics*, Umesh Publications, NewDelhi.

REFERENCES BOOKS:

1. Timoshenko&Young(2013),*EngineeringMechanics*,McGrawHill,India.
2. K.L.Kumar(2009),*EngineeringMechanics*,TataMcGrawHill,NewDelhi.
3. Irving. H. Shames (2004), *Engineering Mechanics*, Prentice-Hall,India.

S. S. Bhavikatti, J. G. Rajasekharappa (2014), *Engineering Mechanics*, New Age International,India.

VARDAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. ME I Semester **VCE-R14**

COMPUTER PROGRAMMING LAB

Course Code: A2502

L	T	P	C
0	0	6	2

Course Overview:

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

Prerequisite(s):NIL

Course Outcomes:

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

CO1. Implement programs by selecting the right identifiers, data types and operators for effective computation.

CO2. Implement programs, demonstrating use of control statements, arrays and strings.

CO3. Implement programs, demonstrating use of functions and pointers.

CO4. Implement C programs for simple real life problems using structures and unions.

CO5. Implement programs illustrating use of files.

CO6. Debug erroneous programs related to the course.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. ME I Semester **VCE-R14**

COMPUTER PROGRAMMING LAB

Course Code: A2502

L	T	P	C
0	0	6	2

LIST OF EXPERIMENTS

Week – 1 (Operators)

1. Write C programs for thefollowing:
   a) Swapping of two numbers without using a thirdvariable.
   b) Check whether the given number is odd or even using conditionaloperator.
   c) Read two integers and shift the first integer by two bits to the left and second integer by one bit to theright.

Week – 2 (if and switch statements)

2. Write C programs for thefollowing:
   a) Check whether the input alphabet is a vowel ornot.
   b) Find the roots of a quadraticequation.
   c) Perform basic arithmetic operations like addition, subtraction, multiplication, division and modulus of two numbers using switch-case statement. Numbers are assumed to be integers and will be entered by theuser.

Week – 3 (Loops)

3. Write C programs for thefollowing:
   a) Print Armstrong numbers between 1 to n where n value is entered by the user. Armstrong numberisdefinedasthesumofcubesofindividualdigitsofanumber.e.g.371 $=3^3+7^3+1^3$
   b) Generate the first n terms of the Fibonacci sequence.
   c) Calculate the followingsum:
   Sum=1 + $x^2/2!$ +$X^4/4!$+---------- up to given 'n'terms.
   d) Generate all the prime numbers between 1 and n, where n value is supplied by theuser.
   e) Find the GCD and LCM of two numbers. Numbers are assumed to be integers and will be entered by theuser.

Week – 4 (Loops)

4. Write C programs for thefollowing:
   a) 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
```

   b) Print first n lines of Floyd'sTriangle.

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

Week – 5 (Arrays)

5. Write C programs for thefollowing:
   a) Find the largest and smallest number among a list ofintegers.
   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 linearsearch.
   c) Read a list of elements into an array and print the reverse of thelist.
   d) Read two matrices and find the addition and multiplication of twomatrices.
   e) Find the transpose of amatrix.
   e.g.

```
Given matrix 1   2   3
4   5   6
```

Transpose of the matrix:

1 4
2 5
3 6

Week – 6 (Functions)

6. Write C programs that uses both recursive and non-recursivefunctions:
   a) Find the sum of n naturalnumbers.
   b) Find the factorial of a givennumber.
   c) Find the N^{th} Fibonaccinumber.
   d) Find the reverse of anumber.

Week – 7 (Strings)

7. Write C programs for thefollowing:
   a) Check whether the given string is palindrome or not with and without using stringfunctions.
   b) Insert a sub-string in to given main string from a givenposition.
   c) Find the frequency of a given character in astring.
   d) Delete n characters from a given position in givenstring.

Week – 8 (Pointers)

8. Write C programs for thefollowing:
   a) Reverse a string usingpointers.
   b) Read a list of elements into an array. Find the sum of array elements usingpointers.
   c) Copy the elements of one array to another array usingpointers.
   d) Read two strings and compare these two strings character by character. Display the similar characters found in both the strings and count the number of dissimilarcharacters.

Week – 9 (Structure and Union)

9. Write C programs for thefollowing:
   a) Read the full name and date of birth of a person and display the same using nestedstructure.
   b) Create a Student structure containing name, rollno and grades as structure members. Display the name, rollno and grades of n students by using array of structuresconcept.
   c) Create a Book structure containing name, author and pages as structure members. Pass the address of structure variable to a user defined function and display thecontents.
   d) Create a Result union and Result structure containing marks and grades as members. Find the size of union and number of bytes reserved forit.

Week – 10 (Enumerated Data Types, Typedef, Bit Fields, Pre-processor Directives)

10. Write C programs for thefollowing:
   a) Create enumerated data type for 7 days of a week. Display their values in integerconstants.
   b) Find the biggest number among two numbers using a parameterizedmacro.
   c) Create a student structure using typedef containing id, name and age as structure members. Declare a bit field of width 3 for age and display the studentdetails.

Week – 11 (Command line arguments)

11. Write C programs for thefollowing:
   a) Pass n number of arguments at the command line and display total number of arguments and theirnames.
   b) Add two numbers using command linearguments.

Week – 12 (Files)

12. Write C programs for thefollowing:
   a) Copy the contents of one file toanother.
   b) Merge the contents of two files and store it in a thirdfile.
   c) Read name and marks of n number of students from user and store them in afile.

Week – 13 (Additional Programs)

13. Write C programs for thefollowing:
   a) Find the 2's compliments of a binarynumber.
   b) Convert a Roman numeral to its decimalequivalent
   c) Count the number of lines, words and characters in a givenstring.
   d) Concatenate two given strings without using built-in function.
   e) Demonstration of dynamic memory allocation functions with example.

REFERENCE BOOKS:

1. Pradip Dey, Ghosh Manas (2009), *Programming in C,* Oxford University Press, USA.
2. E. Balaguruswamy (2009), *C and Data Structures,* 5th Edition, TMH publications,India.
3. M.K. Jain, S.R.K. Iyengar & R.K. Jain (2007), *Numerical Methods for Scientific and Engineering Computation,* 5th edition, New Age International Publishers, NewDelhi.

Aitkinson, Han (2006), *Elementary Numerical Analysis*, 3rd Edition, John Wiley & Sons (Asia) Private Ltd.,India.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. ME I Semester **VCE-R14**

ENGINEERING PHYSICS & ENGINEERING CHEMISTRY LAB

Course Code: A2008

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. Improve their pronunciation using the rules of Phonetics.

CO2. Take part in role-plays and interviews to perform effectively in real life situations.

CO3. Choose appropriate words and phrases to make the telephonic conversation conveying the meaning with etiquettes.

CO4. Minimize the stage fear and make presentations with proper body language.

CO5. Adapt the art of debating and group discussion to present their view point convincingly.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. ME I Semester **VCE-R14**

ENGINEERING PHYSICS & ENGINEERING CHEMISTRY LAB

Course Code: A2008

L	T	P	C
0	0	3	2

LIST OF EXPERIMENTS

PHYSICS LAB:

1. Determination of Rigidity modulus (η) of the material of the given wire using a TorsionalPendulum.
2. Determination of Frequency (n) of an AC supply usingSonometer.
3. Study of V-I characteristics of light emitting diode and determination of the Threshold voltage ofLED.
4. Study of exponential decay of charge in a R.C. Circuit and determination of time constant of R.Ccircuit.
5. Determination of numerical aperture of a given opticalfiber.
6. Determination of wavelength of a given source of laser light using a plane transmission grating by normal incidencemethod.
7. Determination of angular divergence of the laserbeam.
8. Determination of Dispersive power of material of aprism.

CHEMISTRY LAB:

1. **TITRIMETRY:** Estimation of hardness of water by EDTA method (or) Estimation of calcium in limestone by permanganometry.

INSTRUMENTAL METHODS:

2. **CONDUCTOMETRY:** Conductometric titration of strong acid vs strong base (or) Conductometric titration of mixture of acids vs strong base.

3. **POTENTIOMETRY:** Titration of strong acid vs strong base by potentiometry (or) Titration of weak acid vs strong base bypotentiometry.

PHYSICAL PROPERTIES:

4. Determination of viscosity of sample oil by redwood / ostwald'sviscometer.
5. Determination surface tension oflubricants.
6. **IDENTIFICATION AND PREPARATIONS:** preparation of organic compounds: aspirin (or)benzimidazole.
7. **DEMONSTRATION EXPERIMENTS (ANY ONE OF THEFOLLOWING)**:
   a. Preparation of thiokolrubber
   b. Adsorption oncharcoal

TEXT BOOKS:

1. Practical Engineering Physics by Dr. P Sarah, Ms. S Shashi devi, Mr. C.Venkatasubbaiah.
2. Practical Engineering Chemistry by K Mukkanti et.al, B S Publications,Hyderabad.
3. Inorganic quantitative analysis,Vogel.

REFERENCE BOOKS:

1. Text Book of engineering chemistry by R. N. Goyal and Harrmendra Goel.
2. A text book on experiments and calculation engineering chemistry by S.S.Dara.

Instrumental methods of chemical analysis by Chatwal, Anand, HimalayaPublications.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. ME I Semester **VCE-R14**

ENGINEERING DRAWING-I

Course Code: A2302

L	T	P	C
0	2	3	2

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. Construct various types of scales for the design of maps and models.

CO2. Represent the objects using various types of lines and dimensioning rules.

CO3. Make use of the knowledge of geometry and engineering curves for constructions.

CO4. Analyze the objects such as points, lines and regular planes held in different orientations using conventional drawing and CAD tools.

CO5. Visualize the solids held in different orientations using conventional drawing and CAD tools.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. ME I Semester **VCE-R14**

ENGINEERING DRAWING-I

Course Code: A2302

L	T	P	C
0	2	3	2

LIST OF EXPERIMENTS

UNIT - I

INTRODUCTION TO ENGINEERING DRAWING: Drawing instruments and accessories, types of line, lettering practice, rules of dimensioning, geometrical constructions – basic geometrical shapes.

SCALES: Types of scales, Units of length and their conversion. Construction of scales – Plain Scale, Diagonal Scale, Comparative Scale, Vernier Scale and Scale of Chords.

UNIT - II

CURVES USED IN ENGINEERING PRACTICE AND THEIR CONSTRUCTIONS: Conic Sections – construction of ellipse parabola and hyperbola, Special Curves – construction of Cycloid, Epicycloid, Hypocycloid and involutes.

UNIT - III

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

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

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, NewDelhi.
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, NewDelhi.
2. Johle (2009), *Engineering Drawing*, Tata Mc Graw Hill, New Delhi, India.
3. Trymbaka Murthy (2007), *Computer Aided Engineering Drawing*, I.K. International Publishers,NewDelhi.

R.B. Choudary (2005), *Engineering graphics with Auto CAD*, Anuradha Publishers, NewDelhi.

SYLLABI FOR
II SEMESTER

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. ME IISemester **VCE-R14**

MATHEMATICS – II

Course Code: A2006

L	T	P	C
3	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):NIL

Course Outcomes:

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

CO1. **Solve** system of linear equations using rank of a matrix.

CO3. **Examine** the nature of the Quadratic form by eigen values and eigen vectors.3

CO3. **Classify** and solvePartial differential equations.

CO4. **Develop** Fourier series and Fourier transforms of a function.

CO5. **Apply** Z- Transforms to solve difference equations.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. MEII Semester **VCE-R14**

MATHEMATICS-II

Course Code: A2006

L	T	P	C
3	1	0	4

SYLLABUS

UNIT – I

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 $m \square n$ and $n \square n$ linear system of equations by Gausselimination-Cayley-Hamilton Theorem(Statement and Verification) - Finding inverse and powers of a matrix by Cayley-Hamilton theorem.

UNIT – II

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

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

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

FOURIER 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, KhannaPublishers.
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.

HKDass,ErRajnishVarma(2012),*HigherEngineeringMathematics*,SecondRevisedEdition,NewDelhi, S.Chand & Co.Ltd.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. ME IISemester **VCE-R14**

NUMERICAL METHODS

Course Code: A2007

L	T	P	C
3	1	0	4

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. Employ different numerical methods to obtain approximate solutions to algebraic and transcendental equations. Calculate the unknowns of a linear equation set using iterative solution techniques.

CO2. Illustrate different numerical methods for interpolation.

CO3. Apply finite differences to obtain the value of derivatives at given point from the data provided and analyze various methods for numerically solving integration of functions.

CO4. Determine how to fit the best polynomial or special function curve passing from experimental data points using least-square method.

CO5. Solve numerically initial-value problems of ordinary differential equations (ODEs) of first order.

CO6. Apply finite difference approximations to solve numerically boundary value problems of Partial differential equations.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. ME IISemester **VCE-R14**

NUMERICAL METHODS

Course Code: A2007

L	T	P	C
3	1	0	4

SYLLABUS

UNIT- I

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

UNIT- II

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

UNIT-III

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

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

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. ME II Semester **VCE-R14**

TECHNICAL ENGLISH

Course Code: A2005

L	T	P	C
4	0	0	4

Course Overview:

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

Prerequisite(s):NIL

Course Outcomes:

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

CO1. Develop an understanding of the significance of humanity, love and service to mankind and be involved in community service

CO2. Perceive the importance of technological impact on society and plan for the technological advancement

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

CO4. Build creativity for career planning and entrepreneurship

CO5. Develop effective written communication skills in academic writing

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. ME II Semester **VCE-R14**

TECHNICAL ENGLISH

Course Code: A2005

L	T	P	C
4	0	0	4

SYLLABUS

UNIT I

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 Anonyms – Homonyms, Homophones and Homographs – Idiomatic Expressions – Phrasal Verbs.

Writing: Paragraph Writing.

UNIT II

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 Anonyms-Collocations-One wordsubstitute.s

Writing: Letter Writing: Types of letters, Styles of letters, Parts of letters, Letter of Apology and reply, Letter of Complain andReply.

Unit III

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 AnonymsMorphemes.

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

UNIT IV

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/misspelled.

Writing: Letter of Application and Preparation of Resume.

UNIT V

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. A Ramakrishna Rao (2009) *Enjoying Everyday English. Hyderabad: SangamBooks*
2. B Yadava Raju and C Muralikrishna (2009). *Inspiring Speeches and Lives*. Guntur: MaruthiPublications
3. Meenakshi Raman & Sangeeta Sharma, (2009), *Technical Communicatio,* Oxford UniversityPress.

REFERENCE BOOKS:

2. Ashraf Rizvi, M (2005) *Effective Technical Communication*. New Delhi: Tata Mc GrawHill.
3. David Green (2010) *Contemporary English Grammar Structures and Composition* by, MacMillan Publishers, NewDelhi.2010.
4. Meenakshi Raman, *Business Communication with CD*, 2nd Edition, Oxford UniversityPress.

Meenakshi Raman, *Technical Communication*, Oxford UniversityPress

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. ME IISemester **VCE-R14**

ENGINEERING MECHANICS-II

Course Code: A2303

L	T	P	C
4	0	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 - andControl.

Prerequisite(s):NIL

Course Outcomes:

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

CO1. **Explain** Newton's three laws of motion and determine the relation between force and acceleration of particles in motion.

CO2. **Contrast** rectilinear and curvilinear motion of particles and find the relation between force and acceleration of kinetic bodies.

CO3. **Differentiate** potential and kinetic energy - and solve the problems using conservative energy principle

CO4. **Utilize** the Impulse-Momentum principles to problems involving impact.

CO5. **Define** the types and vibrations and utilize them to analyze the problems related to pendulums.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. ME IISemester **VCE-R14**

ENGINEERING MECHANICS-II

Course Code: A2303

L	T	P	C
4	0	0	4

SYLLABUS

UNIT - I

KINEMATICS: Kinematics – Kinetics – Newton laws of motion – Particle – Rigid body – Path of particle. Introduction to Translation, Rotation and Plane motion of a rigid body.

UNIT - II

RECTILINEAR TRANSLATION: Kinematics of rectilinear motion, Principles of dynamics – Differential equation of rectilinear motion – Motion of a particle acted upon by a constant force, Force as a function of time – Force proportional to displacement.

CURVILINEAR TRANSLATION: Kinematics of curvilinear motion – Differential equations of curvilinear motion of a projectile – D'Alembert's principle – Moment of momentum – work and energy in curvilinear motion.

UNIT - III

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

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

MECHANICAL VIBRATIONS: Definitions, Concepts – Simple Harmonic Motion – Free vibrations, simple and Compound Pendulums and its Applications.

TEXT BOOKS:

1. Fedinand L. Singer (1998), *Engineering Mechanics*, Harper – Collins Publishers, NewDelhi.
2. A. K. Tayal (2012), *Engineering Mechanics*, Umesh Publications, NewDelhi.

REFERENCE BOOKS:

1. Timoshenko&Young(2013),*EngineeringMechanics*,McGrawHill,India.
2. K.LKumar(2009),*EngineeringMechanics*,TataMcGrawHill,NewDelhi.
3. Irving. H. Shames (2004), *Engineering Mechanics*, Prentice-Hall,India.
4. S. S. Bhavikatti, J. G. Rajasekharappa (2014), *Engineering Mechanics*, New Age International,India.

G. K. Grover, (2009), *Mechanical Vibrations*, Nem Chand & Brothers, India.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. ME IISemester **VCE-R14**

BASICELECTRONICS

Course Code: A2403

L	T	P	C
3	1	0	4

Course Overview:

This course covers fundamental topics that are common to a wide variety of analog and digital electronics. This course starts with basics of semiconductors, review the operation and characteristics of semiconductor devices (namely, semiconductor diodes and BJTs), and buildup to more advanced topics in analog circuit designs. This course also focuses on the fundamentals of number systems, Boolean algebra and logic gates. This course enables the students to have exposure in inter-disciplinaryconcepts.

Prerequisite(s):NIL

Course Outcomes:

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

CO1. Analyze the physical behavior of diodes and transistors.

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

CO3. Analyze single stage amplifier circuits using small signal low frequency transistor model.

CO4. Distinguish between the concepts of negative and positive feedback in amplifiers and analyze various feedback amplifiers and oscillator circuits.

CO5. Apply the knowledge of number systems and Boolean algebra in minimizing Boolean functions and realizing logic gates.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. MEII Semester **VCE-R14**

BASICELECTRONICS

Course Code: A2403

L	T	P	C
3	1	0	4

SYLLABUS

UNIT – I

DIODE AND ITS CHARACTERISTICS: P-N junction diode, operation in forward and reverse bias conditions, V-I characteristics, Zener diode and its characteristics, rectifiers - half wave, full wave and bridge rectifiers (simple problems), Filters (qualitative treatment), voltage regulation using Zener diode.

UNIT - II

TRANSISTORS: Bipolar Junction Transistor (BJT) - construction, operation, CE, CB and CC transistor configurations and characteristics.

BJT BIASING: Need for biasing, operating point, load line analysis, biasing and stabilization techniques: fixed bias, collector to base bias, self-bias.

UNIT – III

BJT AMPLIFIERS: Transistor as an amplifier, ABJT h-parameter model, analysis of transistor amplifier using h-parameter model, CE, CB and CC amplifiers, comparison of CB, CE and CC configurations, Simplified h-parameter model.

UNIT – IV

FEEDBACK AMPLIFIERS: Concept of feedback, classification of feedback amplifiers, general characteristics of negative feedback amplifiers, effect of negative feedback on input and output resistances.

OSCILLATORS: Condition for oscillations, RC Phase shift oscillator with transistor, Wein bridge oscillator, Hartley and Colpitts oscillator.

UNIT – V

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

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.

TEXT BOOKS:

1. Jacob Milliman, Christos C .Halkias, Satyabrata Jit (2011), *Electronic Devices and Circuits*, 3rd edition, Tata McGraw Hill, NewDelhi.
2. M. Morris Mano, Michael D. Ciletti (2008), *Digital Design*, 4th Edition, Pearson Education Inc,India.

REFERENCE BOOKS:

1. G. K. Mittal (1999), *Electronic Devices and Circuits*, 22nd edition, Khanna Publications, NewDelhi.
2. S. Shalivahanan, N. Suresh Kumar, A. Vallavaraj (2007), *Electronic Devices and Circuits*, 3rd edition, McGraw Hill, New Delhi, India.
3. Zvi. Kohavi (2004), *Switching and Finite Automata Theory*, Tata McGraw Hill,India.

C. V. S. Rao (2009), *Switching and Logic Design*, 3rd Edition, Pearson Education,India.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. ME IISemester **VCE-R14**

Engineering Workshop Practice Lab

Course Code: A2305

L	T	P	C
0	0	3	2

Course Overview:

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

Prerequisite(s):NIL

Course Outcomes:

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

CO1. **Identify** the tools and equipment utilized in workshop.

CO2. **Choose** the required trade for the suitable operations.

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

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

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

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. ME IISemester **VCE-R14**

Engineering Workshop Practice Lab

Course Code: A2305

L	T	P	C
0	0	3	2

LIST OF EXPERIMENTS

1. TRADES FOREXERCISES:

Minimum two exercises in each of the following trades

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

2. TRADES FORDEMONSTRATION:

a. BlackSmithy
b. ArcWelding
c. GasWelding
d. Plumbing

TEXT BOOKS:

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

REFERENCE BOOKS:

1. K. Jeyachandran, S. Natarajan, S. Balasubramanian (2007), *A Primer on Engineering Practices Laboratory*, Anuradha Publications, NewDelhi.
2. T. Jeyapoovan, M. Saravanapandian, S. Pranitha (2006), *Engineering Practices Lab Manual*, Vikas Publishing House Private Limited, NewDelhi.

S. K. Hajra Choudhury, A. K. Hajra Choudhury (2009), *Elements of Workshop Technology Vol 1,* Meidia Promoters, India.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. ME II Semester **VCE-R14**

ENGLISH LANGUAGE COMMUNICATION SKILLS LAB

Course Code: A2009

L	T	P	C
0	0	3	2

Course Overview:

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

Prerequisite(s):NIL

Course Outcomes:

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

CO1. Improve their pronunciation using the rules of Phonetics.

CO2. Take part in role-plays and interviews to perform effectively in real life situations.

CO3. Choose appropriate words and phrases to make the telephonic conversation conveying the meaning with etiquettes.

CO4. Minimize the stage fear and make presentations with proper body language.

CO5. Adapt the art of debating and group discussion to present their view point convincingly.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. ME IISemester **VCE-R14**

ENGLISH LANGUAGE COMMUNICATION SKILLS LAB

Course Code: A2009

L	T	P	C
0	0	3	2

LIST OF EXPERIMENTS

The Language lab focuses on the production and practice of sounds of language and familiarizes the students with the use of English in everyday situations and contexts.

SYLLABUS:

The following course content is prescribed for the English Language Laboratory sessions:

1. Introduction to phonetics
2. Sounds of English- vowels, diphthongs &consonants
3. Introduction to stress and intonation
4. Oral presentations-prepared
5. Oral Presentations-Extempore
6. Situational dialogues / roleplay
7. 'Just A Minute' sessions(JAM)
8. Information transfer
9. Telephoning skills
10. Describing objects, situations and people
11. Giving directions
12. Listening for specific information
13. Listening to record telephone conversations
14. Debate

SUGGESTED SOFTWARE:

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

REFERENCE BOOKS:

1. SureshKumar.E.&SreehariP.A(2007),*HandbookforEnglishLanguageLaboratories,*CambridgeUniversity Press India Pvt. Ltd, NewDelhi.
2. Mandal S. K (2006), *Effective Communication & Public Speaking*, Jaico Publishing House, NewDelhi.
3. Grant Taylor (2004), *English Conversation Practice,* Tata McGraw Hill, NewDelhi.
4. Balasubramanian .T (2000), *A text book of English Phonetics for Indian Student, Mac* Millan Publishers,India.

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. ME IISemester **VCE-R14**

ENGINEERING DRAWING-II

Course Code: A2304

L	T	P	C
0	2	3	2

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. **Develop** the lateral surface of regular solids.

CO2. **Imagine** the sectional views and curves of intersections of regular solids

CO3. **Analyze** isometric projections of objects such as regular planes and solids using conventional drawing and CAD tools.

CO4. **Convert** isometric views to orthographic views & vice versa.

CO5. **Visualize** the perspective projections of regular planes and solids using conventional drawing and CAD tools.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. ME IISemester **VCE-R14**

ENGINEERING DRAWING-II

Course Code: A2304

L	T	P	C
0	2	3	2

LIST OF EXPERIMENTS

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, andcones.

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.

INTRODUCTION TO COMPUTER AIDED DRAFTING: Introduction, Advantages of CAD, CAD work station, introduction to CAD Software.

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 McGraw Hill,India.

REFERENCE BOOKS:

1. D. M. Kulkarni, A. P. Rastogi, and A. K. Sarkar (2009), *Engineering Graphics with AutoCAD*, PHI Learning Private Limited, NewDelhi.
2. Arshad Noor Siddiquee, ZahidAkhtar Khan, Mukhtar Ahmad (2006), *Engineering Drawing with a Primer on AutoCAD,* 2nd Edition, Prentice Hall,India.

Jolhe, Dhananjay (2006), *Engineering Drawing: With an Introduction to CAD*, Tata McGraw Hill,India.

SYLLABI FOR
III SEMESTER

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CE III Semester **VCE-R14**

MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

Course Code: A2012

L	T	P	C
4	0	0	4

Course Overview:

This Course is designed in such a way that it gives an overview of concepts of Economics. Managerial Economics enables students to understand micro environment in which markets operate how price determination is done under different kinds of competitions. Financial Analysis gives clear idea about concepts and conversions accounting procedures along with introducing students to fundamentals of ratio analysis and interpretation of financial statements.

Prerequisite(s):NIL

Course Outcomes:

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

CO1. Explain and infer the concepts of Managerial Economics and Financial Accounting

CO2. Analyze the demand, production, cost and break even to know interrelationship of among variables and their impact

CO3. Classify the market structure to decide the fixation of suitable price

CO4. Analyze the types of business and decide which form of business suits for their requirement

CO5. Apply capital budgeting techniques to select best investment opportunity

CO6. Prepare financial statements and analyze them to assess financial health of business

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CE III Semester **VCE-R14**

MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

Course Code: A2012

L	T	P	C
4	0	0	4

SYLLABUS

UNIT – I **(12 lectures)**

INTRODUCTION TO MANAGERIAL ECONOMICS: Definition, Nature and Scope Managerial Economics, Demand Analysis: Demand Determinants, Law of Demand and its exceptions.

ELASTICITY OF DEMAND: Definition, Types, Measurement and Significance of Elasticity of Demand. Demand Forecasting, Factors governing demand forecasting, methods of demand forecasting (survey methods, statistical methods, expert opinion method, test marketing, controlled experiments, judgmental approach to demand forecasting).

UNIT - II **(10 lectures)**

THEORY OF PRODUCTION AND COST ANALYSIS: Production Function, Isoquants and Isocosts, MRTS, Least Cost Combination of Inputs, Production function, Laws of Returns, Internal and External Economies of Scale.

COST 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), termination of Break Even Point (simple problems), Managerial Significance and limitations of BEA.

UNIT – III **(8 lectures)**

INTRODUCTION TO MARKETS AND PRICING STRATEGIES: Market structures: Types of competition, Features of Perfect competition, Monopoly and Monopolistic Competition.

PRICE DETERMINATION AND PRICE STATISTICS: Price-Output Determination in case of Perfect Competition and Monopoly, Pricing Strategies.

UNIT – IV **(10 lectures)**

BUSINESS AND NEW ECONOMIC ENVIRONMENT: Characteristic features of Business, Features and evaluation of Sole Proprietorship, Partnership, Joint Stock Company, Public Enterprises and their types, Changing Business Environment in Post-liberalization scenario.

CAPITAL AND CAPITAL BUDGETING: Capital and its significance, Types of Capital, Estimation of Fixed and Working capital requirements, Methods and sources of raising finance. Nature and scope of capital budgeting, features of capital budgeting proposals, Methods of Capital Budgeting: Payback Method, Accounting Rate of Return (ARR) and Net Present Value Method (simple problems).

UNIT - V **(12 lectures)**

INTRODUCTION TO FINANCIAL ACCOUNTING: Double-Entry Book Keeping, Journal, Ledger, Trial Balance- Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments).

FINANCIAL ANALYSIS THROUGH RATIOS: Computation, Analysis and Interpretation of Liquidity Ratios (Current Ratio and quick ratio), Activity Ratios (Inventory turnover ratio and Debtor Turnover ratio), Capital structure Ratios (DebtEquity ratio, Interest Coverage ratio), and Profitability ratios (Gross Profit Ratio, Net Profit ratio, Operating Ratio, P/E Ratio and EPS).

TEXT BOOKS:

1. Aryasri (2005*), Managerial Economics and Financial Analysis, 2nd edition*, Tata Mcgraw Hill, New Delhi, India.
2. Varshney, Maheswari (2003*), Managerial Economics,* Sultan Chand, New Delhi, India.

REFERENCE BOOKS:

1. Ambrish Gupta (2004), *Financial Accounting for Management*, Pearson Education, New Delhi, India.
2. Domnick Salvatore (2011), *Managerial Economics in a Global Economy*, 7th edition, Oxford University Press, USA.
3. Narayanaswamy (2005*), Financial Accounting, A Managerial Perspective*, Prentice Hall of India private Ltd, New Delhi, India

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CE III Semester **VCE-R14**

FLUID MECHANICS

Course Code: A2101

L	T	P	C
3	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 rigour. The physical meanings of the terms in the equations are explained. Again, the behaviour of fluids in real situations is made plausible, in the light of the fundamental equations, and explained in physical terms.

Prerequisite(s):

- Mathematics-I (A2001)
- Engineering Mechanics(A2301)

Course Outcomes:

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

CO1. Apply basic fluid mechanics principles in the analysis and design of pipe flow.

CO2. To evaluate basic laws and equations used for analysis of static and dynamic fluids.

CO3. To determine the losses in a flow system, flow through pipes, boundary layer flow and flow past immersed bodies.

CO4. To understand the importance of fluid flow measurement and its applications in Industries.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CE III Semester **VCE-R14**

FLUID MECHANICS

Course Code: A2101

L	T	P	C
3	1	0	4

SYLLABUS

UNIT - I **(12 lectures)**

FLUID PROPERTIES AND FLUID STATICS: Density, Specific weight, Specific gravity, viscosity, Vapour pressure, compressibility, Surface tension Pressure at a point, Pascal's law, pressure variation with temperature, density and altitude. Hydro static law, Piezometer, Simple and differential manometers, pressure gauges, total pressure and center of pressure plane, vertical and inclined surfaces. Buoyancy and stability of floating bodies.

UNIT - II **(12 lectures)**

FLUID KINEMATICS : Stream line, path line, streak line, stream tube, classification of flows, steady, unsteady, uniform, non-uniform, laminar, turbulent, rotational, irrotational flows, one, two and three dimensional flows, Continuity equation in 3D flow, stream function, velocity potential function.

FLUID DYNAMICS: Surface and Body forces, Euler's and Bernoulli's equation derivation, Navier stokes equation (explanation only), Momentum equation - applications, Vortex Free and Forced. Forced vortex with free surface.

UNIT – III **(12 lectures)**

BOUNDARY LAYER CONCEPTS: Definition, thicknesses, characteristics along thin plate, laminar and turbulent layers (No Derivation) boundary layer in transition, separation of boundary layer submerged objects drag and lift.

LAMINAR AND TURBULANT FLOWS: Reynolds experiment, characteristics of laminar and turbulent flows, flow between parallel plates, flow through long tubes.

UNIT – IV **(12 lectures)**

SIMILITUDE AND FLOW MEASUREMENT: Flow through venturimeter and orifice meter, flow through notches and weirs Viscometers hot weir anenomometers, pitot tube flow through nozzles, Characteristics of real fluids.

UNIT – V **(12 lectures)**

CLOSED CONDUIT FLOW: laws of fluid friction, Darcy's equation, minor losses, pipes in series, pipes in parallel, total energy line and hydraulic gradient line, pipe network problem, variation of friction factor with Reynolds number, Moody's chart.

TEXT BOOKS:

1. P. N. Modi, S. M. Seth (2011), Hydraulics and fluid mechanics including hydraulic machines, 18th revised edition Standard Book House, India.
2. Yumus A. Cengel, John M. Cimbala (2010), Fluid Mechanics (SI Units), 2nd edition, Tata McGraw hill education (P) Ltd, New Delhi, India.

REFERENCE BOOKS:

1. R. K. Bansal (2011), A Textbook of Fluid Mechanics and Hydraulic Machines, 10th edition, Laxmi Publications, New Delhi, India.
2. Frank M. White (2011), Fluid Mechanics, 7th edition, Tata McGraw Hill, New Delhi, India.
3. John F. Dauglas (2005), Fluid Mechanics, 5th edition, Pearson Education Limited, New Delhi, India.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CE III Semester **VCE-R14**

BUILDING MATERIALS AND CONSTRUCTION

Course Code: A2102

L	T	P	C
3	1	0	4

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. Describethe process of construction formwork and finishing’s.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CE III Semester **VCE-R14**

BUILDING MATERIALS AND CONSTRUCTION

Course Code: A2102

L	T	P	C
3	1	0	4

SYLLABUS

UNIT - I **(12 lectures)**

STONES: Properties of building stones, relation to their structural requirements. Classification of stones, Stone quarrying, precautions in blasting, Dressing of stone.

BRICKS: Composition of good brick earth, various methods of manufacture of bricks. Comparison between clamp burning and kiln burning. Qualities of a good brick.

TILES: 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: Structure, properties. Classification of various types of woods used in buildings, Processing of timber – Felling, Seasoning, Conversion and Preservation of timber. Qualities of good timber, Defects in timber. Alternative materials for wood.

CEMENT: Various types of cement and their properties. Various ingredients of Cement concrete and their importance, Physical properties of cement, composition of ordinary cement, harmful constituents of cement, mixing of raw materials. Types of Admixtures its uses.

UNIT - III **(10 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 **(12 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. Panalled Door, glazed door, glazed windows, paneled windows, Swing ventilator, Fixed ventilator.

UNIT - V **(12 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., NewDelhi, India.
2. P. C. Varghese (2005*), Building materials,* Prentice Hall of India private Ltd, New Delhi, India.

REFERENCE BOOKS:

1. Rangwala (2011), Engineering Materials, Charotar Publishing House, Gujrat, India.
2. P. C. Varghese (2007), *Building Construction,* Prentice-Hall of India private Ltd, New Delhi, India.
3. S. K. Duggal (2008), *Building material* Second Edition, New Age International Publishers, New Delhi, India.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CE III Semester **VCE-R14**

SURVEYING - I

Course Code: A2103

L	T	P	C
3	1	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 (A2001)

Course Outcomes:

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

CO1. Understand the working principles and methods of surveying.
CO2. Measure the horizontal distances.
CO3. Take the levels of existing ground to determine the reduced level and plotting the contour maps.
CO4. Calculate angles, distances and levels.
CO5. Identify data collection methods and prepare field notes

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CE III Semester **VCE-R14**

SURVEYING - I

Course Code: A2103

L	T	P	C
3	1	0	4

SYLLABUS

UNIT–I **(12 Lectures)**

INTRODUCTION: Overview of plane surveying (chain, compass and plane table), objectives, principles, classifications, conventional symbols.

UNIT–II **(10 Lectures)**

DISTANCES AND DIRECTION: Distance measurement conventions and methods, use of chain and tape, Electronic distance measurements.

UNIT - III **(12 Lectures)**

LEVELING: Concept and Terminology, Temporary and permanent Adjustments, method of leveling.

CONTOURING: Characteristics and Uses of contours, methods of conducting contour surveys and their plotting.

UNIT – IV **(12 Lectures)**

COMPASS TRAVERSING: Introduction, Definition, Principles of compass surveying, Traversing, Method of traversing, check on closed traverse, Types of compass, whole circle Bearing, quadrant bearing, Fore Bearing and back Bearing, Declination, Included Angle, Local Attraction, Meridians, Azimuths and bearings.

UNIT - V **(10 Lectures)**

PLANE TABLE SURVEYING: Principle, Accessories of Plane Table, orientation, setting up over a station, Methods of plane Tabling, Errors and Precautions, Advantages and Disadvantages

TEXT BOOKS:

1. B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain (2005), *Surveying (Vol -1*), Laxmi Publications (P) ltd., NewDelhi, India.
2. R. Subramanian (2007), *Surveying and leveling*, Oxford university press, New Delhi, India.

REFERENCE BOOKS:

1. Duggal S. K (2004), *Surveying (Vol 1 & 2)*, Tata McGraw Hill Publishing Co. Ltd., New Delhi, India.
2. Arror K. R (2004), *Surveying (Vol 1, 2 &*3), Standard Book House, New Delhi, India.
3. Chandra A. M (2007), *Plane Surveying*, New Age International Pvt. Ltd. Publishers, New Delhi, India.
4. Katekar (1988), *Surveying and Leveling*, Pune Vidyarthi Griha Prakashan, India.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CE III Semester **VCE-R14**

STRENGTH OF MATERIALS - I

Course Code: A2104

L	T	P	C
4	0	0	4

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):NIL

- Mathematics-I (A2001)
- Engineering Mechanics-I (A2301)

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. Ability to design a section of beam to calculate the hoop and longitudinal stresses developed in thin & thick cylinder.

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 III Semester **VCE-R14**

STRENGTH OF MATERIALS - I

Course Code: A2104

L	T	P	C
4	0	0	4

SYLLABUS

UNIT - I **(12 Lectures)**

SIMPLE STRESSES AND STRAINS: Elasticity and plasticity, Types of stresses and strains, Hooke's law, Working stress, Factor of safety, Lateral strain, Poisson's ratio and volumetric strain, Elastic modules 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, shear force and bending moment diagrams for cantilever, simply supported and overhanging beams subjected to point loads, U.D.L., uniformly varying loads and combinations, Point of contra flexure, Relation between shear force, bending moment and rate of loading at a section of a beam.

UNIT - III **(12 Lectures)**

THIN CYLINDERS: Thin seamless cylindrical shells, Derivation of formula for longitudinal and circumferential stresses, hoop, longitudinal and volumetric strains, changes in dia, and volume of thin cylinders, Thin spherical shells.

THICK CYLINDERS : Introduction Lame's theory for thick cylinders, Derivation of Lame's formulae, distribution of hoop and radial stresses across thickness, design of thick cylinders, compound cylinders, Necessary difference of radii for shrinkage, Thick spherical shells.

UNIT - IV **(12 Lectures)**

FLEXURAL STRESSES: Theory of simple bending, Assumptions, Derivation of bending equation: $M/I = f/y = E/R$ Neutral axis, Determination bending stresses, section modulus of rectangular and circular sections (Solid and Hollow), I, T, Angle and Channel sections, Design of simple beam sections. Derivation of formula, Shear stress distribution across various beam sections like rectangular, circular, triangular, I, T angle sections.

UNIT - V **(12 Lectures)**

DEFLECTION OF BEAMS: Uniform 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.

TEXT BOOKS:

1. S. Ramamrutham (2008), *Strength of Materials*, Dhanpat Rai Publications, New Delhi, India.
2. R. K. Bansal (2010), *Introduction to text book of Strength of materials,* Laxmi publications Pvt. Ltd., New Delhi.

REFERENCE BOOKS:

1. R. K. Rajput (1999), *Strength of materials,* S.Chand & Co, New Delhi, India.
2. R. Subramanian (2010), *Strength of materials,* Oxford university press, New Delhi, India
3. Bhavi Katti (2009), *Strength of Materials,* Vikas Publishing House Pvt Ltd, India.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CE III Semester **VCE-R14**

ENVIRONMENTAL SCIENCE

Course Code: A2011

L	T	P	C
4	0	0	4

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 nonrenewable resources; Ecosystems; Biodiversity and its conservation; Environmental Pollution; Social Issues and the Environment

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 III Semester **VCE-R14**

ENVIRONMENTAL SCIENCE

Course Code: A2011

L	T	P	C
4	0	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, Organic farming and Food miles. 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. Equitable use of resources for sustainable lifestyles.

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 (ponds, streams, lakes, rivers, oceans and estuaries). 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 mega diversity nation, hot-sports 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 MEASURES: Environmental Pollution: definition, cause, effects and control measures of air pollution, water pollution, soil pollution, marine pollution, noise pollution, thermal pollution and nuclear hazards. 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. Social Issues and the Environment: From unsustainable to sustainable development, urban problems related to energy. 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, wasteland reclamation.

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, 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 Assesment: 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. Benny Joseph (2005), *Environmental Studies*, Tata McGraw Hill Publishing Company Limited, New Delhi.
2. Erach Bharucha (2005), *Textbook of Environmental Studies for Undergraduate Courses*, Universities Press, Hyderabad.

REFERENCE BOOKS:

1. Anji Reddy. M (2007), *Textbook of Environmental Sciences and Technology*, BS Publications, Hyderabad.
2. Rajagopalan. R (2009), *Environmental Studies*, Oxford University Press, New Delhi. 3. Anubha
3. Kaushik (2006), *Perspectives in Environmental Science*, 3rd Edition, New age international, New Delhi.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CE III Semester **VCE-R14**

STRENGTH OF MATERIALS LAB

Course Code: A2105

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 (A2301)
- Strength of Materials-I (A2104)

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 III Semester **VCE-R14**

STRENGTH OF MATERIALS LAB

Course Code:A2105

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. CE III Semester **VCE-R14**

SURVEYING – I LAB

Course Code: A2106

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 levelling 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 (A2103)

Course Outcomes:

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

CO1. Conduct survey and collect field data.
CO2 Prepare field notes from survey data
CO3 Interpret survey data and compute areas and volumes.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CE III Semester **VCE-R14**

SURVEYING – I LAB

Course Code: A2106

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 obstacles
3. Determination of distance between two inaccessible points with compass.
4. Surveying of a given area by prismatic compass (closed traverse) and plotting after Adjustment.
5. Radiation method, intersection methods by plane Table survey
6. Two point and three point problems in plane table survey
7. Traversing by plane table survey
8. Fly leveling (differential leveling)
9. An exercise of L.S and C.S and plotting
10. Two exercises on contouring.

SYLLABI FOR
IV SEMESTER

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CE IV Semester **VCE-R14**

CONCRETE TECHNOLOGY

Course Code: A2107

L	T	P	C
4	0	0	4

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. CE IV Semester **VCE-R14**

CONCRETE TECHNOLOGY

Course Code: A2107

L	T	P	C
4	0	0	4

SYLLABUS

UNIT-I **(14lectures)**

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 **(12lectures)**

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 **(12lectures)**

HARDENED CONCRETE-: water/cement ratio- 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, Nondestructive testing methods-codal provisions for NDT. Elasticity, Creep& Shrinkage-Modulus of elasticity- Dynamic modulus of elasticity- t -Creep of concrete- Factors influencing creep- Relation between creep& time- Effects of creep- Shrinkage- types of shrinkage.

UNIT- IV **(11lectures)**

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 pump able concretes by BIS method of mix design.

UNIT-V **(11lectures)**

SPECIAL CONCRETES: Light weight concrete-Light weight aggregate concrete- Cellular concrete- No-fines Concrete- Fiber reinforced concrete- Polymer concrete- Types of polymer concrete- Self compacting concrete.

TEXT BOOKS:

1. M. S. Shetty (2004), *Concrete Technology,* S. Chand & Co, New Delhi, India.
2. M. L. Gambhir (2004), *Concrete Technology,* Tata McGraw- Hill Publishers, New Delhi, India.

REFERENCE BOOKS:

1. Adam M. Neville (1996), *Properties of Concrete*, 4th edition, Low price Edition, John Wiley & Sons, New Delhi.
2. A. R. Santha Kumar (2007), *Concrete Technology*, Oxford University Press, New Delhi, India.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CE IV Semester **VCE-R14**

STRENGTH OF MATERIALS-II

Course Code: A2108

L	T	P	C
3	1	0	4

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):

- STRENGTH OF MATERIALS-I (A2104)

Course Outcomes:

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

CO1. Design simple springs and circular shafts for allowable stresses and loads.

CO2. Determine the stresses and strains in members subjected to combined loading and apply the theories of failure for static loading.

CO3. Estimate the load carrying capacity of simple structural elements subjected to different end conditions.

CO4. Apply the method of joints and sections to determine the forces in frames.

CO5. Determine the stresses in typicalstructures under the combined action of direct loading and bending.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CE IV Semester **VCE-R14**

STRENGTH OF MATERIALS-II

Course Code: A2108

L	T	P	C
3	1	0	4

SYLLABUS

UNIT – I **(12lectures)**

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, Principal stresses and strains, Analytical and graphical solutions.

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 and Maximum shear strain energy theory.

UNIT – II **(12lectures)**

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 and Gordon formula, Long columns subjected to eccentric loading, Secant formula, Empirical formulae, Straight line formula and Prof. Perry's formula. Laterally loaded struts – subjected to uniformly distributed and concentrated loads, Maximum B.M. and stress due to transverse and lateral loading.

UNIT – III **(12Lectures)**

TORSION OF CIRCULAR SHAFTS: Theory of pure torsion, Derivation of Torsion equations: T/J = q/r = N?/L – Assumptions made in the theory of pure torsion, Torsion 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 – IV **(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.

UNIT – V **(12Lectures)**

ANALYSIS OF PIN-JOINTED PLANE FRAMES: Determination of Forces in members of plane, pin-jointed, perfect trusses by (i) method of joints and (ii) method of sections. Analysis of various types of cantilever and simply supported trusses by method of joints and method of sections.

TEXT BOOKS:

1. R. K. Bansal (2010), A Text book of Strength of materials, Laxmi Publications (P) ltd., New Delhi, India.
2. 2. R. Subramanian (2010), Strength of Materials, Oxford University Press, New Delhi, India.

REFERENCE BOOKS:

1. R. S. Khurmi (2009), strength of Materials, s. chand, New Delhi, India.
2. S. Ramamrutham (2008), Strength of Materials, Dhanpat Rai Publications, New Delhi, India.
3. Bhavi Katti (2009), Strength of Materials, Vikas Publishing House Pvt Ltd, New Delhi, India.
4. B. S. Basavarajaiah (2010), Strength of Materials, Taylor Francis, USA

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CE IV Semester **VCE-R14**

STRUCTURAL ANALYSIS - I

Course Code: A2109

L	T	P	C
3	1	0	4

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 under different loading conditions and also it deals with the simply supported beams under kinematic loading conditions and to determine end moments by using slope deflection equations and also draw the shear force and bending moment diagrams. Also it deals with statically indeterminate trusses using energy theorems and Castigliano's theorems under different loading conditions in the structural system.

Prerequisite(s):

- Strength of Materials-II (A2108)

Course Outcomes:

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

CO1. Differentiate determinate and indeterminate structures.
CO2. Analyze indeterminate beams using different methods like slope-deflection method, Three moment theorem etc.
CO3. Solve simply supported beams under different kinematic loading conditions.
CO4. Evaluate deflections in a statically indeterminate trusses by applying energy theorems
CO5. Develop shear force and bending moment diagrams for various types of beams.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CE IV Semester **VCE-R14**

STRUCTURAL ANALYSIS - I

Course Code: A2109

L	T	P	C
3	1	0	4

SYLLABUS

UNIT - I **(10 Lectures)**

PROPPED CANTILEVERS: Analysis of propped cantilevers-shear force and bending moment diagrams, Deflection of propped cantilevers.

UNIT - II **(14 Lectures)**

FIXED BEAMS: Introduction to statically indeterminate beams with U.D. 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-Deflection of fixed beams effect of sinking of support, effect of rotation of a support.

CONTINUOUS BEAMS: Introduction, Clapeyron's theorem of three moments- Analysis of continuous beams with constant moment of inertia with one or both ends fixed-continuous beams with overhang, continuous beams with different moment of inertia for different spans-Effects of sinking of supports-shear force and Bending moment diagrams.

UNIT - III **(14 Lectures)**

MOVING LOADS: Introduction maximum SF and BM at a given section and absolute maximum S.F. 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 them and several point loads-Equivalent uniformly distributed load-Focal length.

INFLUENCE LINES: 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 single point load, U.D. load longer than the span, U.D. load shorter than the span- Influence lines for forces in members of Pratt and Warren trusses.

UNIT - IV **(10 Lectures)**

SLOPE-DEFLECTION METHOD: Introduction, derivation of slope deflection equation, application to continuous beams with and without settlement of supports.

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-Deflections of simple beams and pin jointed trusses.

UNIT - V **(10 Lectures)**

INDETERMINATE STRUCTURAL ANALYSIS: Indeterminate Structural Analysis, Determination of static and kinematic indeterminacies, Solution of trusses with up to two degrees of internal and external indeterminacies, Castigliano's theorem.

TEXT BOOKS:

1. V. N. Vazirani, M. M. Ratwani (1997), *Analysis of Structures* Vol. I and Vol. II, Khanna Publications, New Delhi.
2. S. S. Bhavikatti (2009), *Structural Analysis,* vol. 1, Vikas publishing House Pvt. Ltd, New Delhi, India.

REFERENCE BOOKS:

1. T. S. Thandavamoorthy (2011), *Analysis of Structures*, Oxford University Press, New Delhi, India.
2. Gupta, Pandit, Gupta (2008), *Theory of Structures*, Tata McGraw Hill Publishing Co.Ltd. , New Delhi, India.
3. B. D. Nautiyal (2001), *Introduction to structural analysis*, New age international publishers, New Delhi, India.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CE IV Semester **VCE-R14**

HYDRAULICS AND HYDRAULIC MACHINES

Course Code: A2110

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 (A2101)

Course Outcomes:

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

CO1. Derive the relations between model and prototype by using various techniques of dimensional analysis, similitude and modelling.

CO2. Apply the Impulse momentum equations to analyse impact forces in the hydraulicturbines

CO3. Design the most economical sections by understanding the open channel flow types and Characteristics

CO4. Analyse the types and working principles of turbines and installation techniques by calculating various hydraulic parameters

CO5. Demonstrate the working principles and installation and performance characteristics of centrifugal pumps

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CE IV Semester **VCE-R14**

HYDRAULICS AND HYDRAULIC MACHINES

Course Code: A2110

L	T	P	C
4	0	0	4

SYLLABUS

UNIT – I **(12 Lectures**

HYDRAULIC 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 – II **(12 Lectures**

BASICS OF TURBO MACHINERY: 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.

UNIT – III **(12 Lectures**

OPEN CHANNEL FLOW - I: Types of flows, Type of channels, Velocity distribution, Energy and momentum correction factors, Chezy's, Manning's and Bazin formulae for uniform flow, Most Economical sections.

CRITICAL FLOW: Specific energy, critical depth, computation of critical depth, critical sub-critical and super critical flows.

OPEN CHANNEL FLOW - II: 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 – IV **(12 Lectures**

HYDRAULIC TURBINES - I: Layout of a typical Hydropower installation, Heads and efficiencies, classification of turbines- Pelton wheel, Francis turbine and Kaplan turbine working, working proportions, velocity diagram, hydraulic design, draft tube, theory and function efficiency.

HYDRAULIC TURBINES - II: Governing of turbines, surge tanks, unit and specific turbines, unit speed, unit quantity, unit power and specific speed performance characteristics, geometric similarity, cavitation's.

UNIT – V **(12 Lectures**

CENTRAIFUGAL PUMPS: Pump installation details, classification, Manometric head, minimum starting speed, losses and efficiencies, specific speed multistage pumps, pumps in parallel, performance of pumps, characteristic curves, NPSH-cavitation's**.**

TEXT BOOKS:

1. Modi, Seth (2004), Fluid Mechanics, Hydraulic and Hydraulic Machines, Standard book house, New Delhi, India.
2. Dr. R. K. Bansal (2002), A text of Fluid mechanics and hydraulic machines, Laxmi Publications (P) ltd., New Delhi, India.

REFERENCE BOOKS:

1. R. S. Khurmi (2004), A text book of Hydraulics, Fluid Mechanics and Hydraulic machines, S. Chand, New Delhi,India.
2. K. R. Sharma (2003), Fluid Mechanics and Machinery, Anuradha Publications, New Delhi, India.
3. Banga, Sharma (1994), Hydraulic Machines, Khanna Publishers, New Delhi, India.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CE IV Semester **VCE-R14**

BUILDING PLANNING AND DRAWING

Course Code: A2111

L	T	P	C
4	0	0	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):NIL

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. Develop details of parts of building.

CO3. Model plan, elevation and section for sloped and flat buildings.

CO4. Interpret the sign conventions and different types of bonds used in brickwork.

CO5. Develop plan and elevation of doors and windows.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CE IV Semester **VCE-R14**

BUILDING PLANNING AND DRAWING

Course Code: A2111

L	T	P	C
4	0	0	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 **(12 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 **(12 Lectures**

SIGN CONVENTIONS AND BONDS: Brick, Stone, Plaster, Sand filling, Concrete, Glass, Steel, Cast iron, Copper alloys, Aluminum alloys etc., Lead, Zinc, tin, white lead etc., Earth, Rock, Timber and Marble. English bond & Flemish bond odd and even courses for one, one and half, two and two and half brick walls in thickness at the junction of a corner.

UNIT – IV **(12 Lectures**

DOORS, WINDOWS, VENTILATORS AND ROOFS: Panalled 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 **(12 Lectures**

SLOPED AND FLAT ROOF BUILDINGS: Given line diagram with specification to draw plan, section and elevation.

TEXT BOOKS:

1. Dr. N. Kumaraswamy (1992), Building Planning and Drawing, Tata McGraw-Hill, New Delhi, India.
2. Gurucharan Singh, Jagdeesh Singh (2010), Building Planning designing and Scheduling, Standard Publishers Distributors.

REFERENCE BOOKS:

1. R. L. Peurifoy et al (2010), Construction Planning, Equipment and methods, Tata McGraw- Hill Publications, New Delhi, India.
2. B. N. Dutta (2000), Estimating and Costing, UBS publishers, New Delhi, India.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CE IV Semester **VCE-R14**

SURVEYING - II

Course Code: A2112

L	T	P	C
4	0	0	4

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 (A2103)

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

(AUTONOMOUS)

B. Tech. CE IV Semester **VCE-R14**

SURVEYING - II

Course Code: A2112

L	T	P	C
4	0	0	4

SYLLABUS

UNIT–I **(14 Lectures)**

COMPUTATION OF AREAS AND VOLUMES: Area from field notes, computation of areas along irregular boundaries and area consisting of regular boundaries. Embankments and cutting for a level section and two level sections with and without transverse slopes, determination of the capacity of reservoir, volume of barrow pits.

UNIT–II **(12 Lectures)**

THEODOLITE: Theodolite, description, uses and adjustments temporary and permanent, Measurement of horizontal and vertical angles. Principles of Electronic Theodolite, Trigonometrically leveling, traversing**.**

UNIT - III **(12 Lectures)**

TACHEOMETRIC SURVEYING: Stadia and tangential methods of Tachometry. Distance and Elevation formulae for Staff Vertical position.

UNIT – IV **(10 Lectures)**

INTRODUCTION TO GEODETIC SURVEYING: Total Station and Global positioning system, Introduction to Geographic information system (GIS).

UNIT - V **(12 Lectures)**

CURVES: Types of curves, design and setting out simple and compound curves.

TEXT BOOKS:

1. B. C. Punmia, Ashok Kumar Jain, Arun Kumar Jain (2005), Surveying, Vol 1, 2 & 3, Laxmi Publications (P) Ltd., New Delhi, India.
2. Duggal S. K (2004), Surveying, Vol 1 & 2, Tata McGraw- Hill Publishing Co. Ltd. , New Delhi, India.

REFERENCE BOOKS:

1. Arthur R. Benton, Philip J. Taety (2000), Elements of Plane Surying, Tata McGraw- Hill, New Delhi, India.
2. R. Subramanian (2007), Surveying and leveling Oxford university press, New Delhi, India.
3. Candra A. M (2007), Plane Surveying, New Age International Pvt. Ltd, New Delhi, India.
4. Arror K. R (2004), Surveying, Vol. 1, 2 & 3, Standard Book House, New Delhi, India.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CE IV Semester **VCE-R14**

FLUID MECHANICS AND HYDRAULIC MACHINERY LAB

Course Code: A2113

L	T	P	C
0	0	3	2

Course Overview:

This course is offered to undergraduate students and its main objective of this lab course is to make the students in better understanding of fluid mechanics and its machines velocity and pressure, measuring head loss in terms of differential head, liquid jet forces acting on various type of vanes and measurement of flow rate by various devices such as orifice meter, weir etc

Prerequisite(s):

- Fluid Mechanics (A2101)
- Hydraulics and Hydraulic Machines (A2110)

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 andhands-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. CE IV Semester **VCE-R14**

FLUID MECHANICS AND HYDRAULIC MACHINERY LAB

Course Code: A2113

L	T	P	C
0	0	3	2

LIST OF EXPERIMENTS

1. Calibration of Venturimeter & Orifice meter
2. Determination of Coefficient of discharge for a small orifice by a constant head method.
3. Determination of Coefficient of discharge for an external mouth piece by variable head method.
4. Calibration of contracted Rectangular Notch and /or Triangular Notch
5. Determination of Coefficient of loss of head in a sudden contraction and friction factor.
6. Verification of Bernoulli's equation.
7. Impact of jet on vanes
8. Study of Hydraulic jump.
9. Performance test on Pelton wheel turbine
10. Performance test on Francis turbine.
11. Efficiency test on centrifugal pump.
12. Efficiency test on reciprocating pump.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CE IV Semester **VCE-R14**

SURVEYING – II LAB

Course Code: A2114

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):

- Surveying-II (A2112)

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. CE IV Semester **VCE-R14**

SURVEYING – II LAB

Course Code: A2114

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. Determination 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, Diff, height between tow inaccessible points using total stations

SYLLABI FOR
V SEMESTER

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CE V Semester

DESIGN OF REINFORCED CONCRETE STRUCTURES

Course Code: A2115

L	T	P	C
3	1	0	4

Course Overview:

This course is offered to undergraduate students, and it will give a clear idea on different design philosophies present in the design of reinforced concrete. The course will deliver a good knowledge on design of flexure, shear, torsion and compression members.

Prerequisite(s):

Strength of Material, Structural analysis-I&II, Concrete technology

Course Outcomes:

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

CO1. Distinguish the different design philosophies.
CO2. Analyze and design the flexure members.
CO3. Analyze and design the shear and torsion members.
CO4. Able to analyze and design the compression members.
CO5. Able to analyze and design the footing members.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CE V Semester

DESIGN OF REINFORCED CONCRETE STRUCTURES

Course Code: A2115

L	T	P	C
3	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 - 2007 - 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 by*Reinforced concrete design*. New age International Publishers, New Delhi.
2. S.Unnikrishna Pillai & Devadas Menon *Reinforced concrete design* by, Tata Mc.Graw Hill, New Delhi.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CE V Semester **VCE-R14**

GEOTECHNICAL ENGINEERING-1

Course Code: A2116

L	T	P	C
4	0	0	4

Course Overview:

Geotechnical Engineering deals with the behaviour of soils under the influence of load from the structures. This course serves as an introduction to geotechnical engineering and covers basic concepts and terminology. It uses the concepts of soil and rock mechanics to model real world engineering problems, aided by empirical observations and a systematic classification of soil materials which seeks to correlate classification and physical properties with engineering behaviour. The engineering properties such as shear strength, compressibility and permeability characteristics are studied in detail.

Prerequisite(s):NIL

Course Outcomes:

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

CO1. **Understand** the basic concepts of soil mechanics through classical theories.

CO2. **Estimate** the basic properties of soil for identification and classification.

CO3. **Evaluate** the engineering properties of the soil like shear strength, compressibility etc.

CO4. **Minimize** the distribution of stress coming on soil.

CO5. **Analyze** the compressibility of soils and evaluate design parameters.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CE V Semester **VCE-R14**

GEOTECHNICAL ENGINEERING-1

Course Code: A2116

L	T	P	C
4	0	0	4

SYLLABUS

UNIT–I **(12 Lectures)**

INTRODUCTION: Origin- Soil formation – soil structure and clay mineralogy – Adsorbed water – Mass- volume relationship–Relativedensity.

INDEXPROPERTIESOFSOILS:Grainsizeanalysis–SieveandHydrometermethods–consistencylimitsandindices–I.S. Classificationofsoils

UNIT–II **(12 Lectures)**

PERMEABILITY:Soilwater–capillaryrise–flowofwaterthroughsoils–Darcy'slaw-permeability–Factorsaffecting–laboratorydetermination ofcoefficientofpermeability–Permeability oflayeredsystems.In-situpermeabilitytests (pumping-inandpumping-outtests)

SEEPAGETHROUGHSOILS: Total, neutraland effectivestresses –quick sand condition– Seepagethrough soils – Flownets:CharacteristicsandUses.

UNIT–III **(12 Lectures)**

STRESSDISTRIBUTIONINSOILS:Boussinesq'sandWestergaard'stheoriesforpointloadsandareasofdifferentshapes–Newmark'sinfluencechart.

COMPACTION: Mechanism of compaction – factors affecting – effects of compaction on soil properties. – Field compactionEquipment–compactionqualitycontrol.

UNIT–IV **(12 Lectures)**

CONSOLIDATION: Springanalogy-Voidratio andeffectivestress(evslogprelationship-Tergaghi'stheoryofonedimensionalconsolidation– Assumptionsand derivation of GoverningDifferential Equation (GDE)-Computationof magnitudeofsettlementandtimerateofsettlement

UNIT–V **(12 Lectures)**

SHEARSTRENGTHOFSOILS:Importanceofshearstrength-Mohr's –Coulomb'sFailuretheories–ShearParameters-Laboratorytestsfordetermination of strengthtests–Directsheartest,Tri-axialcompressiontest(UU,CUandCD)and unconfinedcompressiontests-Vanesheartest. Factorsaffectingshearstrengthofcohesionlessandcohesivesoils-Determinationofelasticmoduli.

TEXTBOOKS:

1. GopalRanjan& ASRRao*BasicandAppliedSoilMechanics*by,NewageInternationalPvt. Ltd,NewDelhi
2. K.R.Arora*SoilMechanicsandFoundationEngineering*.By,StandardPublishersandDistributors,Delhi.Ltd., NewDelhi
3. C.Venkataramiah*GeotechnicalEngineering*by,NewageInternationalPvt. Ltd,(2002).
4. V.N.S.Murthy *SoilMechanicsandFoundationEngineering*.By,CBSPublishersandDistributors.
5. B.M.Das*PrinciplesofgeotechnicalEngineering*by,Cingagelearningpublishers

REFERENCES:

3. B.C.Punmia*SoilMechanicsandFoundation*byby,AshokKumarJainandArunKumarJain, Laxmi,Publications Pvt.
4. T.W.LambeandWhitmanSoil*Mechanics*–,Mc-GrawHillPublishingCompany,Newyork.
5. PurushothamRaj*GeotechnicalEngineering*by

6. ManojDutta&GulatiS.K*GeotechnicalEngineering*by–TataMc.GrawhillPublishersNewDelhi.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CE V Semester **VCE-R14**

WATER RESOURCES ENGINEERING-1

Course Code: A2117

L	T	P	C
4	0	0	4

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):Fluid Mechanics

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. CE V Semester **VCE-R14**

WATER RESOURCES ENGINEERING-1

Course Code: A2117

L	T	P	C
4	0	0	4

SYLLABUS

UNIT –I **(12 Lectures)**

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.

Abstraction from rainfall – 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)**

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 and versa – S – hydrograph, synthetic Unit Hydrograph.

UNIT – III **(12 Lectures)**

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 – well Construction – well Development.

UNIT – IV **(12 Lectures)**

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 Roation, preparation of land for Irrigation, standards of quality for Irrigation water.

Soil – water – plant relationship, vertical distribution of soil moisture, soil moisture constants, soil moisture tension, 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 **(12 Lectures)**

Classification of canals, Design of Irrigation canal by Kennedy's and Lacey's theories, balancing depth of cutting, IS standards for a canal design canal lining

Design Discharge over a catchment, computation of design discharge – rational formula, SCS curve number method, flood frequency analysis – Introductory part only. Stream Gauging – measurement and estimation of stream flow.

TEXT BOOKS:

1. Jayaram Reddy *Engineering Hydrology* by, Laxmi publication pvt.Ltd., New Delhi
2. punmia& Lal *Irrigation and water power engineering* by, Laxmi publications pvt. Ltd., New Delhi

REFERENCES:

1. V.P.Singh *Elementary hydrology* by, PHI publications.
2. P.N.Modi *Irrigation and water Reasources& Water power* by, Standard Book House.
3. D.K. Majundar *Irrigation water Managemen*t by, Printice Hall of India.
4. S.K. Grag *Irrigation and Hydraulic structures* by.

5. Vent te chow *Applied hydrology* by, David R. MaidmentlarryW.Mays Tata MC. Graw Hill
6. Viessvann *Introduction to hydrology* by Warren, Jr. Garryl. Lewis, PHI

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CE V Semester **VCE-R14**

STRUCTURAL ANALYSYS-II

Course Code: A2118

L	T	P	C
3	1	0	4

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-deflection method and Matrix method of analysis under different loading conditions and also it deals with the Indeterminate trusses and also draw the shear force, bending moment diagrams and influence line diagram for indeterminate structures under different loading conditions in the structural system.

Prerequisite(s):

- Structural analysis – 1 (A2109)

Course Outcomes:

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

CO1. Analyze two hinged arches and trusses under different loading conditions.
CO2. Solve Multi-storied building frames using different methods.
CO3. Apply Matrix methods of analysis to continuous beams and frames under different loading systems.
CO4. Evaluate end moments for the frames subjected to lateral loads using different methods.
CO5. Develop influence line diagram for continuous beams and propped cantilever beams.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CE V Semester **VCE-R14**

STRUCTURAL ANALYSYS-II

Course Code: A2118

L	T	P	C
3	1	0	4

SYLLABUS

UNIT – I
(12LECTURES)
MOMENT DISTRIBUTION METHOD: Analysis of single Bay Single Story Portal Frames including side sway. Analysis ofinclined frames.
KANI'S METHOD: Analysis of continuous beams including settlement of supports. Analysis of single bay single storey andsingle bay two storey Frames by Kani's Method Including Side sway. Shear force and bending moment diagrams. Elastic curve.

UNIT – II
(12LECTURES)
SLOPE DEFLECTION METHOD: Analysis of single Bay - Single storey Portal Frames by Slope Deflection Method IncludingSide Sway. Shear force and bending moment diagrams. Elastic curve.
TWO HINGED ARCHES: Introduction - Classification of Two hinged Arches - Analysis of Two Hinged Parabolic arches -Secondary stresses in two hinged arches due to temperature and elastic shortening of rib.

UNIT – III **(10LECTURES)**
APPROXIMATE METHODS OF ANALYSIS: Introduction - Analysis of multi- storey frames for lateral loads: Portal Method,Cantilever method and Factor method. Analysis of multi- storey frames for gravity (vertical) loads. Substitute Frame method. Analysis of Mill bents.

UNIT – IV
(14LECTURES)
MATRIX METHODS OF ANALYSIS: Introduction - Static and Kinematic Indeterminacy - Analysis of continuous beamsincluding settlement of supports, using stiffness method. Analysis of pin-jointed determinate plane frames using stiffness method - Analysis of single bay single storey frames including side sway, using stiffness method. Analysis of continuous beams up to three degree of indeterminacy using flexibility method. Shear force and bending moment diagrams. Elastic curve.

UNIT – V
(12LECTURES)
INFLUENCE LINES FOR INDETERMINATE BEAMS: Introduction - ILD for two span continuous beam with constant andvariable moments of inertia. ILD for propped cantilever beams.
INDETERMINATE TRUSSES: Determination of static and kinematic indeterminacies - Analysis of trusses having single andtwo degree of internal and external indeterminacies - Castigliano's second theorem.

TEXT BOOKS:

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

REFFERENCES:

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

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CE V Semester **VCE-R14**

ENGINEERING GEOLOGY

Course Code: A2119

L	T	P	C
3	1	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. Outline the importance of Tunnels.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CE V Semester **VCE-R14**

ENGINEERING GEOLOGY

Course Code: A2119

L	T	P	C
3	1	0	4

SYLLABUS

UNIT – I
(12LECTURES)

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
(12LECTURES)

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
(12LECTURES)

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
(12LECTURES)

GEOLOGY OF DAMS RESERVOIRS: Types of dams and bearing of Geology of site in their selection, 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. Fundamental aspects of Rock mechanics and Environmental Geology.

UNIT – V
(12LECTURES)

TUNNELS: Purposes of tunnelling, Effects of Tunnelling on the ground Role of Geological Considerations (lithological, structural and ground water) in tunnelling over break and lining in tunnels. Tunnels in rock, subsidence over old mines, mining substances

TEXT BOOKS:

1. N. Chennkesavulu *Engineering Geology* by, McMillan, India Ltd. 2nd addition
2. K.V.G.K. Gokhale *Principals of Engineering Geology* by– B.S publications
3. SubinoyGangopadhyay *Engineering Geology* by.Oxward University press

REFERENCES:

1. P.C.Varghese *Engineering Geology for Civil Engineering*, , PHI Learning& private Limited
2. AureleParriaux *Geology of Engineering* by, CRCpress
3. Butterworths,F.G. Bell, *Fundamental of Engineering Geology* Publications, New Delhi, 1992.
4. Krynine& Judd, Principles of *Engineering Geology*& Geotechnics, CBS Publishers & Distribution,

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CE V Semester **VCE-R14**

ESTIMATING AND COSTING

Course Code: A2120

L	T	P	C
3	1	0	4

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 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**.**

CO5.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CE V Semester **VCE-R14**

ESTIMATING AND COSTING

Course Code: A2120

L	T	P	C
3	1	0	4

SYLLABUS

UNIT – I
(12LECTURES)
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
(12LECTURES)
Earthwork for roads and canals.

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

UNIT – IV
(12LECTURES)
Reinforcement bar bending and bar requirement schedules. Contracts - Types of Contracts - Contract Documents - Conditions of contract.

UNIT – V
(12LECTURES)
Valuation of Buildings. Standard specifications for different items of building construction.

TEXT BOOKS:

1. B.N.Dutta *Estimation and Costing* by, USB publishers, 2000
2. G.S.Birdie *Estimation and costing* by.

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 by; Laxmi publications.
4. National Building Code.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CE V Semester **VCE-R14**

COMPUTER AIDED DRAFTING OF BUILDINGS LAB

Course Code: A2121

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.

CO5.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CE V Semester **VCE-R14**

COMPUTER AIDED DRAFTING OF BUILDINGS LAB

Course Code: A2121

L	T	P	C
0	0	3	2

LIST OF EXPERIMENTS

1. Introduction to Computer Aided Drafting
2. Software f or Cad-Introduction to Different Software
3. Practice exercises on CAD software
4. Drawing of plans of buildings using software
   a.Single storeyed buildings
   b.multi storeyed buildings
5. Developing sections and elevations for
   a.Single storeyed building
   b.multi storyed buildings
6. Detailing of building components like Doors, Windows, Roof Trusses etc. using CAD software's
7. Exercises on development of working of buildings.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CE V Semester **VCE-R14**

ENGINEERING GEOLOGY LAB

Course Code: A2122

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. CE V Semester **VCE-R14**

ENGINEERING GEOLOGY LAB

Course Code: A2122

L	T	P	C
0	0	3	2

LIST OF EXPERIMENTS

1. Study of physical properties and identification of minerals referred under theory.
2. Megascopic and microscopic description and identification of rocks referred under Theory.
3. Megascopic identification of rocks & Minerals.
4. Interpretation and drawing of sections for geological maps showing tilted beds, faults, unconformities.
5. Simple Structural Geology problems.

SYLLABI FOR
VI SEMESTER

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CE VI Semester

DESIGN OF STEEL STRUCTURES

Course Code: A2123

L	T	P	C
4	0	0	4

Course Overview:

This course is offered to undergraduate students, and it mainly deals with the design of connections such as welded and bolted connections. The design of tension members, compression member and welded plate girders.

Prerequisite(s):

Strength of Material, Structural analysis-I&II.

Course Outcomes:

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

CO1. Distinguish the different design philosophies.

CO2. Analyze and design the different types connections.

CO3. Analyze and design the steel structures subjected to compression.

CO4. Analyze and design the steel structures subjected to tension.

CO5. Analyze and design the Plate girders.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CE VI Semester

DESIGN OF STEEL STRUCTURES

Course Code: A2123

L	T	P	C
4	0	0	4

SYLLABUS

UNIT - I **(12 Lectures)**

Materials - Making of iron and steel - Types of structural steel - mechanical properties of steel - Concepts of plasticity - yield strength. Loads - and combinations loading wind loads on roof trusses, behaviour of steel, local buckling. Concept of limit State Design - Different Limit States as per IS 800 - 2007 - Design Strengths - deflection limits - serviceabiolity - Bolted connections - Welded connections - Design Strength - Efficiency of joint - Prying action Types of Welded joints - Design of Tension members - Design Strength of members.

UNIT -II **(12 Lectures)**

Design of compression members - Buckling class - slenderness ration / strength design - laced - battened columns - column splice - column base - slab base.

UNIT -III **(12 Lectures)**

Design of beams - Plastic moment - Bending and shear strength laterally / supported beams design - Built up sections - large plates Web Buckling Crippling and Deflection of Beams, Design of Purlin.

UNIT -IV **(10 Lectures)**

Design of eccentric connections with brackets, Beam end connections - Web angle - Un-stiffened seated connections (bolted and Welded types) Design of truss joints

UNIT - V **(14 Lectures)**

Design of welded 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. N.Subramanian(2009)*Design of steel structures* -, Oxford University Press
2. S.K.Duggal (2010) Limit State *Design of steel structures*, , Tata McGraw- Hill

REFERENCE BOOKS:

1. K.S.Sai Ram*Design of steel structures* by, Person Education.
2. H.Gaylord, Jr.CharlesN.Gaylord and James Stallmeyer *Design of Steel Structures* Edwin Tata McGraw-Hill Education pvt.Ltd.
3. Ramchandra,*Design of steel structures Vol. 1& 2* - Standard Publications.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CE VI Semester **VCE-R14**

GEOTECHNICAL ENGINEERING-II

Course Code: A2124

L	T	P	C
3	1	0	4

Course Overview:

Foundations provide the connection between man-made structures and the geosphere, with foundation engineering being concerned with soil-structure interaction. Geotechnical Engineering II introduces the background theory required in foundation engineering.The main objective is to introduce the principles of shear strength theory, which are required for the design and analyses of foundations of structures, including buildings, bridges, and retaining structures. A varietyoftheproblems encounteredwithinthesoilmassesare manifestedas slopefailure,foundationfailureetc. the theoriesof earthpressureandslope stabilityprovidesthenecessaryinsightintothese difficulties.The necessary principlesandrequirementsfortheselectionoffoundations,bothdeepandshallowfoundations aredealt with in detail togetherwiththerequired designpractices.

Prerequisite(s):Geotechnical engineering-I

Course Outcomes:

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

CO1. Analyze complex geotechnical engineering problems.

CO2. Summarizetheneedandimportanceoffieldreconnaissance inthedesignof major projects.

CO3. Determinethe magnitude and direction of earth pressure.

CO4. Estimate parametersfor thedesignbyapplyingtheprinciples of geotechnical engineeringcritically, subjectivelyandquantitativelyfor thesuccessfuldesignoffoundations,earthretainingwallsand hydraulicstructureswith dueconsiderations to thenecessaryfactorsofsafety.

CO5. Comparetheclassicalsoil-mechanics tothenewagetechniques.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CE VI Semester **VCE-R14**

GEOTECHNICAL ENGINEERING-II

Course Code: A2124

L	T	P	C
3	1	0	4

SYLLABUS

UNIT–I **(12LECTURES)**

SOILEXPLORATION:Need–Methodsofsoilexploration–BoringandSamplingmethods–Fieldtests–Penetration Tests,Plateloadtest–Pressuremeter–planningofProgrammeandpreparationofsoilinvestigationreport.

UNIT–II

(12LECTURES)

EARTHSLOPESTABILITY:Infiniteandfiniteearthslopes–typesoffailures–factorofsafetyofinfiniteslopes–stabilityanalysisbySwedisharcmethod,standardmethodofslices,Bishop'sSimplifiedmethod–Taylor'sStabilityNumber-Stabilityof slopesof earthdamsunderdifferentconditions.

UNIT–III **(12LECTURES)**

EARTH PRESSURETHEORIES:States of earth pressures-Active,Passive and at rest conditions-Rankine'stheory-Computation ofActiveandPassiveEarthPressuresinCohesionlessandCohesivesoils,Coloumb's wedgetheory–Culmann'sgraphicalmethod

RETAININGWALLS:Typesofretainingwalls–stabilityofretainingwallsagainstoverturning,Sliding,bearingcapacityand drainagefrombackfill.

UNIT–IV **(12 LECURES)**

SHALLOWFOUNDATIONS-STREANGTHCRITERION:Types-Choiceoffoundation-Locationofdepth-safebearingcapacity-TerzaghiandMeyrhoff,SkemptonandIS methods.

SHALLOWFOUNDATIONS–settlementcriteria–SafebearingpressurebasedonNvalue-Allowablebearingpressure: Safebearingcapacity-Allowablesettlementofstructures

UNIT–V **(12 LECTURES)**

PILEFOUNDATION:Typesofpiles–Loadcarryingcapacityofpilesbasedonstaticpileformulaeindifferentsoils–Dynamicpileformulae–Pileloadtests-Loadcarryingcapacityofpilegroupsinsandsandclays–Settlementofpile groups.

WELLFOUNDATIONS:Types–Different shapesof wells –Componentsofwells –functionsanddesignCriteria–Sinkingofwells– Tiltsandshifts.

TEXTBOOKS:

1. GopalRanjan& ASRRao,*BasicandAppliedSoilMechanics*byNewAgeInternationalPvt.Ltd,(2004).
2. ByV.N.S.Murthy*SoilMechanicsandFoundationEngineering*.,CBSPublishersandDistributors.
3. Bowles,J.E.,(1988)*FoundationAnalysisandDesign–4thEdition*,McGraw-HillPublishingcompany,Newyork.
4. ByK.R.Arora*SoilMechanicsandFoundationEngineering*.,StandardPublishersandDistributors,Delhi

REFERENCES:

1. C.Venkataramiah*GeotechnicalEngineering*by,NewageInternationalPvt. Ltd,(2002).
2. Das,B.M.,-(1999)Principlesof*FoundationEngineering*–6thedition(Indianedition)Thomso Engineering
3. SwamiSaran*AnalysisandDesign*ofSubstructures–,OxfordandIBHPublishingcompanyPvtLtd(1998).

4. S.K.Gulhati&ManojDatta*GeotechnicalEngineering*by–TataMc.GrawHillPublishingcompanyNewDelhi.2005.
5. B.C.Punmia,AshokKumar Jain andArun Kumar Jain*Soil MechanicsandFoundations*by-by,Laxmi,publications Pvt.Ltd.,NewDelhi
6. Varghese, P.C.,*FoundationEngineering*byPrenticeHallofIndia.,NewDelhi.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CE VI Semester **VCE-R14**

TRANSPORTATION ENGINEERING

Course Code: A2125

L	T	P	C
3	1	0	4

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. Understand different modes of transportation and planning stages for highways.

CO2. Design various highway geometric elements using the knowledge of mechanics and applying the principles of equilibrium conditions.

CO3. Identify the different rules, regulations and different signal systems based on traffic flow.

CO4. Build knowledge of the different types of intersections and their advantages.

CO5. Create awareness of highway construction material and maintenance.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CE VI Semester **VCE-R14**

TRANSPORTATION ENGINEERING

Course Code: A2125

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 DistanceDesign 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 StudiesData 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 UNChannelized 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 Materiel 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, BituminousConcrete Construction of Cement Concrete Pavements- Construction of joints on cementsConcrete Pavements-joint Filler and Seal- Pavement Failures- Maintenance of Highways- Highway Drainage.

TEXT BOOKS:

1. S.K.Khanna&C.E.G.Justo, Nemchand& Bros *Highway Engineering* –., 7th edition (2000).
2. S.P.chadula *Railway Engineering – A text book of Transportation Engineering* –– S.Chand& Co. Ltd. – (2001).
3. L.R.Kadiyali and Lal *Highway Engineering Design* –- Khanna Publications.
4. S.K.Khanna and Arora,Nemchand Bros *Airport Planning and Design*-.

REFERENCES:

1. S.P.Bindra ,DhanpatRai& Sons *Highway Engineering* –. – 4th Edition (1981)
2 Dr.L.R.Kadyali *Traffic Engineering & Transportation* Planning –, Khanna publications – 6th Edition – 1997.
2. *Railway Engineering* – August – Prabha& Co., 15th Edition – 1994.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CE VI Semester **VCE-R14**

WATER RESOURCES ENGINEERING - II

Course Code: A2126

L	T	P	C
4	0	0	4

Course Overview:

The student will able to develop skills in mathematical modelling of both natural and engineering water resource systems that are used to analyse 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 VI Semester **VCE-R14**

WATER RESOURCES ENGINEERING - II

Course Code: A2126

L	T	P	C
4	0	0	4

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 **(12 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 dam: 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 **(12 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 distributary 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. Garge *Irrigation engineering and hydraulic structures* by, Khanna publications pvt.Ltd., New Delhi
2. Punmia& Lal *Irrigation and water power engineering* by, Laxmi publications pvt.Ltd., New Delhi

REFERENCES:

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

4. R.K.Sharma and T.K.Sharma *Irrigation Engineering* by, S. Chand publishers
5. warrenViessvann, Jr.Gary *Introduction to hydrology* by. Lewis, PHI
6. CS Pojha, R.Berndtsson and P.Bhunya *Engineering Hydrology* by, Oxford University press

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CE VI Semester **VCE-R14**

ENVIRONMENTAL ENGINEERING-1

Course Code: A2127

L	T	P	C
4	0	0	4

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 engineers 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 optimizing 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. CE VI Semester **VCE-R14**

ENVIRONMENTAL ENGINEERING-1

Course Code: A2127

L	T	P	C
4	0	0	4

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, confined and unconfined aquifers- 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 .Design of sewers 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 rat- 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.Birdie *Water supply& Sanitary Engineering*
2. B.C.Punmia, Ashok jain&Arun Jain, Water supply Engineering, Vol. I waste water Engineering. Vol. IILaxmi Publications Pvt.ltd New Delhi
3. .P.N.Modi *Water Supply Engineering Vol.I& waste water Engineering Vol. II*, Standard Book Publishers, NewDelhi.

REFERENCES:

1. Mark J Hammer and Mark J Hammer Jr *Waste Water Technology*
2. Steel .*Water and Waste Water Technology*
3. Fair Geyer and Okun*Waste Water Engineering*
4. Metcalf and Eddy, Waste Water Engineering
5. Ronald L Drose, *Theory& practice of water & waste water Treatment*, Wiley India Publishers

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CSEVI Semester **VCE-R14**

1

(InterdepartmentalElective - I)

Course Code: A3001

L	T	P	C
4	-	-	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)

B. Tech. CSEVI Semester **VCE-R14**

1

(Interdepartmental Elective - I)

Course Code: A3001

L	T	P	C
4	-	-	4

SYLLABUS

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CSEVI Semester **VCE-R14**

2

(Interdepartmental Elective - I)

Course Code: A3001

L	T	P	C
4	-	-	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)

B. Tech. CSEVI Semester **VCE-R14**

2

(Interdepartmental Elective - I)

Course Code: A3001

L	T	P	C
4	-	-	4

SYLLABUS

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CSEVI Semester **VCE-R14**

3

(Interdepartmental Elective - I)

Course Code: A3001

L	T	P	C
4	-	-	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)

B. Tech. CSEVI Semester **VCE-R14**

3

(Interdepartmental Elective - I)

Course Code: A3001

L	T	P	C
4	-	-	4

SYLLABUS

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CSEVI Semester **VCE-R14**

4

(Interdepartmental Elective - I)

Course Code: A3001

L	T	P	C
4	-	-	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)

B. Tech. CSEVI Semester **VCE-R14**

4

(Interdepartmental Elective - I)

Course Code: A3001

L	T	P	C
4	-	-	4

SYLLABUS

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CSEVI Semester **VCE-R14**

5

(Interdepartmental Elective - I)

Course Code: A3001

L	T	P	C
4	-	-	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)

B. Tech. CSEVI Semester **VCE-R14**

5

(Interdepartmental Elective - I)

Course Code: A3001

L	T	P	C
4	-	-	4

SYLLABUS

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CSEVI Semester **VCE-R14**

6

(Interdepartmental Elective - I)

Course Code: A3001

L	T	P	C
4	-	-	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)

B. Tech. CSEVI Semester **VCE-R14**

6

(Interdepartmental Elective - I)

Course Code: A3001

L	T	P	C
4	-	-	4

SYLLABUS

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CSEVI Semester **VCE-R14**

Lab-1

Course Code: A2128

L	T	P	C
-	-	3	2

Course Overview:

Environmental Engineering is concerned with the regulation of the natural environment, including one ofthe most fundamental requirements of human living - the provision of clean water. The environmentalengineer is involved in all aspects of the cycle of water supply and purification and is also concerned withthe treatment and safe disposal of waste water and other effluents generated, as well as clean air andland. 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, thiscourse will appeal to you.

Prerequisite(s): Engineering Chemistry, Environmental Engineering-I

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

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CE VI Semester **VCE-R14**

ENVIRONMENTAL ENGINEERING LAB

Course Code: A2128

L	T	P	C
-	-	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. CE VI Semester **VCE-R14**

GEOTECHNICAL ENGINEERING LAB

Course Code: A2129

L	T	P	C
-	-	3	2

Course Overview:

The course applies and extends the fundamental understanding of soil mechanics to the design of geotechnical engineering systems. The following topics are examined: site investigations and in situ testing; lateral earth pressures and retaining wall design; foundation design; loading induced stresses and displacements; bearing capacity of shallow foundations; design of shallow foundations; analysis and design of pile foundations; pavement design; and the stability of slopes.

Prerequisite(s): GeotechnicalengineeringI

Course Outcomes:

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

CO1. Determinethe indexpropertiesof thesoil

CO2. Classifythesoilbasedontheindexpropertiesof thesoil

CO3. Evaluatethefieldqualitycontrolofembankmentsadsubgrades

CO4. Determinetheengineeringpropertiesof thesoil

CO5. Estimate theshearstrengthundercontrolled drainageconditions

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CE VI Semester **VCE-R14**

GEOTECHNICAL ENGINEERING LAB

Course Code: A2129

L	T	P	C
-	-	3	2

LIST OF EXPERIMENTS

1. Atterberg'sLimits.
2. Fielddensity-corecutterandsandreplacementmethod
3. Grainsizeanalysis
4. Permeabilityofsoil,constantandvariableheadtest
5. Compactiontest
6. CBRTest
7. Consolidationtest
8. Unconfinedcompressiontest
9. Tri-axialCompressiontest
10. Directsheartest.
11. Vanesheartest

SYLLABI FOR
VII SEMESTER

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CIVIL VII Semester **VCE-R14**

REMOTE SENSING AND GIS APPLICATIONS

Course Code: A2130

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 andterminology of GIS and also includes how the data is presented and data base management system. In thiscourse the applications of remote sensing and GIS in civil engineering.

Prerequisite(s): Surveying – I, Surveying – II

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. CIVIL VII Semester **VCE-R14**

REMOTE SENSING AND GIS APPLICATIONS

Course Code: A2130

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 fidcial 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,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)

VECTOR DATA MODEL: Representation of simple features - Topology and its importance; coverage and its data structure, Shape file; Data Models for composite features Object Based Vector Data Model; Classes and Their Relationship; The geobase data model; Geometric representation of spatial Feature and Data Structure, Topology rules.

UNIT –V (12 Lectures)

RASTER DATA MODEL: Elements of Raster data Model, Types of Raster Data, Raster Data Structure, Data Conversion, Integration of Raster and Vector data.

DATA INPUT: Metadata, Conversion of Existing data, creating new data; Remote Sensing data, Field data, Text data, Digitizing, Scanning, on Screen digitizing, importance of source map, Data Editing.

TEXTBOOKS:

1. L.R. A Narayana (1999), *Remote Sensing and its applications*, University Press 1999.

2. Peter A Burragh and Rachael. A. Mc Donnell (2004), *Principals of Geo physical Information Systems*, Oxford Publishers, 2004

REFERENCE

1. C.P.Lo Albert, K.W. Yonng, *Concepts & Techniques of GIS*, Prentice Hall (India) Publications.

2. M.Anji Reddy (2001), Remote Sensing and Geographical Information systems, JNTU Hyderabad, B.S.Publications.
3. S.Kumar, *Basics of Remote sensing & GIS*, Laxmi Publications

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CIVIL VII SEMESTER **VCE-R14**

DESIGN AND DRAWING OF HYDRAULIC STRUCTURES

Course Code: A2131

L	T	P	C
3	1	0	3

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): Water ResourcesEngineering- I, Water ResourcesEngineering- I, FluidMechanics

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. CIVIL VII SEMESTER **VCE-R14**

DESIGN AND DRAWING OF HYDRAULIC STRUCTURES

Course Code: A2131

L	T	P	C
3	1	0	3

SYLLABUS

Design and drawing of the following hydraulic structures.

GROUP A

1. Surplus Weir.
2. Syphon Well Drop
3. Trapezoidal notch fall
4. Tank sluice with tower head

GROUP B

1. Sloping glacis weir
2. Canal regulator
3. Under Tunnel
4. Type III Syphon aqueduct

FINAL EXAMINATION PATTERN:

The question paper is divided into two parts with two parts with two questions in each part.The student has to answer ONE question from each part. .Part I should cover the designs andDrawing from Group A for 45 marks and part II should cover only designs from Group B carrying 30 marks.The duration of the examination will be Three hours. However, the students are supposed to practice the drawing for Group B structures also for internal evaluation.

TEXT BOOKS:

1. Challa Satyanarayana Murthy, *Water Resources Engineering,* Principles and Practice by, New Age. International Publishers.
2. S.K. Garg, *Irrigation Engineering and Hydraulic structures*, Standard Book House

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CIVIL VII SEMESTER **VCE-R14**

ENVIRONMENTAL ENGINEERING - II

Course Code: A2132

L	T	P	C
4	0	0	4

Course Overview:

This course is offered to undergraduate students and it deals with air pollution and control along with noise pollution control methods. It also deals with industrial, solid and hazardous waste management and treatment methods

Prerequisite(s): Environmental Engineering-I

Course Outcomes:

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

CO1. Categorize the characteristics and suggest suitable methods of treatment and disposal of industrial wastewater

CO2. Choose suitable methods for collection, transport, recovery, reuse and treatment of urban solid waste

CO3. Illustrate on noise pollution and suggest suitable noise control techniques according to the situation

CO4. Examine global implications of air pollution and suggest suitable methods of control of particulate pollution depending on concentration and size of the particulate matter

CO5. Improve biological treatment with new and more advanced treatment methods

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CIVIL VII SEMESTER **VCE-R14**

ENVIRONMENTAL ENGINEERING - II

Course Code: A2132

L	T	P	C
4	0	0	4

SYLLABUS

UNIT– I **(12Lectures)**

AIR POLLUTION & CONTROL: Air Pollution – sources of pollution, Classification of pollutants, effects on human beings, Global effects of Air pollution. Air pollution Control Methods – Particulate control devices, General Methods of Controlling Gaseous Emission

NOISE POLLUTION: Effects of noise and control methods, Effluent standards, Air emission standards

UNIT–II **(12 Lectures)**

SPECIAL TREATMENT METHODS: Adsorption, Reverse Osmosis, Defluoridation, Ion exchange, Ultra Filtration.

UNIT–III **(12 Lectures)**

THEORIES INDUSTRIAL WASTE TREATMENT: Volume reduction, strength reduction, Neutralization, Equalization, Proportioning. Nitrification and Denitrification, Removal of Phosphates.

UNIT – IV **(12 Lectures)**

SOLID WASTE MANAGEMENT: Sources, composition and properties of solid waste, collection and handling, separation and processing of Solid waste, disposal methods – Land filling, Incineration and composting

UNIT – V **(12 Lectures)**

HAZARDOUS WASTE: Nuclear waste, Biomedical wastes, chemical wastes their disposal and treatment methods.

TEXT BOOKS:

1. C.S. Rao (2006), *Environmental Pollution control Engineering*, New Age International Publications, New Delhi, India.
2. Suresh K. Dhameja (2005), *Environmental Engineering and Management*, 2nd Edition, S. K. Kartarai & Sons, New Delhi, India

REFERENCE BOOKS:

1. MN Rao & H.N.Rao (1988), *Air Pollution*, Tata Mc Graw-Hill, New Delhi, India.
2. J.G.Henry and G.W.Heinke (1989), *Environmental Science and Engineering*, Person Education, New Delhi, India.
3. Weber (1972), *Physico-Chemical process for water quality control*, Wiley-Inter science, New Delhi, India.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CIVIL VII SEMESTER **VCE-R14**

RehabilitationandRetrofitting Structures

Course Code: A2133

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): Geo Technical Engineering –I, Geo Technical Engineering-II, Design of Steel Structures, Estimating and Costing

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

CO5. Adapt students to professional practice and practical problems to solve

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CIVIL VII SEMESTER **VCE-R14**

Rehabilitation and Retrofitting Structures

Course Code: A2133

L	T	P	C
4	0	0	4

SYLLABUS

UNIT – I **(12Lectures)**

INTRODUCTION: Deterioration of Structures, Distress in Structures, causes and Prevention. Mechanism ofDamage and Types of Damage.

UNIT – II **(10 Lectures)**

Corrosion of Steel Reinforcement - Causes, Mechanism and Prevention.
Damage of Structures due to Fire - Fire Rating of Structures, Phenomena of Desiccation.

UNIT – III **(12 Lectures)**

Repair of Structure, Common Types of Repairs, Repair in Concrete Structures, Repairs in Under Water Structures, Guniting, Shot Create, Underpinning.
Inspection and Testing - Symptoms and Diagnosis of Distress, Damage assessment, NDT

UNIT –IV **(10 Lectures)**

Strengthening of Structures - Strengthening Methods, Retrofitting and Jacketing.

UNIT – V **(12 Lectures)**

Health Monitoring of Structures - Use of Sensors, Building instrumentation.

TEXT BOOKS:

1. James Douglas and Bill Ransom (2007), *Understanding Building Failures*, 3rd edition, Taylor and Francis, OX.
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 and Amit Gupta (2007), *Maintenance and Repair of CIVIL Structures*, Standard Publications, India

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CIVIL VII SEMESTER **VCE-R14**

MANAGEMENT SCIENCE

(Interdepartmental Elective - II)

Course Code: A2013

L	T	P	C
4	0	0	4

Course Overview:

This course is an introduction to the basic theory underlying Management Science and Operations Research. It focuses on linear programming, the fundamental concepts, and algorithms. Applications drawn from different functional areas of business will also be presented. In particular, the course will cover a variety of applications of management science in the areas of finance, marketing, and production such as capital budgeting, optimal sales allocation, and scheduling and distribution. Special cases of linear programming problems, such as the transportation problem and assignment problems will also be studied.

Prerequisite(s): Managerial Economics and Financial Analysis

Course Outcomes:

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

CO1. Plan and organizational structure for a given context in the organization carry out production operations through Work study.

CO2. Carry out production operations through Work study

CO3. Understand the markets, customers and competition better and price the given products appropriately

CO4. Ensure quality for a given product or service

CO5. Plan, schedule and control projects through PERT and CPM

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CIVIL VII Semester **VCE-R14**

MANAGEMENT SCIENCE
(Interdepartmental Elective - II)

Course Code: A2013

L	T	P	C
4	0	0	4

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 - Organisation structures (Line organization, Line and staff organization, Functional organization, Committee organization, Matrix organization)

UNIT – II **(10 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, RChart, 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 **(10 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. A.R. Aryasri (2009), *Management Science*, TMH, 4th edition, 2009

REFERENCES:

1. Koontz & weihrich (2010), *Essentials of management*, TMH, 8th edition, 2

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. CIVIL VII Semester **VCE-R14**

HUMAN RESOURCE MANAGEMENT

(Interdepartmental Elective - II)

Course Code: A2016

L	T	P	C
4	0	0	4

Course Overview:

Students are introduced to the management of an organization's workforce through the design and implementation of effective human resources policies and procedures. Current Canadian issues and practices are examined. Topics include the need for human resources management and its growing professionalism; human resource planning including job design and analysis; recruitment and selection; compensation; employee development; workplace health and safety; and employee relations

Prerequisite(s): Managerial Economics and Financial Analysis, Estimating and Costing

Course Outcomes:

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

CO1. Understand HR functions effectively and apply this knowledge to manage the employees in the organizations.

CO2. Explain Job Analysis, Recruitment and Employee Retention practices and strategies and apply thisknowledge to hire and retain the right people for the right jobs in organizations

CO3. Indicate different training methods and performance appraisal systems and apply this knowledgeto impart appropriate training method as well as appraise the performance of the employeesbyusing different appraisal methods

CO4. Analyze decisions relating to compensation and factors influencing the employee compensation

CO5. Apply knowledge on different techniques to resolve industrial disputes in the organization.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CIVIL VII Semester **VCE-R14**

HUMAN RESOURCE MANAGEMENT

(Interdepartmental Elective - II)

Course Code: A2016

L	T	P	C
4	0	0	4

SYLLABUS

UNIT - I (12 Lectures)

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 (10 Lectures)

JOB ANALYSIS AND RECRUITMENT: Process and Sources of Recruitment; Selection, process of selection andtechniques, Retention ofEmployees.

UNIT - III (12 Lectures)

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 (12 Lectures)

COMPENSATION MANAGEMENT: Concepts and components of wages, Factorsinfluencing wage fixation, Jobevaluation, Methods of payment, Incentives and Fringe benefits.

UNIT - V (12 Lectures)

MANAGING INDUSTRIAL RELATIONS: Components of Industrial Relation, TradeUnions, functions of Trade Union,Employee Participation, Importance and Schemes, Collective Bargaining, Grievance Redressal, Industrial DisputeSettlement 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. CIVIL VII Semester **VCE-R14**

ENTREPRENEURSHIP

(Interdepartmental Elective - II)

Course Code: A2017

L	T	P	C
4	0	0	4

Course Overview:

The course make the students to learn. Role, characteristics, qualities, and functions of entrepreneur and also different barriers toentrepreneurship.Various Institutional support for setting up a business enterprise.Role, importance and functions of women entrepreneur andwomen entrepreneur development.Concept of Project Management and steps in Project development.Training programs to inculcate entrepreneurial spirit and different training institutions to imparttraining to entrepreneurs

Prerequisite(s): Estimating and Costing, Managerial Economics and Financial Analysis

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. Interpret various Institutional support for setting up a business enterprise and apply this knowledge while approaching these institutions for financial support

CO3. Illustrate role, importance and functions of women entrepreneur and use this knowledge to become future women entrepreneurs

CO4. Infer the concept of Project Management and steps in Project development and analyse while taking future project assignments

CO5. Indicate 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. CIVIL VII Semester **VCE-R14**

ENTREPRENEURSHIP

(Interdepartmental Elective - II)

Course Code: A2017

L	T	P	C
4	0	0	4

SYLLABUS

UNIT - I **(12 Lectures)**

ENTREPRENEURSHIP: Importance and role of entrepreneurship, Characteristics 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 **(10 Lectures)**

INSTITUTIONAL SUPPORT: Role of Government; Role of IDBI, SIDBI, SIDO, NIESBUD, SISI, DIC, EntrepreneurshipDevelopment Institute, MSMEs.

UNIT – III **(10 Lectures)**

WOMEN ENTREPRENEURSHIP: Role and Importance, Functions of women entrepreneur, Profile of Indian WomenEntrepreneur, Problems of Women Entrepreneurs, Women EntrepreneurshipDevelopment in India and in ForeignCountries.

UNIT – IV **(12 Lectures)**

PROJECT MANAGEMENT: Concept of project and classification of project identification, project formulation - project report - project design, Project appraisal - profitability appraisal - project planning - social cost benefit analysis - financial analysis and project financing.

UNIT – V **(12 Lectures)**

TRAINING: Designing appropriate training programmes to inculcate Entrepreneurial Spirit, significance of entrepreneurial training, Training for New and Existing Entrepreneurs, Feedback and Performance of Trainees.

TEXT BOOKS:

1. Bholanath Datta (2009), *Entrepreneurship*, Excel Publications, India.

REFERENCE BOOKS:

1. Robert Hisrich, Michael P. Peter, Dean A. Shepherd (2010), *Entrepreneurship*, Tata Mc Graw Hill, NewDelhi.
2. David H Holt (2010), *Entrepreneurship*, Prentice hall of India, New Delhi, India

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CIVIL VII Semester **VCE-R14**

BUSINESS COMMUNICATION

(Interdepartmental Elective - II)

Course Code: A2018

L	T	P	C
4	0	0	4

Course Overview:

To understand the importance of oral and written communication and its applications in Business.

Prerequisite(s): Managerial Economics and Financial Analysis

Course Outcomes:

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

CO1. Students will be able to understand the importance of Communication in Business

CO2. To develop writing skills and presentation

CO3. Writing business proposals and letters

CO4. Application of business communication in the self-development process

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CIVIL VII Semester **VCE-R14**

BUSINESS COMMUNICATION

(Interdepartmental Elective - II)

Course Code: A2018

L	T	P	C
4	0	0	4

SYLLABUS

UNIT – I (12 Lectures)

INTRODUCTION TO MANAGERIAL COMMUNICATION: Meaning, Importance and objectives, Principles of Communication, Forms of communication, Communication Process, Barriers To effective communication, Gateways to effective communication

UNIT – II (10 Lectures)

NONVERBAL COMMUNICATION: Body Language, Gestures, Postures, Facial Expressions, Dress Code. Listening andSpeaking Skills, Probing questions, Observation, Business and Social etiquette.

UNIT – III (10 Lectures)

MANAGERIAL SPEECHES: Principles of Effective Speech & Presentations. Technical and Non-technical presentations.Speech of introduction, speech of thanks, occasional speech, theme speech, Use of audio visual aids.

UNIT – IV (12 Lectures)

INTERVIEW TECHNIQUES: Mastering the art of conducting and giving interviews, Placement interviews, discipline/technical interviews, appraisal interviews, exit Interviews. Group communication: Importance, Meetings, group discussions, Video conferencing.

UNIT – V (12 Lectures)

INTRODUCTION TO BUSINESS CORRESPONDENCE: Business letters: Enquiries, Circulars, Quotations, Orders,Acknowledgments, Executions, Complaints, Persuading letters, Sales letters, Job application letters, Bio-data, Covering Letter, Interview Letters, Letter of Reference, Memos, minutes, Circulars and Notices. Reports: Types of Business Reports - Format, Choice of vocabulary, Coherence, paragraph writing, organization reports by individual, Report by committee.

TEXT BOOKS:

1. Lesikar R. V, Flatley M. E (2005), *For Empowering the Internet Generation*, Tata McGraw Hill Publishing Company Ltd., New Delhi, India.
2. Ludlow. R, Panton. F (1998), *The Essence of Effective Communications*, Prentice Hall of India Pvt. Ltd., New Delhi, India.

REFERENCE BOOKS:

1. Adair .J (2003), *Effective Communication*, Pan Macmillan, London.
2. Pan Mcmillan Thill J. V, Bovee G. L (1993), *Excellence in Business Communication*, Tata McGraw Hill, New York.
3. Bowman J.P, Branchaw P. P (1987), *Business Communications: From Process to Product*, Dryden Press, Chicago.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CIVIL VII Semester **VCE-R14**

ORGANIZATIONAL BEHAVIOR

(Interdepartmental Elective - II)

Course Code: A2020

L	T	P	C
4	0	0	4

Course Overview:

Organizational behaviour in its broadest multidisciplinary context of Individual, group and organization as well as approaches, opportunities and challenges of OB.Importance of diversity management need in global context and Personality and perception ofindividual.Group behaviour and role of leadership theories related to behavioural perspectives.Motivation theories and framework of different types of organization structures.Conflict management, Stress management, Organization change and self-manage

Prerequisite(s): Managerial Economics and Financial Analysis

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 understandbehaviour people in organizations.

CO2. Explain the importance of diversity in organizations as well as personality and perception ofindividual and apply this knowledge for better understanding of human beings in organizations

CO3. Indicate the group behaviour and leadership styles exhibit by the managers and apply this knowledge to get the things done through subordinates efficiently and effectively.

CO4. Illustrate motivation theories and different Organization structures and apply this knowledge to create suitable organization structure for business as well as to get better work from employees.

CO5. Interpret the role of Conflict management, Stress management, Organization change and Self management and apply this knowledge for solving different problems of organizations

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CIVIL VII Semester **VCE-R14**

ORGANIZATIONAL BEHAVIOR

(Interdepartmental Elective - II)

Course Code: A2020

L	T	P	C
4	0	0	4

SYLLABUS

UNIT – I (12 Lectures)

NATURE AND IMPORTANCE OF 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.

INDIVIDUAL BEHAVIOR– Diversity – Biographical Characteristics Ability – Implementing Diversity Management –Strategies – Attitudes & Job Satisfaction.

UNIT – II (10 Lectures)

PERSONALITY: Theories of Personality –Perception – Process of Perception – Perception & Individual Decision Making – Motivation from concepts to Applications.

UNIT –III (12 Lectures)

GROUP BEHAVIOR–Foundations of Group Behavior – 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.

UNIT –IV (12 Lectures)

LEADERSHIPTHEORIES: Leadership Theories – Challenges to Leadership Construct – Finding and Creating EffectiveLeaders – Power & Polities.

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.

UNIT –V (12 Lectures)

FOUNDATION OF ORGANIZATIONAL STRUCTURE: Nature of organizing, organizational levels and span of control and types of span of control, factors determining span, organizational structure, departmentation and types of departmentation, making organizing effective.

ORGANIZATIONAL CULTURE AND CLIMATE: Conflicts management, Organization Change & Stress Management–SelfManagement – 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), *Organizational Behaviour*, Pearson Publications
2. Aswathappa (2009), *Organizational Behaviour*, Himalaya Publications
3. John M. Ivancevich (2009), *Organizational 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.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CIVIL VII Semester **VCE-R14**

PROJECT PLANNING AND MANAGEMENT

(Interdepartmental Elective - II)

Course Code: A2019

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 buildingand construction industry. This course is management-oriented and focuses on a broad range ofinterrelated disciplines including domestic, commercial and civil construction. You will be taught by adedicated 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): Estimating and Costing

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, andgovernmental 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. CIVIL VII Semester **VCE-R14**

PROJECT PLANNING AND MANAGEMENT

(Interdepartmental Elective - II)

Course Code: A2019

L	T	P	C
4	0	0	4

SYLLABUS

UNIT–I **(10 Lectures)**

PERTANDCPM: Introduction,originofPERTandCPM,planning,schedulingandcontrolling,barcharts,milestonecharts,weaknessesinbarcharts,PERTandCPMnetworkscomparison,event,activity,rulesfordrawingnetworks, numberingtheevents(Fulkerson'slaw),dummyactivities.

UNIT–II **(12 Lectures)**

CPM-PERTNETWORKANALYSIS: Timeestimate,expectedtime,earliest allowableoccurrencetime,latest allowableoccurrencetime,slack,projectduration,probabilityofcompletion,startandfinishtimeestimates,floats,project scheduling,criticalandsub-criticalpath.Updating-processofupdating,whentoupdate.

UNIT–III **(10 Lectures)**

CPMCOSTMODEL&RESOURCESALLOCATIONS,
RESOURCESCHEDULING: Costanalysis,directandindirectcosts,
operationtime,normalandcrashtimesandcosts,optimizing
projectcost,crashlimit,freefloatlimit,optimization. Resourcesmoothening,resource leveling.

UNIT–IV **(12 Lectures)**

MANAGEMENT: Scopeofconstructionmanagement,significanceofconstructionmanagement, conceptofscientific management, psychologyinmanagement, ahistoricalaccountofmanagementphilosophy,qualitiesofmanager,the roles/functionsperformed byeffective andcompetent managers, themanager-asadecisionmaker,asa motivator, asacommunication-link,asaconflictresolver,asawellwisherofco-employeesandtheemployeretc.

UNIT-V **(12 Lectures)**

ORGANIZATION: Typesoforganization,meritsanddemeritsofdifferenttypesoforganization,authority,policy,
recruitmentprocessandtraining;developmentofpersonneldepartment;laborproblems;laborlegislationinIndia;'workmen'scompensationactof1923andminimumwagesactof1948',andsubsequentamendments.Safetyinconstruction.

TEXTBOOKS:

1. Punmia,Khandelwal(2006),*ProjectplanningandcontrolwithPERTandCPM*,3rd edition,LaxmiPublications, NewDelhi,India.

REFERENCEBOOKS:

1. L. S.Srinath(1975),*PERTandCPM*,2ndEdition,AfflictedEastWestPressPvt.Ltd,NewDelhi,India .
2. U.K.Shrivastava(1999),ConstructionPlanningandManagement,GalgotiaPublicationsPvt.Ltd.,NewDelhi

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CIVIL VII Semester **VCE-R14**

FINITE ELEMENT METHODS IN CIVIL ENGINEERING

(Professional Elective - I)

Course Code: A2134	**L**	**T**	**P**	**C**
	3	**1**	**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 variouspackages will be introduced. Course notes, source code, analysis software and the accompanying manualswill enable the participants to perform routine analyses

Prerequisite(s): Engineering Mechanics - I, Strength of Materials – I

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. CIVIL VII Semester **VCE-R14**

FINITE ELEMENT METHODS IN CIVIL ENGINEERING

(Professional Elective - I)

Course Code: A2134

L	T	P	C
3	1	0	4

SYLLABUS

UNIT–I **(10 Lectures)**

INTRODUCTION: Conceptsof FEM,Stepsinvolvedmerits&demerits,energyprinciples,discretization,Rayleigh–Ritzmethodoffunctionalapproximation.

UNIT–II **(12 Lectures)**

PRINCIPLESOFELASTICITY: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.

UNIT-III **(12 Lectures)**

TWO DIMENSIONALFEM:Differenttypesofelementsforplanestressandplanestrainanalysis,Displacementmodels generalizedcoordinates,shapefunctions,convergentandcompatibilityrequirements.Geometricinvariance–Naturalcoordinatesystem,areaandvolumecoordinates

UNIT–IV **(12 Lectures)**

Generationof elementstiffnessandnodalloadmatricesfor3-nodetriangularelementandfournoderectangular elements.Isoperimetricformulation–Conceptsof,isoperimetricelementsfor2Danalysis-formulationofCSTelement,4–nodedand8-nodediso-parametricquadrilateralelements–LagrangianandSerendipityelements.

UNIT–V **(10 Lectures)**

Axi-symmetricanalysis-Basicprinciples-Formulationof4-nodeiso-parametricaxi-symmetricelementSolutionTechniques:NumericalIntegration,Staticcondensation,assemblyofelementsandsolutiontechniquesfor staticloads.

TEXTBOOKS:

1. T
irupati.R.ChandrepatlaandAshok,D.Belegundu(1997),*FiniteElementsMethodsin Engineering*,Pearson EducationPublications,NewDelhi,India.

2. S
.S.Bhavakatti(2007),*Finiteelementanalysis*,Newageinternationalpublishers,NewDelhi,India.

REFERENCE BOOKS:

1. RobertD.Cook,David(2001),*ConceptsandApplicationsofFiniteElementAnalysis*,wileypublications,New Delhi,India.
2. DavidVHutton(2003),*Finite elementanalysis*,TataMcgrawHill,NewDelhi,India.
3. S.MalkusandMichael E.Plesha(2002), *conceptsandapplicationsofFiniteElementAnalysis,* JhonWiley&Sons, India.
4. C.S.Krishna(1995),*FiniteElementanalysisTheory&Programming*,TataMc.GrawHillPublishers,NewDelhi, India.
5. P.Seshu(2004),*TextbookofFiniteElementanalysis,*PrenticeHallofIndia,NewDelhi,India

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CIVIL VII Semester **VCE-R14**

ADVANCED STRUCTURAL ANALYSIS

(Professional Elective - I)

Course Code: A2135

L	T	P	C
3	1	0	4

Course Overview:

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

Prerequisite(s): Engineering Mechanics - I, Strength of Materials – I

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. Analyse fixed and continuous beams by using plastic analysis

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CIVIL VII Semester **VCE-R14**

ADVANCED STRUCTURAL ANALYSIS

(Professional Elective - I)

Course Code: A2135

L	T	P	C
3	1	0	4

SYLLABUS

UNIT–I (10 Lectures)

ANALYSISTWOHINGEDANDTHREEHINGEDARCHESUSINGINFLUENCELINES.

FlexibilityMethod:Introductiontothestructuralanalysisby flexibilityconceptusingMatrixapproachand applicationto continuousbeamsandplanetrusses.

UNIT–II (10 Lectures)

STIFFNESSANDFLEXIBILITYMETHOD:Introductiontothestructuralanalysisby stiffnessconceptusingMatrixapproach andapplicationtocontinuousbeamsandplanetrusses.

UNIT–III (12 Lectures)

MOMENTDISTRIBUTIONMETHOD:Applicationtotheanalysisofportalframeswithinclinedlegs,gableframe sStrainenergymethod:Applicationtotheanalysisofcontinuousbeamsandsimpleportalframes.

INFLUENCELINES: InfluencelinediagramsforReaction,Shearingforceandbendingmomentincaseofdet erminate beamsandInfluencelinediagramsformemberforcesindeterminatetrusses– applicationofinfluencelinediagrams.

UNIT–IV (10 Lectures)

Analysisofportalfamesby flexibilityandstiffnessmethods.Drawingofbendingmomentdiagram.

UNIT–V (10 Lectures)

PLASTICANALYSIS:Introduction,Idealizedstress,Straindiagram,shapefactorsforvarioussections.Moment curvaturerelationship,ultimatemoment,Plastichinge,lowerandupperboundtheorems,ultimatestrengtho ffixedand continuousbeams.

TEXTBOOKS:

1. VazraniandRatwani(1983),*Analysisofstructures,*Vol.I & II*,* Khannapublications,NewDelhi,India.
2. RSKhurmi(2010),*TheoryofStructures*,S. Chand,NewDelhi,India.

REFERENCEBOOKS:

1. Ramamuratam(1982),*Theoryofstructures,*Dhanpatraipublications,NewDelhi,India.
2. VaidyanathanandP.Perumal,(2008),*Comprehensive StructuralAnalysis,*Vol.1&2*,*Laxmi,publications Pvt.Ltd.,NewDelhi,India.
3. PanditandGupta(2001),*MatrixmethodsofStructuralAnalysis*,TataMcGrawHill,NewDelhi,India.
4. BhaviKatti(2005),*StructuralAnalysis,*Vol.I & II, VikasPublications,NewDelhi,India

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CIVIL VII Semester **VCE-R14**

PAVEMENT ANALYSIS AND DESIGN

(Professional Elective - I)

Course Code: A2136

L	T	P	C
3	1	-	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 usesstress/ strain of a pavement structure using mechanics based principle, and, as well, it is empirical becausethe expected life for a given stress/ strain level is estimated from empirical relationships obtained fromlaboratory or field performance studies. The pavement design approach is not governed by the maximumamount of load that the pavement can sustain, rather, it estimates the number of standard load repetitionsthat can cause failure

Prerequisite(s): Surveying – I, Surveying – II

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 rigidrunway 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 inConstruction

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CIVIL VII Semester **VCE-R14**

PAVEMENT ANALYSIS AND DESIGN

(Professional Elective - I)

Course Code: A2136

L	T	P	C
3	1		4

SYLLABUS

UNIT–I **(10 Lectures)**

Typesofpavement,Factorsaffectingdesign ofpavements, wheel loads. ESWL Concept-tyre pressure,contact pressure, Materialcharacteristics. Environmental andotherfactors.Stressesinflexiblepavement,layeredsystemsconcept,one layersystem,BossinessTwolayersystem,BurmisterTheoryforPavementDesign.

UNIT–II **(10 Lectures)**

Stressesinrigidpavements,relativestiffnessofslab,modulusofsub-gradereaction,stressesduetowarping,stressesduetoloads,stressesduetofriction.

UNIT–III **(12 Lectures)**

PAVEMENTDESIGN: CBR MethodofFlexiblePavementDesign, IRCmethod of flexiblepavementdesign.AASHOMethodof FlexiblePavementdesignandIRCmethodof rigid pavementdesign.ImportanceofJointsinRigid Pavements,TypesofJoints,Useof Tie BarsandDowellBars.

STABILIZATION OF SOILS: Soil Stabilization – Methods and Objectives, Soil-cement Stabilization and Soil-limeStabilization.

UNIT–IV **(12 Lectures)**

HIGHWAYMATERIALS: Soil,AggregateandBitumen-Testsonaggregates–AggregateProperties andtheirImportance, TestsonBitumen,BituminousConcrete,Requirements ofDesignMix,Marshall'sMethodofBituminousMixdesign. Highwayconstruction–Construction ofEarthRoads,GravelRoads,WBMRoads,Bituminous Pavements andCement ConcreteRoads,Stepsin Construction,ReinforcedConcretePavements

UNIT–V **(10 Lectures)**

NeedforHighwayMaintenance, PavementFailures-FailuresinFlexiblePavements - TypesandCauses.RigidPavementFailures-Typesandcauses,PavementEvaluation,BenkelmanBeammethod,StrengtheningofExistingPavements, Overlays.

TEXTBOOKS:

1. S. K.Khanna&C. J. Justo(2000),*HighwayEngineering*,7th Edition,Nemchand& Bros,NewDelhi,India.
2. Rangwala(2011),*HighwayEngineering*,Charotar,India.
3. L.R.Kadiyali&Dr.N.B.Lal(2003),*PrinciplesandPracticesofHighwayEngineering*,Khannapublishers, New delhi,India.

REFERENCEBOOKS:

1. Yoder&witzorac(2001),*Principlesofpavementdesign*,JohnWiley& Sons,NewDelhi,India.
2. YangH.Haung (2008),*Pavementanalysisanddesign*,Pearson, NewDelhi,India

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CIVIL VII Semester **VCE-R14**

INTRODUCTION TO EARTHQUAKE ENGINEERING

(Professional Elective - I)

Course Code: A2137

L	T	P	C
3	1	0	4

Course Overview:

Earthquake engineering is 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 structuresmoreresistant to earthquakes. An earthquake (or seismic) engineer aims to construct structures that will not bedamaged in minor shaking and will avoid serious damage or collapse in a major earthquake. Earthquakeengineering is the scientific field concerned with protecting society, the natural environment, and the manmade environment from earthquakes by limiting the seismic risk to socio-economically acceptablelevels. Traditionally, it has been narrowly defined as the study of the behavior of structures and geostructures subject to seismic loading**.**

Prerequisite(s): Geo Technical Engineering-I, Design of Reinforced Concrete Structures

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. CIVIL VII Semester **VCE-R14**

INTRODUCTION TO EARTHQUAKE ENGINEERING

(Professional Elective - I)

Course Code: A2137

L	T	P	C
3	1	0	4

SYLLABUS

UNIT-I **(12 Lectures)**

ENGINEERING SEISMOLOGY:Earthquake phenomenon causeofearthquakes- Faults-Platetectonics–Seismicwaves- Terms associated with earthquakes-Magnitude/Intensity of an earthquake-scales-Energyreleased–Earthquake measuringinstruments-Seismograph, accelerograph-stronggroundmotions-SeismicZonesofIndia.

THEORYOFVIBRATIONS:Elementsofvibratorysystems-Degrees ofFreedom-Continuous system-Lumpedmass idealization–Oscillatorymotion-Simple HarmonicMotion-Freevibrationofsingledegreeoffreedom(SDOF)system– undampedanddamped–criticaldamping-Logarithmic decrement-Forcedvibrations-Harmonicexcitation-Dynamic magnificationfactor-ExcitationbyrigidbasedtranslationforSDOFsystem-Earthquakegroundmotion.

UNIT-II **(12 Lectures)**

CONCEPTUALDESIGN:Introduction-Functionalplanning-Continuous loadpath-Overallform-simplicityandstrength- Horizontaland Vertical members-Twistingof building-Ductility-definition-ductility relationships-flexiblebuildings- framingsystems-choiceofconstructionmaterials-Unconfinedconcrete-confined concrete-masonry-reinforcing steel.

INTRODUCTION TO EARTHQUAKE RESISTANT DESIGN: Seismic design requirements- regular and irregular configurations-basic assumptions-designearthquakeloads-basicloadcombinations-permissiblestresses-seismic methodsofanalysis-factorsin seismicanalysis-equivalentlateralforcemethod.

UNIT-III **(10 Lectures)**

REINFORCEDCONCRETEBUILDINGS:PrinciplesofearthquakeresistantdesignofRCmembers-Structuralmodelsof framebuildings-Seismicmethodsofanalysis-Seismic designmethods-IScode basedmethodsforseismicdesign-Seismic evaluationandretrofitting-Vertical irregularities-Planconfigurationproblems–lateralloadresistingsystems- Determinationofdesignlateralforces–Equivalentlateralforceprocedure-Lateraldistributionofbaseshear.

UNIT-IV **(10 Lectures)**

MASONRYBUILDINGS:Introduction-Elasticpropertiesofmasonryassemblage-Categories ofmasonrybuildings- Behaviourofunreinforced andreinforcedmasonrywalls-Behaviour ofwalls-

Boxactionandbands–Behaviourofinfill walls-Improvingseismicbehaviourofmasonrybuildings-Loadcombinations andpermissiblestresses-Seismic design requirements–Lateralloadanalysisof masonrybuildings.

UNIT-V **(12 Lectures)**

STRUCTURALWALLS ANDNON-STRUCTURALWALLS-sectionalwalls-sectionalshapes-variationsinelevation-cantilever wallswithoutopenings-failuremechanism ofnon-structures-Effectsofnon-structural elements onstructuralsystems- Analysisofnon-structuralelements-Prevention of non-structuraldamage-Isolationofnon-structures.Ductility Considerationsin EarthquakeResistantdesign of RCbuildings: Introduction–Impact of Ductility-Requirementsfor Ductility-AssessmentofDuctility-FactorsaffectingDuctility-Ductiledetailingconsiderationsasper IS13920.Behaviorof beams,columnsandjointsinRcbuildingsduringearthquakes-Vulnerability ofopengroundstoreyandcolumnsduring earthquakes.

TEXTBOOKS:

1. EARTHQUAKEResistantDesignofStructures-S.K.Duggal.OxfordUniversityPress.
2. EarthquakeResistantDesignofStructures-PankaiAgarwalandManishShrikhande,PrenticeHall ofIndiaPvt. Ltd.

REFERENCES:

1. T. PaulayandM.J. N. *Priestly SesmicDesignofReinforcedConcreteandMasonryBilding-*, JohnWiley&Sons.
2. VinodHosur, *EarthquakeResistant DesignofBuildingstructures*by, WileyIndiaPvt. Ltd.
3. R.N.Iyengar, *ElementsofMechanicalVibration*, I.K.InternationalPublishingHousePvt.L;td
4. MasonryandTimberstructuresincludingearthquakeResistantDesign–AnandS.Arya,Nemchand &Bros.
5. C.V.R.,Murthy, *EarthquakeTips-LearningEarthquakeDesignandConstruction*

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CIVIL VII Semester **VCE-R14**

ENVIRONMENTAL IMPACT ASSESSMENT METHODOLOGIES

(Professional Elective - I)

Course Code: A2138

L	T	P	C
3	1	-	4

Course Overview:

This course introduces the methodology of environmental impact assessment (EIA) as a vital tool for soundenvironmental 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 EIAoverseas. It mainly draws on case studies of EIA in India but also focuses on the EIA process in othercountries, including developing countries. Different levels and systems of EIA are examined to highlight thediversity of approach and impact of the EIA process.

Prerequisite(s): Environmental Science

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 theassessment of soil and ground water.

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

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

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

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CIVIL VII Semester **VCE-R14**

ENVIRONMENTAL IMPACT ASSESSMENT METHODOLOGIES

(Professional Elective - I)

Course Code: A2138

L	T	P	C
3	1	-	4

SYLLABUS

UNIT–I **(12 Lectures)**

BASICCONCEPTOFEIA:InitialenvironmentalExamination,Elementsof EIA,factorsaffectingE-I-AImpactevaluationand analysis,preparationofEnvironmentalBasemap,Classificationofenvironmentalparameters.

EIAMETHODOLOGIES:introduction,CriteriafortheselectionofEIAMethodology,EIAmethods,Ad-hocmethods, matrixmethods,NetworkmethodEnvironmentalMediaQualityIndexmethod,overlaymethods,cost/benefitAnalysis.

UNIT–II **(10 Lectures)**

IMPACT OFDEVELOPMENTALACTIVITIESANDLANDUSE:IntroductionandMethodologyfortheassessmentofsoiland groundwater,Delineationof studyarea,Identificationofactives.

UNIT–III **(12 Lectures)**

EIAOFWATER,AIR&BIOLOGICAL ENVIRONMENT: Impactprediction,Assessment ofImpactsignificance,Identification andIncorporation ofmitigationmeasures.EIAofsurfacewater,AirandBiologicalenvironment:Methodology forthe assessmentofImpactson surfacewaterenvironment.

EIA OF VEGETATION &WILD LIFE: Assessment of Impact of development Activities on Vegetation and wildlife, environmentalImpactofDeforestation,Causesandeffectsofdeforestation.

UNIT–IV **(10 Lectures)**

ENVIRONMENTALAUDITING: EnvironmentalAudit&Environmentallegislationobjectivesof EnvironmentalAudit,Types ofenvironmentalAudit,stagesofEnvironmentalAudit,onsiteactivities,evaluationofAuditdataandpreparationof Auditreport.PostAuditactivities.

UNIT-V **(10 Lectures)**

ENVIRONMENTALLEGISLATION: TheEnvironmentalprotectionAct,ThewaterAct,TheAir(Prevention&Controlof pollutionAct.),MotorAct,WildlifeAct.

TEXTBOOKS:

1. Y. Anjaneyulu(2011),*EnvironmentalImpactAssessmentMethodologies*,B.S.Publication,SultanBazar,Hyderabad.

2. J.GlynnandGaryW.HeinKe(1989),*EnvironmentalScienceandEngineering*,PrenticeHallofIndiaPublishers,NewDelhi,India.

REFERENCEBOOKS:

1. SureshK.Dhaneja(2009),*EnvironmentalScienceandEngineering*,S.K.Katania&SonsPublication,NewDelhi, India.

2. LarryW. Canter(1997),*EnvironmentalImpactAssessment*,TataMcGrawHill,NewDelhi,India

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CIVIL VII Semester **VCE-R14**

URBAN PLANNING AND INFORMATION SYSTEMS

(Professional Elective - I)

Course Code: A2139

L	T	P	C
3	1	-	4

Course Overview:

This course explores important substantive areas and concepts in the field of urban and regional planningand 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 generalinformation, and APPLYING logical process when writing.

CO2. Oral presentations and debating arguments will be PRIORITISED as a tool of coming to a personalconclusion 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, forreporting findings, and implementing the results of those findings, including.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CIVIL VII Semester **VCE-R14**

URBAN PLANNING AND INFORMATION SYSTEMS

(Professional Elective - I)

Course Code: A2139

L	T	P	C
3	1	-	4

SYLLABUS

UNIT-I **(10 Lectures)**

INTRODUCTION OF PLANNING: backgroundandprinciples;Needforplanning;Urbanization anditsimpact,Distributionoflanduse/land cover;TownplanninginancientIndiaandnewtownsofIndia;Requirements andpossibletypesofdevelopmentof towns;Geoinformaticsapplicationin UrbanPlanning

UNIT-II **(12 Lectures)**

FORMULATIONOFPLANS: Objectivesandcontents,Regionalplan,Perspective plan,Masterplan,Development plan, Project(scheme) plan,Delineation ofplanning area,Trendanalysis,Landsuitabilityanalysis,Landuseplanning,Zoning andprinciplesofzoning, BuildingBye-lawsanditsprinciples,Requirementofurban&regionalplanners,Remotesensing fordifferentlevelsofdevelopmentplanning.

UNIT-III **(10 Lectures)**

IMPORTANCEOFHOUSING;Urbanhousingdemandandproduction,Slumsandsquatters,Housingproblemi nIndia.

National Housing policy;Siteanalysis,Layout design,Housing projects /Slumhousing.Urbanrenewal projects,urban infrastructureplanning

UNIT-IV **(12 Lectures)**

TRANSPORTATION PLANNING: Classificationofurbanroads,Trafficsurveys:speed,time,delaysurveys.Useofspeed, journeytimeanddelaystudies.Trafficvolume,OriginDestination surveys,Parkingsurveys,Utilityofremotesensingin trafficandtransportationstudies

UNIT-V **(10 Lectures)**

URBANINFORMATIONSYSTEM:Land;Housing;Transportation;Infrastructure;Trendsinmappingusingrem otesensing, GISandGPS;DatabasecreationforInfrastructure developmentDecisionsupportsystemforurbanandregional management

TEXTBOOKS:

1. Rangwala(2009),*TownPlanning*,CharotarPublishingHouse,Anand,India
2. GallianB.ArthuandSimonEisner(1975),*TheUrbanPattern,CityPlanningandDesign*,vanNostrand.
3. MargaretRoberts(1974),*Introductionto TownPlanningTechniques*,Hutchinson,London

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CIVIL VII Semester **VCE-R14**

CONCRETE AND HIGHWAY ENGINEERING LAB

Course Code: A2140	**L**	**T**	**P**	**C**
	-	**-**	**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 willbecome familiar with the nature and properties of these materials by conducting laboratory tests. Thesetests 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 timelimitation, are mostly those outlined by the Indian Standards.

Prerequisite(s): Transportation Engineering

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. CIVIL VII Semester **VCE-R14**

CONCRETE AND HIGHWAY ENGINEERING LAB

Course Code: A2140

L	T	P	C
-	-	3	2

LIST OF EXPERIMENTS

I. ROADAGGREGATES:

1. AggregateCrushingvalue.
2. AggregateImpactTest
3. SpecificGravityandWaterAbsorption.
4. AttritionTest.
5. AbrasionTest.
6. Shapetests.

II. BITUMINOUSMATERIALS:

1. PenetrationTest.
2. DuctilityTest.
3. SofteningPointTest.
4. Flashandfirepointtests.

III. CEMENTANDCONCRETES: TESTONCEMENTS:

1. NormalConsistencyoffinenessofcement.
2. Initialsettingtimeandfinalsettingtimeofcement.
3. Specificgravityandsoundnessofcement.
4. Compressivestrengthofcement.
5. Workabilitytestonconcretebycompactionfactor,SlumpandVee-bee.
6. Young'smodulusandcompressivestrengthofconcrete.
7. Bulkingofsand.
8. Non-Destructivetestingonconcrete(fordemonstration).

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CIVIL VII Semester **VCE-R14**

GEOGRAPHICAL INFORMATION SYSTEMS LAB

Course Code: A2141

L	T	P	C
-	-	3	2

Course Overview:

GIS (Geographic Information Systems) is a computer-based tool that uses spatial (geographic) data toanalyze and solve real-world problems. This course is designed to introduce the student to the basicprinciples and techniques of GIS. The lab material will emphasize GIS data collection, entry, storage,analysis, and output using ArcGIS.

Prerequisite(s): Remote Sensing and GIS Applications

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.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CIVIL VII Semester **VCE-R14**

GEOGRAPHICAL INFORMATION SYSTEMS LAB

Course Code: A2141

L	T	P	C
-	-	3	2

LIST OF EXPERIMENTS

SOFTWARE:

1. ArcGIS9.0
2. ERDAS8.7
3. MapInfo6.5

AnyoneorEquivalent

EXCERCISES:

1. DigitizationofMap/Toposheet
2. Creationofthematicmaps.
3. Studyoffeaturesestimation
4. DevelopingDigitalElevationmodel
5. SimpleapplicationsofGISinwaterResourcesEngineering&TransportationEngineering

SYLLABI FOR
VIII SEMESTER

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CIVIL VIII Semester **VCE-R14**

PROFESSIONAL ETHICS AND INTELLECTUAL PROPERTY RIGHTS

Course Code: A2015

L	T	P	C
3	1	0	4

Course Overview:

To create an awareness on engineering ethics and human values.To adumbrate the inevitability of different intellectual property rights like patents, copyrights,trademarks, and trade secret.To give an impetus on achieving higher positions in profession, with ethical and human valuesas a base and support for the growth.To explicate the professional and societal responsibilities of the engineers.To make the student realize the sensitiveness associated with experimentation process.

Prerequisite(s):NIL

Course Outcomes:

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

CO1. Acquires the basic concepts of Professional ethics and human values & Students also gain the connotations of ethical theories.

CO2. Knows the duties and rights towards the society in an engineering profession

CO3. Would realize the importance and necessity of intellectual property rights.

CO4. Can take all the necessary precautions while conducting the experiments, which may reduce the
risk.

CO5. Understands the importance of risk evacuation system in reality and takes the utmost responsibility while handling the risky situations.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CIVIL VIII Semester **VCE-R14**

PROFESSIONAL ETHICS AND INTELLECTUAL PROPERTY RIGHTS

Course Code: A2015

L	T	P	C
3	1	0	4

SYLLABUS

UNIT-I **(12 Lectures)**

ENGINEERINGETHICS: Senses of'EngineeringEthics'-Varietyofmoralissues- Types ofinquiry-Moral dilemmasMoralautonomy-Kohlberg'stheoryGilligan'stheory-Consensusand controversy– ModelsofProfessionalRoles-Theoriesaboutrightaction-Self interest - Customsandreligion-Usesof Ethical theories.

HUMANVALUES: Morals, values and ethics, integrity, work ethic, service learning, civic virtue, respect for others, living peacefully, caring, sharing, honesty, courage, valuing time, co-operation, commitment, empathy, self- confidence,character andspirituality.

UNIT-II **(10 Lectures)**

ENGINEERINGASSOCIALEXPERIMENTATION: Engineeringasexperimentation,engineersasresponsible experimenters, codesof ethics,abalancedoutlookonlaw,thechallengercase study.

UNIT-III **(12 Lectures)**

SAFETY, RESPONSIBILITIES AND RIGHTS: Safety and risk, assessment of safety and risk, risk benefit analysis and reducing risk, the Three Mile Island and Chernobylcase studies. Collegiality andloyalty, respect forauthority, collective bargaining, confidentiality,conflictsofinterest,occupationalcrime,professionalrights,employeerights.

UNIT-IV **(10 Lectures)**

INTRODUCTION TO INTELLECTUAL PROPERTY: Introduction, types of intellectual property, international organizationsagenciesandtreaties,importanceofintellectualpropertyrights.

TRADEMARKS:Purposeandfunctionoftrademarks,acquisitionoftrademarkrights,protectablematter,selecting andevaluating trademarks,trademarkregistrationprocess.

UNIT-V **(12 Lectures)**

LAW OF COPY RIGHTS : Fundamentals of copy right law, originality of material, rights of reproduction, rights to performtheworkpublicly, copy rightownership issues, copyrightregistration,noticeofcopy right.

LAWOFPATENTS:Foundationofpatent law,patentsearchingprocess,ownershiprightsandtransfer.

NEWDEVELOPMENTSININTELLECTUALPROPERTY: Trademarklaw;CopyrightlawandPatentlaw, Tradesecrets law,Intellectual

propertyaudits.

TEXTBOOKS:

1. MikeMartin,RolandSchinzinger(1996),*EthicsinEngineering*,McGraw-Hill,New York.
2. GovindarajanM,NatarajanS,SenthilKumarV.S(2004),*EngineeringEthics*,PrenticeHallofIndia,New Delhi,India.
3. Deborah.E.Bouchoux(2009*),Intellectualproperty*,Cengagelearning,India.
4. Deborah.E.Bouchoux(2001),*Protectingyourcompaniesintellectualproperty*,AMACOM,USA.

REFERENCEBOOKS:

1. Charles D.Fleddermann(2004),*EngineeringEthics*,PearsonEducation/PrenticeHall,NewJersey.
2. Charles EHarris, Michael S. Protchard, MichaelJRabins(2000), *EngineeringEthics- Conceptsand Cases*, WadsworthThompsonLearning,UnitedStates.
3. JohnRBoatright(2003),*EthicsandtheConductofBusiness*,PearsonEducation,NewDelhi.EdmundGSeebauerand RobertLBarry,(2001),*FundamentalsofEthicsforScientistsandEngineers,*OxfordUniversityPress,NewYork.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CIVIL VIII Semester **VCE-R14**

EARTH QUAKE RESISTANT DESIGN STRUCTURES

(Professional Elective - II)

Course Code: A2143

L	T	P	C
3	1	0	4

Course Overview:

This subject introduces the fundamental concepts and practice of earthquake resistant design of buildings from an international perspective, incorporating consideration of design in regions of low to moderate seismicity in regions of high seismicity. The design of economically and environmentally feasible structures that can successfully withstand the forces and displacements generated by severe ground motions is a challenge demanding the best in structural engineering art and science. This subject builds on knowledge of Risk Analysis, Engineering Mathematics, Dynamics, and Structural Theory and Design to allow candidates to work as a supervised graduate engineer in this specialised area of practice.

Prerequisite(s): Engineering Geology

Course Outcomes:

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

CO1. Select and apply the appropriate energy dissipation or base-isolation device for mitigating seismically induced damage to a building

CO2. Predict damage to un-reinforced masonry buildings and identify the vulnerable features

CO3. Assess existing building structures and provide plans for their effective retrofitting

CO4. Assess seismic performance of vulnerable buildings and components in regions of low and moderate seismicity taking into account the effects of soil resonance and identify effective means of retrofitting

CO5. Assess seismic performance of non-structural components and building contents and identify effective measures to mitigate potential damage.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CIVIL VIII Semester **VCE-R14**

EARTH QUAKE RESISTANT DESIGN STRUCTURES

(Professional Elective - II)

Course Code: A2143

L	T	P	C
3	1	0	4

SYLLABUS

UNIT-I **(10Lectures)**

IntroductiontoEarthquakeEngineering seismology,Causes ofearthquakesandseismicwaves,magnitude,intensityandenergyrelease,characteristicsofstrongearthquakegroundmotions,SeismicRisk

UNIT-II **(12 Lectures)**

IntroductiontotheoryofvibrationsBasictheoryofvibrations,EQResponseofstructures,Single-degree offreedom dynamics, Concept of Response Spectra and introduction to multi-degree of freedom systems, Design response spectrum,IdealizationofStructuresFlexibilityoflongandshortperiodstructures,Responsespectrumanalysis

UNIT–III: **(10 Lectures)**

EARTHQUAKERESISTENTDESIGN: Philosophyofearthquakeresistantdesign,Ductility,Redundancy&overstrength.

DAMPING: Damping,Supplementeddamping,Codeprovisions,buildingformsforearthquakeresistance,performanceof buildingsinpastearthquakes

UNIT-IV **(10 Lectures)**

Seismicbehaviorofconcrete,steelandmasonrystructures,Materialproperties,Behaviorandanalysisofmembers undercyclicloads,Seismicdetailingprovisions,Reviewofdamageinpastearthquakes

UNIT-V **(12 Lectures)**

Equivalentstaticlateralearthquakeforce(IS:1893),Seismicdesignanddetailingofmasonrybuildings(IS:4326,IS:13827IS:13828),SeismicdesignanddetailingofRcbuildings(IS:13920)Soileffectsandliquefaction,conceptsofbase isolationandenergydissipationdevises

TEXTBOOKS:

1. SKDuggal(2007),*Earthquakeresistantdesignofstructures*,OxfordUniversityPress,India.

2. PankajAgarwalandManish Shrikhande(2006), *Earthquakeresistantdesignofstructures*,PrenticehallofIndia, NewDelhi,India.

REFERENCEBOOKS:

1. MihaTomazevic(1999),*EarthquakeresistantdesignofMasonryBuildings*,ImperialCollegePress,London.
2. PCVarghese(2006),*AdvancedReinforcedconcretedesign*,PrenticehallofIndia,NewDelhi,India.

RelevantISCodes:

1 IS:1893

2. IS:4326

3. IS:13827

4. IS:13828

5. IS:13920

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CIVIL VIII Semester **VCE-R14**

ADVANCED STRUCTURAL DESIGN

(Professional Elective - II)

Course Code: A2144

L	T	P	C
3	1	0	4

Course Overview:

It covers four main areas:Design of Industrial Buildings in Structural Steelwork, Design of steel-framed multi-storey buildings, Design of domestic buildings using masonry and timber, Design of pre-stressed concrete

Prerequisite(s): Design of Reinforced Concrete Structures, Design of Steel Structures

Course Outcomes:

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

CO1. Master the terminology and be able to communicate topics of advanced theory of structures at a professional level, including setting objectives to investigate and writing professional reports.

CO2. Understand the advanced theory of structures.

CO3. Apply theory to solve practical problems.

CO4. Understand the major requirements of relevant Australian Standards.

CO5. Identify features and limitations of some common software used in professional practice for advanced structural analysis and utilise software in set assessments

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VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CIVIL VIII Semester **VCE-R14**

ADVANCED STRUCTURAL DESIGN

(Professional Elective - II)

Course Code: A2144

L	T	P	C
3	1	0	4

SYLLABUS

UNIT–I **(12 Lectures)**

DesignofRetainingwalls,cantileverandcounterfortDesignofRCCwatertanks,Circularandrectangulartypes
.

UNIT–II **(10 Lectures)**

Designofsteel watertanks

Introductionto bunkers,silosandChimney,conceptsofloadingandDesign.

UNIT–III **(12 Lectures)**

DESIGNOFGIRDERS: Designofplategirderrailwaybridgesandgantrygirders.

DESIGNOFTRUSSBRIDGES: Designofsteeltrussbridgesforrailwayloading

UNIT–IV **(12 Lectures)**

Introductiontoconcretebridges,IRCloading,slabbridgesandT-beambridgesdesignconcepts.

UNIT–V **(10 Lectures)**

Multistorybuildingsystem– detailingforDuctility,Designfor earthquakeandwindforces.

TEXTBOOKS:

1. B.C.Punmia, Ashok Kumar Jain and ArunKumar Jain (1992), *Reinforced concrete structures,* Vol-2, LaxmipublicationsPvt.Ltd.,NewDelhi,India.
2. S.UnnikrishnaPillai&DevdasMenon(2003),*Reinforcedconcretedesign,*TataMcGrawHill,NewDelhi,India.

REFERENCEBOOKS:

1 S.U.PillaiandD.Menon(2003),*Reinforcedconcretedesign*,TataMcGrawhill,NewDelhi,India.

2. N.KrishnaRaju(2005),*Designdrawingofconcreteandsteelstructures*,UniversitiesPress,Hyderabad, India.

3. Vargheesh(2005),*AdvancedReinforcedconcretedesign*,PrenticeHallofIndiaPvt.Ltd,NewDelhi,India.

Codes:RelevantIScodes

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CIVIL VIII Semester **VCE-R14**

GROUND IMPROVEMENT TECHNIQUES

(Professional Elective - II)

Course Code: A2145

L	T	P	C
3	1	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 purposeas a founding soil or a back fill material. The theory of the expansive soils is dealt with in detail. Theprinciples of reinforced earth are introduced along with the design philosophies. Various geosyntheticsused are briefly described explaining the types and their functions.

Prerequisite(s): Geo Technical Engineering-I, Geo Technical Engineering-II

Course Outcomes:

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

CO1. Understand the failures of geotechnical problems

CO2. Analyze 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. CIVIL VIII Semester **VCE-R14**

GROUND IMPROVEMENT TECHNIQUES

(Professional Elective - II)

Course Code: A2145

L	T	P	C
3	1	0	4

SYLLABUS

UNIT-I **(12 Lectures)**

INTRODUCTIONTOGROUNDIMPROVEMENTMODIFICATION:
Needandobjectives,Identificationofsoiltypes,Insituandlaboratoryteststocharacterizeproblematicsoils,Mechanical,Hydraulic,Physico-chemical,Electrical,Thermal methodsandtheirapplications.

UNIT-II **(10 Lectures)**

MECHANICAL MODIFICATION:Deep compaction Techniques- Blasting Vibrocompaction, Dynamic Tamping andcompactionpiles

UNIT-III **(12 Lectures)**

HYDRAULICMODIFICATIONObjectivesandtechniques,traditionaldewateringmethodsandtheirchoice,Designofdewateringsystem,Electro-osmosis,ElectroKineticdewatering,Filtration,Drainageandseepagecontrolwith Geosynthetics,preloadingandverticaldrains

UNIT-IV **(12 Lectures)**

PHYSICALANDCHEMICALMODIFICATION:Modificationbyadmixtures,ShotcreatingandGuintingTechnology, Modificationatdepthbygrouting,CrackGrouting andcompactiongrouting ,Jetgrouting,Thermal modification,Ground freezing.

UNIT-V **(10 Lectures)**

MODIFICATIONBYINCLUSIONSANDCONFINEMENT:Soilreinforcement,reinforcementwitstrip,andgridreinforced soil.Insitugroundreinforcementgroundanchors,rockboltingandsoilnailing.

TEXTBOOKS:

1 HAUSMANN,M.R.(1990)–*EngineeringPrinciplesofGroundModifications*,McGrawHill publications

REFERENCES:

1. Koerner,R.M(1994)-*DesigningwithGeosynthesis*–PrenticeHallNewJersey
2. JonesC.J.F.P(1985)-*EarthReinforcementandSoilstructures*–Butterworths,London
3. Xianthakos,AbreimsonandBruce-*GroundcontrolandImprovement*
4. Mosley-*GroundImprovement*

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CIVIL VIII Semester **VCE-R14**

URBAN DISASTER AND INTELLIGENT CONTROL SYSTEMS

(Professional Elective - II)

Course Code: A2146	**L**	**T**	**P**	**C**
	3	**1**	**0**	**4**

Course Overview:

The course discussesmethods for the analysis and design of intelligent control systems. The main topics include: general characteristics and structures of intelligent control systems; methods for designknowledge-based control systems, model-based control systems, intelligent adaptive control systems and learning control systemsusing soft computingtechniques such as neural networks, fuzzy logicand geneticalgorithm;foraging theory and applications in control;examples of intelligent control systems in industry.

Prerequisite(s): Estimating and Costing

Course Outcomes:

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

CO1. To understand Urban Disaster and their environmental impacts.

CO2. Monitoring profileusing cameras, sensors and communication systems engineering profiles.

CO3. To understand web enabled communication systems

CO4. Technologyenabledonlinemonitoringsystems

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CIVIL VIII Semester **VCE-R14**

URBAN DISASTER AND INTELLIGENT CONTROL SYSTEMS

(Professional Elective - II)

Course Code: A2146

L	T	P	C
3	1	0	4

SYLLABUS

UNIT-I **(12 Lectures)**

DISASTERS: Typesof disaster,significantaspectsof disasters,economicimpactof disasters,Risk aspects,Hazards disasters. UrbanDisasterandtheirenvironmental impacts:Impactofearthquakes,floods,fires,droughts,landslides, Congestionpollution,accidentriskonurbanenvironment policiesforremedialmeasures.Technologytoforecasttheir impact.

UNIT-II **(10 Lectures)**

TECHNOLOGY TO TRACK URBAN DISASTERS: Monitoring profile – cameras, sensors and communication systems engineeringprofiles.

UNIT-III **(12 Lectures)**

PlanningprofileimpactonurbanDisasters:planningprofile,GPS,satellitetechnologyandphotograp hictechnique. Totalstation,terrestrialscanners,andothersurveyequipment.

UNIT-IV **(12 Lectures)**

INFORMATIONSYSTEMS:geographyinformationsystem differentpackagesandoverview,MIS-Architecture,web enabledcommunicationsystems,overview

UNIT-V **(10 Lectures)**

INTELLIGENTCONTROLSYSTEMS:Technologyenabledonlinemonitoringsystems,postevaluation multicriteriasystems, forecastingapproachesthroughdecisionsupportingsystems.Disasters–casestudiesondisastermitigationmeasures.

TEXTBOOKS:

1. RajibShaw.RR.KrishnaMurthy(2009),*Disastersglobalchallengesandlocalsolutions*,Universitiespress,India.
2. PradeepsahniAlkaDhameja(2004),*Disastermitigation-Experiencesandreflections*,UmaMadhuri,Prentice hallofIndia,NewDelhi,India.

REFERENCEBOOKS:

1. LawrenceA.Klein(2001),*SensorTechnologies& DaterequirementifITS*.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CIVIL VIII Semester **VCE-R14**

BRIDGE ENGINEERING

(Professional Elective - II)

Course Code: A2147

L	T	P	C
3	1	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. Bridgegeometry. Conceptual design of different types of bridges. Analysis of slab bridge. T-Beam bridge.Introduction to piers and abutments, well foundation.

Prerequisite(s): Geo Technical Engineering-I, Structural Analysis-II

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. Analyze and design different components of a highway and railway bridge, to meet desired needswithin 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. CIVIL VIII Semester **VCE-R14**

BRIDGE ENGINEERING

(Professional Elective - II)

Course Code: A2147

L	T	P	C
3	1	0	4

SYLLABUS

UNIT-I **(10 Lectures)**

LoadingStandardsas per IRC, Railwayload,EquivalentUniformlyDistributedlive load,Influencelinediagramfor memberofPratttruss.

UNIT-II **(12 Lectures)**

SlabBridge,T-BeamBridge

UNIT-III **(12 Lectures)**

BalancedCantileverBridge.

Designofwell,construction;opensinkingofwells,Plugging,sandfillingandcastingofwellcap

UNIT-IV **(12 Lectures)**

Steel TrussBridge.

UNIT-V **(10 Lectures)**

Piers,abutments,wingwallsfactorseffectingandstability,well foundations.

TEXTBOOKS:

1. D.JohnsonVictor (2001), *EssentialsofBridge Engineering*,5th Edition, Oxford &IBHPublishingCo.Pvt.Ltd,NewDelhi,India.
2. S.Ponnuswamy(2008),BridgeEngineering,TataMcGrawHill,NewDelhi,India.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CIVIL VIII Semester **VCE-R14**

INDUSTRIAL WASTE AND WASTE MANAGEMENT

(Professional Elective - II)

Course Code: A2148

L	T	P	C
3	1	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 processesand the sources of their wastes are discussed. Treatment and proper disposal of Industrial waste water have been discussed.

Prerequisite(s): Environmental Science

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. CIVIL VIII Semester **VCE-R14**

INDUSTRIAL WASTE AND WASTE MANAGEMENT

(Professional Elective - II)

Course Code: A2148	**L**	**T**	**P**	**C**
	3	**1**	**0**	**4**

SYLLABUS

UNIT–I **(12 Lectures)**

Qualityrequirementsofboilerandcoolingwaters,QualityrequirementsofprocesswaterforTextiles,FoodprocessingandBreweryIndustries,BoilerandcoolingwatertreatmentmethodsBasicTheoriesofIndustrialWastewaterManagement,VolumereductionandStrengthreduction.Neutralization,Equalizationandproportioning.Jointtreatment ofindustrialwastes,consequentproblems.

UNIT–II **(10 Lectures)**

Industrialwastewaterdischargesintostreams.Lakesandoceansandproblems.RecirculationofIndustrialWastes.Use ofMunicipalWasteWaterinIndustries.

UNIT–III **(12 Lectures)**

ManufacturingProcessandoriginofliquidwastefromTextiles,PaperandPulpindustries,ThermalPowerPlants andTanneries,SpecialCharacteristics,Effectsandtreatmentmethods.ManufacturingProcessand originof liquid waste from Fertilizers,Distillers,andDairy,SpecialCharacteristics,Effectsand treatmentmethods.

UNIT–IV **(10 Lectures)**

ManufacturingProcessanddesignoriginofliquidwastefromSugarMills,SteelPlants,OilRefineries,andPharmaceuticalPlants,SpecialCharacteristics,Effectsandtreatmentmethods.

UNIT–V **(12 Lectures)**

CommonEffluentTreatmentPlantsAdvantagesandSuitability,Limitations,EffluentDisposalMethods.

TEXTBOOK:

1. M.N.RaoandDutta(2009),*WasteWaterTreatment*,Oxford& IBH,NewDelhi.

REFERENCEBOOKS:

1. MetCalfandEddi(1979),*Wastewaterengineering,*McGrawhillpublications,NewDelhi,India.MarkJ
2. HammerandMarkJ.Hammer(Jr)(2008),*WaterandWasteWatertechnology*,PrenticeHall,NewYork.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CIVIL VIII Semester **VCE-R14**

PRESTRESSED CONCRETE STRUCTURES

(Professional Elective - III)

Course Code: A2149

L	T	P	C
3	1	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): Structural Analysis – I

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. CIVIL VIII Semester **VCE-R14**

PRESTRESSED CONCRETE STRUCTURES

(Professional Elective - III)

Course Code: A2149

L	T	P	C
3	1	0	4

SYLLABUS

UNIT-I **(12Lectures)**

INTRODUCTION: Historic development- General Principles of prestressingpre tensioning and post tensioning -AdvantagesandlimitationsofPrestressedconcrete-GeneralprinciplesofPSC-Classificationandtypesofprestressing.Materialshighstrengthconcreteandhightensilesteeltheircharacteristics.

METHODSANDSYSTEMSOFPRESTRESSING:
PretensioningandPosttensioningmethodsandsystemsofprestressinglikeHoyersystem,MagnelBlatonsystem,FreyssinetsystemandGifford-UdallSystem-LeeMcCallsystem.

UNIT-II **(10Lectures)**

LOSSESOFPRESTRESS: Lossofprestressinpretensionandposttensionedmembersduetovariouscauseslikeelasticshortageofconcrete,shrinkage ofconcrete,creepofconcrete,relaxationofstressinsteel,slipinanchorage, frictional losses.

UNIT-III **(12Lectures)**

FLEXURE: AnalysisofsectionsforflexurebeamsPrestressedwithstraight,concentric,eccentric,bentandparabolic tendons-stressdiagrams- ElasticdesignofPSCbeams ofrectangular andIsections-Kernline-Cableprofileandcable layout.

SHEAR: General considerations - Principal tension and compression - Improving shear resistance of concrete by horizontalandverticalprestressingandbyusinginclinedorparaboliccables-Analysisofrectangular andIbeamsfor shear-Designofshearreinforcements-BureauofIndianStandards(BIS)Codeprovisions.

UNIT-IV **(12Lectures)**

TRANSFEROFPRESTRESSINPRETENSIONEDMEMBERS:Transmissionofprestressingforcebybond-Transmissionlength-Flexuralbondstresses-IS codeprovisions-Anchoragezonestressesinposttensionedmembers- stress distributioninEndblock-AnalysisbyGuyon,Magnel,ZielinskiandRowe'sMethods-Anchoragezonereinforcement- BISProvisions.

UNIT-V **(10Lectures)**

COMPOSITEBEAMS: DifferentTypes-ProppedandUnpropped-stressdistribution-Differentialshrinkage-Analysisof compositebeams-Generaldesignconsiderations.

DEFLECTIONS: Importanceofcontrolofdeflections-Factorsinfluencingdeflections-Shorttermdeflectionsofuncrackedbeams-predictionoflong-timedeflections-BIScoderequirements.

TEXTBOOK:

1. N.KrishnaRaju, Prestressedconcrete,5th Edition,TataMcGrawHillBookEducationPvt.Ltd.

REFERENCES:

1. T.Y.LinandBurn,*Designofprestressconcretestructures,* JhonWiley,NewYork.
2. PrestressedconcretebyS.Ramamrutham,DhanpatRai& Sons,Delhi
3. PrestressedConcretebyN.Rajagopalan,NarosaPublishingHouse.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CIVIL VIII Semester **VCE-R14**

INDUSTRIAL STRUCTURES

(Professional Elective - III)

Course Code: A2150

L	T	P	C
3	1	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 lowrise office or apartment buildings, hospitals and institutional buildings, shopping centers, sporting facilitiesand warehouse industrial sheds. Each project has characteristic structural forms and resultant methodsofconstruction. This subject investigates the various structural design concepts and their influence onconstruction.

Prerequisite(s): Structural Analysis – I

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. CIVIL VIII Semester **VCE-R14**

INDUSTRIAL STRUCTURES

(Professional Elective - III)

Course Code: A2150

L	T	P	C
3	1	0	4

SYLLABUS

UNIT-I **(12Lectures)**

CONNECTIONS:DesignofFrame,seatedmomentresistingconnections(bothweldedandbolted).

UNIT-II **(10Lectures)**

AnalysisofPitched(Gable)Portalframes,Assumptions,BendingMomentandShearForcediagrams.

UNIT-III **(12Lectures)**

GIRDERS:Analysisanddesignofgantrygirders,SteelBracketdesign.

DESIGNOFFRAMES: Designofportalframe(deadliveandwindloads).

UNIT-IV **(12Lectures)**

Towers,
PrinciplesofAnalysisandDesignofLatticetowers,Transmissiontowers.Designoflatictowersandtransmission towers(onlysessionalwork).

UNIT-V **(10Lectures)**

AnalysisofMillBends.

TEXTBOOKS:

1. M.Raghupati(2000),*DesignofSteelStructures*,McGrawHillEducationPvt.Ltd,NewDelhi,India.
2. P.Dayaratnam(1996),*DesignofSteelStructures*,2ndedition,S.Chand,NewDelhi,India
3. KazmiandZindal(1988),*DesignofSteelStructures*,PrenticehallofIndia,NewDelhi,India.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CIVIL VIII Semester **VCE-R14**

SOIL DYNAMICS AND MACHINE FOUNDATION

(Professional Elective - III)

Course Code: A2151	**L**	**T**	**P**	**C**
	3	**1**	**0**	**4**

Course Overview:

This course will covered like behavior of shallow underground foundations, due to dynamic loads, dynamic earth pressure on retaining structures, slope stability. Due to dynamic loads, dynamic response of pile foundations, behavior of sub grade soil due to cyclic loads of railway, run way etcetera. So, these are the entire contents of the course on soil dynamics.

Prerequisite(s):Geo Technical Engineering-I

Course Outcomes:

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

CO1. To understand the various types, design criteria, permissible amplitudes and bearing pressure

CO2. To know about degrees of freedom - analysis under different modes of vibration

CO3. To analyse the various types and methods of Isolating materials and their properties

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CIVIL VIII Semester **VCE-R14**

SOIL DYNAMICS AND MACHINE FOUNDATION

(Professional Elective - III)

Course Code: A2151	**L**	**T**	**P**	**C**
	3	**1**	**0**	**4**

SYLLABUS

UNIT–I **(12Lectures)**

THEORYOFVIBRATIONS:Basicdefinitionsfreeandforcedvibrationswithandwithoutdampingforsingledegrefreedomsystem.Resonanceanditseffect,magnification,Logarithmicdecrement.TransmissibilityNaturalfrequencyoffoundation,Soilsystem-Barkan'sandISmethods,pressurebulbconcept,Pauw'sAnalogy.

UNIT–II **(12Lectures)**

WAVEPROPAGATION:ElasticwavesinRods,Wavesinelastichalfspace.DynamicSoilProperties:FieldandLaboratory methods ofdetermination, Uphole,downholeandcrosswholemethods,Cyclicplateloadtest,Blockvibrationtest, DeterminationofDampingfactor.

UNIT–III **(10Lectures)**

MACHINEFOUNDATIONS:Types,Designcriteria,permissibleamplitudesandbearingpressure.

BLOCKFOUNDATION: Degreesoffreedom-analysisunderdifferentmodesofvibration

UNIT–IV **(12Lectures)**

AnalysisofTwoDegreefreedomsystemsunderfreeandforcedvibrations.PrinciplesofDesignofFoundationsforreciprocatingandimpactmachinesasperIScode.

UNIT–V **(10Lectures)**

VIBRATIONISOLATION:Typesandmethods–Isolatingmaterialsandtheirproperties

TEXTBOOKS:

1. P.SrinivasuluandG.V.Vaidyanathan(2009),*HandbookofMachineFoundations*,TataMcGrawHill,NewDelhi, India.

2. ShamsherPrakash(1981),*SoilDynamics,*TataMcGraw-Hill,NewDelhi,India.

REFERENCEBOOKS:

1. Barken(1962),*DynamicsofBasesandFoundations*,McGrawHillPublishingCo.,NewYork.

2. Richart,HallandWoods(1970),*VibrationofSoilsandFoundations*,PrenticeHall,eaglewoodCliffs,New Jersy, USA.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CIVIL VIII Semester **VCE-R14**

TRAFFIC ENGINEERING

(Professional Elective - III)

Course Code: A2152

L	T	P	C
3	1	0	4

Course Overview:

Traffic engineering subject is deals with traffic planning and characteristics of roads and traffic surveys and variousintersection designs and safety of environment and also deals with the traffic management.

Prerequisite(s): Surveying – I, Surveying – II, Transportation Engineering

Course Outcomes:

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

CO1. Understand the factors influencing road vehicle performance characteristics and design

CO2. Analysetraffic problems and plan for traffic systems various uses.

CO3.Design Channels, Intersections, signals and parking arrangements.

CO4. Develop the traffic management Systems.

CO5. Assess societal needs and plan suitable infrastructure

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CIVIL VIII Semester **VCE-R14**

TRAFFIC ENGINEERING

(Professional Elective - III)

Course Code: A2152

L	T	P	C
3	1	0	4

SYLLABUS

UNIT-I: **(12Lectures)**

TRAFFICCHARACTERISTICS: BasiccharacteristicsofTraffic,Volume,SpeedandDensity.RelationshipamongTraffic parameters.

TRAFFICMEASUREMENT:TrafficVolumeStudies:Objectives,TypesofVolumeStudies,ConceptofPCU.DataCollection andPresentation, SpeedStudies,TypesofSpeeds.Objectives ofSpeedStudies.MethodsofConductingspeedstudies. DatacollectionandPresentation,StatisticalMethodsforAnalysisofSpeedData.

UNIT-II: **(10Lectures)**

HIGHWAYCAPACITY: DefinitionofCapacity,Importanceofcapacity,FactorsaffectingCapacity,ConceptofLevelofService,differentLevelsofService,ConceptofServiceVolume,PeakHourFactor.

UNIT-III **(12Lectures)**

TRAFFICCONTROL&REGULATION:TrafficProblemsinUrbanareas,ImportanceofTrafficControlandregulation,TrafficRegulatoryMeasures,Channelization,TrafficSignals,SaturationFlow,SignalDesignbyWebsterMethod,SignalPhasingandTimingDiagrams.Detrimentaleffectoftrafficonenvironment– AirPollution,PollutantsduetoTraffic,Measurestoreduce AirPollution dueto Traffic-NoisePollution,MeasurestoreduceNoisePollution.

UNIT-IV **(10Lectures)**

PARKINGSTUDIES: Typesof parkingfacilities,on street andOff Street ParkingFacilities.ParkingStudies,ParkingInventoryStudy,ParkingSurveybyPatrollingMethod,AnalysisofParkingDataandparkingcharacteristics,MultiStory

CarParkingFacility,Designstandards.

UNIT-V **(12Lectures)**

TRAFFICSIGNSANDROADMARKINGS: TypesofTrafficSigns,cautionary,RegulatoryandInformativeSigns,Specifications.Pavementmarkings,TypesofMarkings,LanemarkingsandObjectmarkings.StandardsandSpecificationsforRoadMarkings.ProblemofHighwaySafety,TypesofRoadaccidents,Causes.EngineeringMeasurest

oreduceAccidents,EnforcementMeasures,EducationalMeasures,RoadSafetyAudit,Principlesof RoadSafetyAudit.

TEXTBOOKS:

1. LRkadiyali(1987),*TrafficEngineeringandTransportationplanning*,Khannapublishers,NewDelhi,India.
2. ParthaChakroborthy,AnimeshDas(2004),*Principles ofTransportationEngineering*,PrenticeHallofIndia,New Delhi,India.

REFERENCEBOOKS:

1. C. J. Khisty(2003),*TransportationEngineering–AnIntroduction*,PrenticeHallofIndia,NewDelhi,India.
2. C.S.Papacostas(1987),*FundamentalsofTransportationEngineering*,PrenticeHallofIndia,NewDelhi,India.
3. ManneringandKilareski(2007),*HighwayEngineeringandTrafficAnalysis*,JohnWileyPublications,NewYork.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CIVIL VIII Semester **VCE-R14**

GEOINFORMATICS FOR ENVIRONMENTAL MONITORING

(Professional Elective - III)

Course Code: A2153	**L**	**T**	**P**	**C**
	3	**1**	**0**	**4**

Course Overview:

This course presents the concepts and applications of geoinformatics, a multidisciplinary field that has at its core different technologies that support the acquisition, analysis and visualization of geodata for environmental monitoring and management.

Prerequisite(s): Engineering Geology

Course Outcomes:

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

CO1. To understand the water and environmental issues

CO2. Analysis the data related to geo information

CO3. To solve various complex issues related to environmental

CO4. Air quality monitoring

CO5. Sensors for environmental monitoring

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CIVIL VIII Semester **VCE-R14**

GEOINFORMATICS FOR ENVIRONMENTAL MONITORING

(Professional Elective - III)

Course Code: A2153

L	T	P	C
3	1	0	4

SYLLABUS

UNIT-I **(12Lectures)**

WATER AND THEENVIRONMENT:R.S.offluorescence,water quality, water pollution,potentialpollutionsources,waterrunoff,RemoteSensingandWaterqualitymanagement,snowsurfacecover,floodprediction.Soilsandlandforms,insectsanddisease,soilerosion,salinity,flooddamage,soillimitation,soildegradationusingRemoteSensingandGIS.

UNIT-II **(10Lectures)**

URBANENVIRONMENT: Generalconsiderationruralstructure,Urbanareas,Impactofindustrialpollution,chemical effluents,landreclamation,disposalof solidwaste,miningpollution.

UNIT-III **(12Lectures)**

AIRPOLLUTION:

R.S.techniquesforAirqualitymonitoring,casestudies,weatherforecastingandclimatology,emissivitycharacteristics.

GLOBAL CLIMATOLOGY: measurementof atmospheric temperature, composition, constituent distribution andconcentration,windflowsandaircirculation,Hurricanetracking,meteorologicalsatellitesystems.

UNIT-IV **(10Lectures)**

MARINE ENVIRONMENT: Sensors for environmental monitoring, sensors, visible and outside visible wave length, absorptionspectrometers, selectionofgroundtruthsites,seatruthobservations,Radartechniquesforsensingocean surface,thermalmeasurements,applicationofsensing,mappingoilslicks,Chlorophylldetection,Fisheriesresources, Coastalmarinestudies–determinationoftemperatureandseastate.

UNIT-V **(12Lectures)**

CASESTUDIES

TEXTBOOKS:

1 Barett,E.C.andCulisI.F.(1997),*IntroductiontoEnvironmentalRemoteSensing,*3rdedition,Chapman andHall, NewYork.

2. Lintz,J. andSimonentD.S.(1976),*RemoteSensingofenvironment,*AddisionWesley,USA.

REFERENCEBOOKS:

1. James B. Campbell andRandolph H. Wynne (2011), *Introduction to Remote Sensing 5th Edition*, GuilfordPublicationsInc.,NewYork.

2. LRANarayana(1999),*RemoteSensinganditsapplications,*UniversityPress,Hyderabad,India.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CIVIL VIII Semester **VCE-R14**

AIR POLLUTION AND CONTROL METHODOLOGIES

(Professional Elective - III)

Course Code: A2154

L	T	P	C
3	1	0	4

Course Overview:

The course has been designed to improve the understanding of the students about different pollutioncontrol strategies and the skills of application of remediation techniques to combat air pollution. Thecourse will also be dealing about the sources of air pollution, the impact of these sources on theenvironment 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. CIVIL VIII Semester **VCE-R14**

AIR POLLUTION AND CONTROL METHODOLOGIES

(Professional Elective - III)

Course Code: A2154

L	T	P	C
3	1	0	4

SYLLABUS

UNIT-I **(12Lectures)**

AIRPOLLUTION: Definitions,scope,significance,airpollutantsclassificationnaturalandartificial,primaryandsecondary,pointandnon-point,lineandareal,stationaryandmobilesources.Effectsofairpollutantsonman,material andvegetation,globaleffectsofairpollution,greenhouseeffect,heatislands,acidrains, ozoneholesetc.

UNIT-II **(10Lectures)**

THERMODYNAMICSANDKINETICSOFAIR-POLLUTION: ApplicationsintheremovalofgaseslikeSOx, NOx, CO,HC etc.,air-fuelratio. ComputationandControlofproductsofcombustion.MeteorologyandplumeDispersion,

UNIT-III **(12Lectures)**

PROPERTIESOFATMOSPHERE: Heat, Pressure,Wind forces,MoistureandrelativeHumidity,InfluenceofMeteorologicalphenomenaonAirQuality-windrosediagrams.

LAPSERATES:PressureSystems,WindsandmoistureplumebehaviorandplumeRiseModels;GaussianModelforPlumeDispersion.

UNIT-IV **(12Lectures)**

CONTROLOFPARTICULATES: ControlatSources,ProcessChanges,Equipmentmodifications,Designandoperationofcontrol.Equipment'sSettlingChambers,Centrifugalseparators,filtersDryandWetscrubbers,Electrostatic precipitators.GeneralMethodsofControlofNOxandSoxemissions,In-plantControlMeasures,processchanges,dry andwetmethodsofremovalandrecycling.

UNIT-V **(10Lectures)**

AIRQUALITYMANAGEMENT: MonitoringofSPM,SO;NOandCOEmissionStandards.

TEXTBOOKS:

1. M.N.Rao,H.V.N.Rao(1988),*Airpollution*,TataMcGrawHillEducation,NewDelhi,India.

2. C.S.Rao(2006),*EnvironmentalPollutioncontrolEngineering*,Newageinternational,NewDelhi,India.

REFERENCEBOOKS:

1. R.K.Trivedy,P.K.Goel(2003),*IntroductiontoAirpollution*,ABDPublications,NewDelhi,India.

2. Wark,Warner(1998),*Airpollutionitsoriginandcontrol,*Addison-Wesley,NewYork.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CIVIL VIII Semester **VCE-R14**

STAAD Pro LAB

Course Code: A2155	**L**	**T**	**P**	**C**
	0	**0**	**6**	**2**

Course Overview:

To familiarize the students on the software package (STAAD Pro) for analysis and design of concrete and steelstructures.

Prerequisite(s): Structural analysis, Strength of materials, design of reinforced concrete structures

Course Outcomes:

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

CO1. Analyze and interpret the results.

CO2. Design the framed structures.

CO3. To develop a program for the analysis of Multi-storey space frame using STAAD Pro.

CO4. To develop a program for the analysis and design of a Multi-storey Reinforced Cement Concrete building using STAAD Pro

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech. CIVIL VIII Semester **VCE-R14**

STAAD Pro LAB

Course Code: A2155

L	T	P	C
0	0	6	2

SYLLABUS

LISTOFEXPERIMENTS:

1. Introductiontodevelopaprogramin Clanguageusingarraysandfunctionsformatrixmanipulationupto4x4 matrices.

2.Todevelopaprogramtodrawbendingmomentdiagramandshearforcediagramforbeamssubjectedtodifferent loadsusingfundamentalprinciplesofgraphicsin C.

3. Todevelopa programfordesigningReinforcedCementConcreteslabsusingExcelSheets.

4. Todevelopa programfordesigningReinforcedCementConcretebeamsusingExcelSheets.

5. TodevelopaprogramfordesigningReinforcedCementConcreteColumnsandFootingsusingExcelSheets.

6. Todevelopa programfortheanalysisofPinJointedPlaneTrussusingSTAADpro.

7. Todevelopa programfortheanalysisofMulti-storeyspaceframeusingSTAADPro.

8. TodevelopaprogramfortheanalysisanddesignofaMulti-storeyReinforcedCementConcretebuildingusingSTAADPro

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 ofthe **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 theacademic 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 HODconcerned/ Principal.
10. I hereby **acknowledge** that I have **received** acopy 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)

Undertaking by Students/Parents

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Signature of Student

Signature of Parent
Name & Address with Phone Number

-- OFFICE COPY --