

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

Affiliated to JNTUH, Approved by AICTE, Accredited by NAAC and ISO 9001:2015 Certified

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

www.vardhaman.org

BACHELOR OF TECHNOLOGY MECHANICAL ENGINEERING (Accredited by NBA)

ACADEMIC REGULATIONS COURSE STRUCTURE (VCE-R18)

CHOICE BASED CREDIT SYSTEM

**B. Tech. - Regular Four Year Degree Program
(For batches admitted from the Academic Year 2018 - 2019)**

&

**B. Tech. - Lateral Entry Scheme
(For batches admitted from the Academic Year 2019 - 2020)**



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PRELIMINARY DEFINITIONS AND NOMENCLATURES

- ❖ “Autonomous Institution / College” means an institution / college designated as autonomous institute / college by University Grants Commission (UGC), as per the UGC Autonomous College Statutes.
- ❖ “Academic Autonomy” means freedom to a College in all aspects of conducting its academic programs, granted by the University for promoting excellence.
- ❖ “Commission” means University Grants Commission.
- ❖ “AICTE” means All India Council for Technical Education.
- ❖ “University” means Jawaharlal Nehru Technological University Hyderabad.
- ❖ “College” means Vardhaman College of Engineering, Hyderabad unless indicated otherwise by the context.
- ❖ “Program” means:
 - Bachelor of Technology (B. Tech.) Degree program
 - UG Degree Program: B. Tech.
- ❖ “Branch” means specialization in a program like B. Tech. Degree program in Civil Engineering, B. Tech. Degree program in Computer Science and Engineering etc.
- ❖ “Course” or “Subject” means a theory or practical subject, identified by its course-number and course-title, which is normally studied in a semester. For example, A4001: Linear Algebra and Ordinary Differential Equations, A4501: Programming for Problem Solving, etc. The description of allocation of course code is mentioned in the table 1.

Table 1: Course Code Description

First Digit	Second Digit	Third Digit	Fourth and Fifth Digits
Indicates Program	Indicates Regulation	Indicates Department	Indicates Course Number
A : B. Tech. B : M. Tech. C : MBA	1 : R11 2 : R14 3 : R15 4 : R18	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

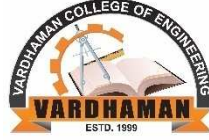
The autonomy conferred on Vardhaman College of Engineering by UGC based on its performance as well as future commitment and competency to impart quality education. It is a mark of its ability to function independently in accordance with the norms set by the monitoring bodies like UGC and AICTE. It reflects 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



VARDHAMAN COLLEGE OF ENGINEERING

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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 MECHANICAL ENGINEERING

Department Vision:

To be a premier center for producing competent mechanical engineers to cater the ever changing industrial demands and societal needs.

Department Mission:

- ❖ To impart knowledge and skills in basic and applied areas of Mechanical Engineering through innovative learner-centric approach.
- ❖ To associate with industries and research organizations for gaining real time practical knowledge.
- ❖ To facilitate continuous learning based on dynamic needs of the society.

Program Educational Objectives (PEOs)

PEO1: Graduates make their way to the society with proper scientific and technical knowledge to identify, formulate and solve Mechanical Engineering problems.

PEO2: Graduates adapt to rapidly changing environment in the areas of Mechanical Engineering and explore possible profession in industry, academic, research and self-employment opportunities.

PEO3: Graduates excel in career by their team-working ability and communicate effectively to complete task with minimal resources.

PEO4: Graduates commit to professional and ethical practices encouraging diversity, continuous improvement and lifelong learning.

Program Outcomes (POs):

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

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

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

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

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

Program Specific Outcomes (PSOs)

- PSO1:** Demonstrate knowledge in the area of design, analysis and fabrication of mechanical systems.
- PSO2:** Apply learned concepts and management skills to associate professionally in industry or as an entrepreneur.



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ACADEMIC REGULATIONS

**B. Tech. - Regular Four Year Degree Program
(For batches admitted from the Academic Year 2018 - 2019)
&
B. Tech. - Lateral Entry Scheme
(For batches admitted from the Academic Year 2019 - 2020)**

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 2018-2019 onwards.

2. EXTENT

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

3. ADMISSION

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

3.1.1. Eligibility:

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

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

3.1.2. Admission Procedure:

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

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

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

3.2.1. Eligibility:

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

3.2.2. Admission Procedure:

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

4. PROGRAMS OFFERED

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

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

5. MEDIUM OF INSTRUCTION

The medium of instruction is English for all the courses.

6. DURATION OF THE PROGRAMS

6.1. Minimum Duration

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

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

6.2. Maximum Duration

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

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

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

7. SEMESTER STRUCTURE

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

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

8. PROGRAM STRUCTURE

In the B.Tech. program structure, every course is placed in any one of the eight categories. The total 160 credits are distributed into these eight categories mentioned below in the table 2.

Table 2: Category wise distribution of credits

S.No	Broad Course Classification	Course Group/Category	Course Description	Total Credits (Approximate)
1	Foundation Courses (FnC)	BSC- Basic Sciences courses	Includes Mathematics, Physics and Chemistry	23
2		ESC- Engineering Sciences Courses	Includes Fundamental Engineering subjects	21
3		HSMC- Humanities and Social Sciences Courses including Management courses	Includes subjects related to Humanities, Social sciences and Management	12
4	Core Courses (CoC)	PCC– Professional Core Courses	Includes core subjects related to the parent discipline/Department/branch of Engineering.	57
5		PROJ : Project Work Industrial training / Mini Project Seminar	B. Tech. project or UG project or UG major project	11
			Industrial training / Internship / UG Mini-Project / Mini-Project	4
		Seminar/Colloquium based on core contents related to parent discipline/ Department/branch of Engineering	2	
6	Elective Courses (EIC).	PEC – Professional Electives Courses	Includes elective subjects related to the parent discipline/Department/branch of Engineering	18
7		OEC-Open Electives Courses	Elective subjects which include interdisciplinary subjects or subjects in an area outside the parent discipline/ Department/ branch of Engineering	12
8	Mandatory Courses(MC)	-	Mandatory courses (Non-Credit)	

9. CREDIT BASED SYSTEM

All the academic programs under autonomy are based on credit system. Credits are assigned based on the following norms, shown in table 3.

Table 3: Credit Representation

Lectures (hrs/wk/Sem.)	Tutorials (hrs/wk/Sem.)	Practical Work (hrs/wk/Sem.)	Credits (L: T: P)	Total Credits
3	0	0	3:0:0	3
3	1	0	3:1:0	4
3	1	3	3:1:1.5	5.5
3	2	0	3:2:0	5
3	0	2	3:0:1	4
3	0	4	3:0:2	5
4	0	0	4:0:0	4
4	1	0	4:1:0	5
4	0	3	4:0:1.5	5.5
0	2	4	0:2:2	4
0	0	3	0:0:1.5	1.5
0	0	2	0:0:1	1
0	0	16	0:0:8	8

- 9.1. The duration of each semester will normally be 23 weeks with 6 days a week (every second Saturday will be observed as holiday). A working day shall have six lecture hours each of 60 minutes duration.
- 9.2. The four-year curriculum of any B. Tech. program of study shall have 160 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 of study shall have a total 122 credits.

10. COURSE REGISTRATION

- 10.1. A 'faculty advisor or counsellor' shall be assigned to a group of 20 students, who will advise student about the under graduate program, its course structure and curriculum, choice/option for subjects/courses, based on their competence, progress, pre-requisites and interest.
- 10.2. The college Exam cell invites 'registration forms' from students before the beginning of the semester through 'on-line registration', ensuring 'date and time stamping'. The on-line registration requests for any 'current semester' shall be completed before the commencement of SEEs (Semester End Examinations) of the 'preceding semester'.
- 10.3. A student can apply for on-line registration, only after obtaining the 'written approval' from faculty advisor/counsellor, which should be submitted to the Examination section through the Head of the Department. A copy of it shall be retained with Head of the Department, faculty advisor/counsellor and the student.
- 10.4. If the student submits ambiguous choices or multiple options or erroneous entries during on-line registration for the subject(s)/course(s) under a given/specified course group/category as listed in the course structure, only the first mentioned subject/ course in that category will be taken into consideration.
- 10.5. Subject/course options exercised through on-line registration are final and cannot be changed or interchanged; further, alternate choices also will not be considered. However, if the subject/course that has already been listed for registration by the Head of the Department in a semester could not be offered due to any unforeseen or unexpected reasons, then the student shall be allowed to have alternate choice either for a new subject (subject to offering of such a subject), or for another existing subject (subject to availability of seats). Such alternate arrangements will be made by the head of the department, with due notification and time-framed schedule, within the first week after the commencement of class-work for that semester.
- 10.6. Open electives: The students have to choose one open elective (OEC-I) during III year I semester, one (OEC-II) during III year II semester, one (OEC-III) in IV year I semester and one (OEC-IV) in IV year II semester, from the list of open electives given. However, the student cannot opt for an open elective subject offered by their own (parent) department, if it is already listed under any category of the subjects offered by parent department in any semester.
- 10.7. Professional Electives: students have to choose professional elective I (PEC-I) in III year I semester, Professional electives II, III (PEC-II, III) in III year II semester, Professional electives IV and V (PEC-IV and V) in IV year I semester and PEC-VI in IV year II semester, from the list of professional electives given.

11. SUBJECTS / COURSES TO BE OFFERED

- 11.1. A typical section (or class) strength for each semester shall be 60.
- 11.2. A subject/course may be offered to the students, only if a minimum of 20 students (1/3 of the section strength) opt for it. The maximum strength of a section is limited to 80 (60 + 1/3 of the section strength).
- 11.3. More than one faculty member may offer the same subject (lab/practical may be included with the corresponding theory subject in the same semester) in any semester. However, selection of choice for students will be based on - 'first come first serve basis and CGPA criterion' (i.e. the first focus shall be on early on-line entry from the student for registration in that semester, and the second focus, if needed, will be on CGPA of the student).
- 11.4. If more entries for registration of a subject come into picture, then the Head of Department concerned shall decide, whether or not to offer such a subject/ course for two (or multiple) sections.
- 11.5. In case of options coming from students of other departments/branches/disciplines (not considering open electives), first priority shall be given to the student of the 'parent department'.

12. METHOD OF EVALUATION

The performance of a student in each semester shall be evaluated subject-wise with a maximum of 100 marks each for theory, practical/computer aided engineering drawing lab. In addition, mini-project and technical seminar work shall be evaluated for 100 marks each and project work shall be evaluated for 300 marks.

12.1. Theory Courses

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

Table 4: Method of Evaluation

Internal Evaluation	Continuous Internal Evaluation (CIE) Midterm Exam: 20 Marks (Two midterm exams of each 20 marks and average marks is taken as final) Assignment: 05 marks Alternate Assessment: 05 marks (Seminar, In-class Assessment, Mini Project, Quiz, Regularity)	30 Marks
External Evaluation	Semester End Examination (SEE)	70 Marks

12.1.1. Midterm Examinations:

There will be two midterm examinations in theory courses for a maximum of 30 marks to be answered in 90 minutes duration and will be scaled down to 20 marks. The first midterm examination will be on the first two units of the syllabus and the second midterm examination will be on the last three units. The final marks of midterm examinations are calculated by taking average of two midterm examinations. Any fraction will be rounded off to next higher integer. In case a student does not appear for midterm examination, a missing examination will be conducted upon the recommendations of standing committee subjected to payment of a prescribed fee for each missing examination.

12.1.2. Assignment and Alternate Assessment:

There will be five assignments in a semester for each subject. Each assignment carries 05 marks. The average of five assignments will be considered for awarding 05 marks. Remaining 05 marks are based on the performance in the alternate assessment. The alternate assessment strategies include in-class participation, regularity, quiz, seminar, mini-project etc. The modalities for conducting the assignment and alternate assessment will be decided by the department concerned.

12.1.3. Semester End Examinations (SEE):

The SEE question paper in theory courses will be for a maximum of 70 marks to be answered in three hours duration. The details of the question paper pattern are as follows,

- The SEE will be conducted for 70 marks consisting of two parts viz.
i) Part- A for 20 marks **ii) Part - B** for 50 marks.
- Part-A is compulsory which consists of ten questions carrying 2 marks each. Two questions from each unit.
- Part-B consists of five questions (numbered from 2 to 6) carrying 10 marks each. Each of these questions is from one unit and may contain sub-questions. For each question there will be an "either" "or" choice, which means that there will be two questions from each unit and the student should answer either of the two questions.

The question paper shall be set externally and valued both internally and externally. If the difference between both the valuations is less than 15 marks, the average marks of the two valuations shall be awarded as final marks, otherwise third valuation will be conducted and the average marks of the best two valuations shall be awarded as final marks.

12.1.4. Valuation:

Both midterm examination and semester end examination answer scripts are valued digitally/manually. In the digital valuation process, all the student answer scripts are encoded and scanned subject wise.

12.2. Practical Examinations

Practical examinations shall be evaluated for 100 marks, out of which 70 marks shall be for external examination and 30 marks for internal. The 30 internal marks are distributed as 20 marks for day-to-day evaluation and 10 marks for internal examination. The external end-examination shall be conducted by the teacher concerned and an external examiner from outside the college.

12.3. Mini Project / Internship

The First mini-project / internship shall be carried out during the summer break for a minimum of 4 weeks after the II year II semester and shall be completed before the end of the III year I semester. The Second mini-project / internship shall be carried out during the summer break for a minimum of 4 weeks after the III year II semester and shall be completed before the end of the IV year I semester. A report has to be submitted for assessment to an internal evaluation committee comprising Head of the Department or his nominee and two faculty members of the department including the project supervisor for 100 marks each.

12.4. Technical Seminar

The seminar shall be a reproduction of the concept in any standard research paper or on latest cutting edge technologies. A hard copy of the information on seminar topic in the form of a report is to be submitted for evaluation along with presentation. The presentation of the seminar shall be made before an internal evaluation committee comprising the Head of the Department or his nominee, seminar supervisor and a senior faculty of the department. It will be evaluated for 100 marks.

12.5. Project Work

The project work shall be evaluated for 300 marks of which 160 marks shall be for internal evaluation (100 marks for project phase-I and 60 for project phase -II) and 140 marks for end-semester evaluation. A project batch shall comprise of not more than four students.

13. ATTENDANCE REQUIREMENTS TO APPEAR FOR THE END SEMESTER EXAMINATION

A student shall be eligible to appear for the semester end examinations, if student acquires a minimum of 75% of attendance in aggregate of all the subjects/courses. Shortage of attendance in aggregate up to 10% (65% and above, and below 75%) in each semester may be condoned by the college academic committee on genuine and valid grounds, based on the student's representation with supporting evidence. A stipulated fee shall be payable towards condonation. Shortage of attendance below 65% aggregate shall not be considered for condonation.

13.1. Students whose shortage of attendance is not condoned in any semester are not eligible to take their end examinations of that semester. They get detained and their registration for that semester shall stand cancelled. They will not be promoted to the next semester. They may seek re-registration for all those subjects registered in that semester in which student was detained, by seeking re-admission into that semester as and when offered; in case if there are any professional electives and/or open electives, the same may also be re-registered if offered. However, if those electives are not offered in later semesters, then alternate electives may be chosen from the same set of elective subjects offered under that category.

13.2. A student fulfilling the attendance requirement in the present semester shall not be eligible for readmission into the same semester.

14. EVALUATION

Following procedure governs the evaluation.

14.1. The marks for the internal evaluation components will be added to the external evaluation marks secured in the end semester examinations to arrive at total marks for any subject in that semester.

14.2. Performance in all the courses is tabulated course-wise and will be scrutinized by the Examination Committee. Moderation is applied, if needed, based on the recommendations of results committee and then course-wise grade lists are finalized.

14.3. Student-wise tabulation is done and grade sheet is generated which is issued to the student.

15. REVALUATION

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

16. SUPPLEMENTARY EXAMINATION

16.1. Supplementary Examination:

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

16.2. Advanced Supplementary Examination:

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

17. ACADEMIC REQUIREMENTS FOR PROMOTION / COMPLETION OF REGULAR B. TECH. PROGRAM OF STUDY

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

For students admitted into B. Tech. program (Batches admitted from 2018–2019)

17.1 Academic Requirements

- 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% (24 out of 70 marks) of marks in the end semester examination and a minimum of 40% of marks in the sum total of the Continuous Internal Evaluation (CIE) and Semester End Examination (SEE) taken together.
- ii. In case of Mini project/Internship and Technical Seminar, a student shall be deemed to have satisfied the minimum academic requirements and earned the credits allotted to each of them, if he secures not less than 40% of marks.
- iii. In case of project work, a student shall be deemed to have satisfied the minimum academic requirements and earned the credits allotted, if he secures not less than 40% of marks in Phase-I and not less than 35% (49 out of 140 marks) of marks in the external end-evaluation and a minimum of 40% of marks in the sum total of the internal evaluation and external end-evaluation taken together in Phase-II.
- iv. A student shall register for all credits and has to earn all the credits. Grade points obtained in all subjects shall be considered for the award of the class based on aggregate of grades.
- v. A student should register for all Mandatory courses mentioned in the curriculum and get minimum pass marks to get the degree. Grade points obtained in these courses will not be considered for awarding class.

17.2 Promotion Rules

S. No.	Promotion	Conditions to be fulfilled
1	First year first semester to first year second semester	Regular course of study of first year first semester.
2	First year second semester to second year first semester	(i) Regular course of study of first year second semester. (ii) Must have secured at least 19 credits out of 38 credits i.e., 50% credits up to first year second semester from all the relevant regular and supplementary examinations, whether the student takes those examinations or not.
3	Second year first semester to second year second semester	Regular course of study of second year first semester.
4	Second year second semester to third year first semester	(i) Regular course of study of second year second semester. (ii) Must have secured at least 48 credits out of 81 credits for Regular students and 25 credits out of 43 credits for Lateral Entry students i.e., 60% credits up to second year second semester from all the relevant regular and supplementary examinations, whether the student takes those examinations or not.
5	Third year first semester to third year second semester	Regular course of study of third year first semester.
6	Third year second semester to fourth year first semester	(i) Regular course of study of third year second semester. (ii) Must have secured at least 75 credits out of 126 credits for Regular students and 52 credits out of 88 credits for Lateral Entry students i.e., 60% credits up to third year second semester from all the relevant regular and supplementary examinations, whether the student takes those examinations or not.
7	Fourth year first semester to fourth year second semester	Regular course of study of fourth year first semester.

For lateral entry students (Batches admitted from 2019–2020)

For Lateral Entry students, the regulations are same as Regular students, except maximum duration to complete the program. It is six years for Lateral Entry students.

18. TRANSITORY REGULATIONS

For students detained due to shortage of attendance:

- 18.1.** A student who has been detained in any of the semesters under old Regulations (prior to R18) due to lack of attendance, shall be permitted to join in the same semester where he/she got detained. In such case/s the readmitted student shall have to follow R18 regulations with substitute subjects wherever necessary as recommended by academic standing committee.
- 18.2.** A student who has been detained for want of credits under old Regulations (prior to R18), shall be permitted to join in the next semester where he got detained, provided if the student gets required number of credits. In such case the readmitted student shall have to follow R18 regulations with substitute subjects wherever necessary as recommended by academic standing committee.
- 18.3.** A student who has got detained belongs to R18 regulations for want of attendance/credits and readmitted into the next regulations has to follow the new regulations with substitute subjects wherever necessary as recommended by academic standing committee.

19. TRANSFER OF STUDENTS FROM OTHER COLLEGES/UNIVERSITIES

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

20. TRANSCRIPTS

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

21. AWARD OF DEGREE

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

21.1. For students admitted into B.Tech. program (Batches admitted from 2018-2019)

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

- The student shall pursue a course of study for not less than four academic years and not more than eight academic years.
- The student shall register for 160 credits and has to secure all 160 credits. Marks obtained in all 160 credits shall be considered for the award of the class based on aggregate of grades.
- The student has to obtain not less than 40% of marks (minimum requirement for declaring as passed) in all the courses.
- The student has no dues to the college, hostel, and library etc. and to any other amenities provided by the College.
- The student has no disciplinary action pending against him.
- The student should satisfy minimum requirements for all Mandatory courses.

21.2. For lateral entry students (Batches admitted from 2019–2020)

Same as Regular students except minimum duration which is 3 years and maximum duration which is 6 years to complete course and number of credits.

The student shall register for 122 credits and has to secure all 122 credits. Marks obtained in all 122 credits shall be considered for the award of the class based on aggregate of grades.

21.3. 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/she shall be placed in one of the following four classes shown in Table 5:

Table 5: Declaration of Class based on CGPA (Cumulative Grade Point Average)

Class Awarded	CGPA to be Secured	From the aggregate marks secured from 160 Credits for Regular Students and 122 Credits for Lateral Entry Students.
*First Class with Distinction	≥ 8.0	
**First Class	≥ 6.5	
Second Class	5.5 to <6.5	
Pass Class	5.0 to <5.5	
Fail	Below 5.0	

* Students with final CGPA (at the end of the under graduate programme) ≥ 8.0, and fulfilling the following conditions shall be placed in '**First Class with Distinction**'.

- (i) Should have passed all the subjects/courses in 'first appearance' within the first 4 academic years (or 8 sequential semesters) from the date of commencement of first year first semester.
- (ii) Should have secured a CGPA ≥ 8.0, at the end of each of the 8 sequential semesters, starting from I year I semester onwards.
- (iii) Should not have been detained or prevented from writing the end semester examinations in any semester due to shortage of attendance or any other reason.

Students fulfilling the conditions listed above alone will be eligible for award of '**college rank**' and '**gold medal**'.

Students with final CGPA (at the end of the under graduate programme) ≥ 6.5, and not fulfilling the conditions listed above, shall be placed in 'First class**' only.

21.4. Grade Point

It is necessary to provide equivalence of percentages and/or *Grade Point (GP)*. This shall be done by prescribing certain specific thresholds of marks in a subject.

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

Grade	Grade Points (GP)	Percentage of Marks
O	10	≥ 90
A+	9	≥ 80 and <90
A	8	≥70 and < 80
B+	7	≥ 60 and <70
B	6	≥ 50 and <60
C	5	≥ 40 and <50
F	0	Below 40
AB	0	ABSENT

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

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

21.5. Semester grade point average (SGPA)

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

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

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

Table 7: Illustration of calculation of SGPA

Course/Subject(i)	Credits (C _i)	Letter Grade	Grade Points (G _i)	Credit Points C _i X G _i
Course 1	4	A	8	4 X 8 = 32
Course 2	4	O	10	4 X 10 = 40
Course 3	4	C	5	4 X 5 = 20
Course 4	3	B	6	3 X 6 = 18
Course 5	3	A+	9	3 X 9 = 27
Course 6	3	C	5	3 X 5 = 15
	ΣC _i =21			Σ C _i X G _i = 152

$$SGPA = 152/21=7.24$$

21.6.Cumulative grade point average (CGPA)

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

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

Where S_i is the SGPA of the ith semester and C_i is the total number of credits in that semester.

Table 8: Illustration of calculation of CGPA

Course/Subject(i)	Credits (C _i)	LetterGrade	Grade Points (G _i)	Credit Points C _i X G _i
I Year I Semester				
Course 1	4	A	8	4 X 8 =32
Course 2	4	A+	9	4 X 9 = 36
Course 3	4	B	6	4 X 6 = 24
Course 4	3	O	10	3 X 10 = 30
Course 5	3	B+	7	3 X 7 = 21
Course 6	3	A	8	3 X 8 = 24
SGPA (S_i)				
I Year II Semester				
Course 7	4	B+	7	4 X 7 = 28
Course 8	4	O	10	4 X 10 = 40
Course 9	4	A	8	4 X 8 = 32
Course 10	3	B	6	3 X 6 = 18
Course 11	3	C	5	3 X 5 = 15
Course 12	3	A+	9	3 X 9 = 27
SGPA (S_i)				

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

22. TERMINATION FROM THE PROGRAM

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

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

23. CURRICULUM

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

24. WITHHOLDING OF RESULTS

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

25. GRIEVANCES REDRESSAL COMMITTEE

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

Headed by Senior Faculty member

Heads of all departments

A senior lady staff member from each department (if available)

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

26. MALPRACTICE PREVENTION COMMITTEE

A malpractice prevention committee shall be constituted to examine and punish the student who involves in malpractice/behaves in an in-disciplinary manner during the examination. The committee shall consist of:

Principal

Subject expert

Head of the department to which the student belongs to

The invigilator concerned

Controller of Examinations

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

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

27. AMENDMENTS TO REGULATIONS

The Academic Council of Vardhaman College of Engineering reserves the right to revise, amend, or change the regulations, scheme of examinations, and/or syllabi or any other policy relevant to the needs of the society or industrial requirements etc., without prior notice.

28. STUDENTS’ FEEDBACK

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

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

29. GRADUATION DAY

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

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

30. AWARD OF A RANK UNDER AUTONOMOUS SCHEME

30.1. Merit Rank will be declared only for those students who have been directly admitted in VCE under Autonomous Regulations and complete the entire course in VCE only within the minimum possible prescribed time limit, i.e., 4 years for B. Tech. and 3 years for B. Tech. under lateral entry scheme.

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

31. CODE OF CONDUCT

- 31.1. Each student shall conduct himself in a manner befitting his association with VCE.
- 31.2. He is expected not to indulge in any activity, which is likely to bring disrepute to the college.
- 31.3. He should show due respect and courtesy to the teachers, administrators, officers and employees of the college and maintain cordial relationships with fellow students.
- 31.4. Lack of courtesy, decorum, indecorous behaviour or untoward attitude both inside and outside the college premises is strictly prohibited. Wilful damage or discard of Institute's property or the belongings of fellow students are not at all accepted. Creating disturbance in studies or adopting any unfair means during the examinations or breach of rules and regulations of the Institute or any such undesirable means and activities shall constitute violation of code of conduct for the student.
- 31.5. **Ragging in any form is strictly prohibited and is considered a serious and punishable offence as per law. It will lead to the expulsion of the offender from the college.**
- 31.6. Violation of code of conduct shall invite disciplinary action which may include punishment such as reprimand, disciplinary probation, debarring from the examination, withdrawal of placement services, withholding of grades/Degrees, cancellation of registration, etc., and even expulsion from the college.
- 31.7. Principal, based on the reports of the warden of Institute hostel, can reprimand, impose fine or take any other suitable measures against an inmate who violates either the code of conduct or rules and regulations pertaining to college hostel.
- 31.8. A student may be denied the award of Degree/certificate even though he has satisfactorily completed all the academic requirements if the student is found guilty of offences warranting such an action.
- 31.9. Attendance is not given to the student during the suspension period.

32. OTHER ISSUES

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

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

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

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

33. SCOPE

- 33.1. The academic regulations should be read as a whole, for the purpose of any interpretation.
- 33.2. In case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Principal is final.
- 33.3. The College may change or amend the academic regulations, course structure or syllabi at any time, and the changes or amendments made shall be applicable to all students with effect from the dates notified by the college authorities.

35. GENERAL

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

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

MALPRACTICES RULES
DISCIPLINARY ACTION FOR / IMPROPER CONDUCT IN EXAMINATIONS

	Nature of Malpractices/Improper conduct	Punishment
	<i>If the student:</i>	
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-R18)

B. TECH - MECHANICAL ENGINEERING

REGULATIONS: VCE-R18

I YEAR I SEMESTER									
Induction Program for Three Weeks									
Code	Course	Category	Periods per Week			Credits	Scheme of Examination Maximum Marks		
			L	T	P		Internal	External	Total
A4001	Linear Algebra and Ordinary Differential Equations	BSC	3	1	0	4	30	70	100
A4005	Oscillations, Waves and Optics	BSC	4	0	0	4	30	70	100
A4501	Programming for Problem Solving	ESC	3	1	0	4	30	70	100
A4301	Engineering Graphics and Computer Aided Drafting	ESC	0	0	3	1.5	30	70	100
A4006	Oscillations, Waves and Optics Laboratory	BSC	0	0	2	1	30	70	100
A4502	Programming for Problem Solving Laboratory	ESC	0	0	3	1.5	30	70	100
A4021	Social Innovation	ESC	0	0	2	1	30	70	100
TOTAL			10	2	10	17	210	490	700
I YEAR II SEMESTER									
Code	Course	Category	Periods per Week			Credits	Scheme of Examination Maximum Marks		
			L	T	P		Internal	External	Total
A4002	Advanced Calculus	BSC	3	1	0	4	30	70	100
A4007	Engineering Chemistry	BSC	4	0	0	4	30	70	100
A4303	Engineering Mechanics	ESC	3	1	0	4	30	70	100
A4009	Functional English	HSMC	3	0	0	3	30	70	100
A4302	Engineering Workshop	ESC	0	0	3	1.5	30	70	100
A4008	Engineering Chemistry Laboratory	BSC	0	0	2	1	30	70	100
A4304	Engineering Mechanics Laboratory	ESC	0	0	3	1.5	30	70	100
A4010	English Language Communication Skills Laboratory	HSMC	0	0	2	1	30	70	100
A4022	Engineering Exploration	ESC	0	0	2	1	30	70	100
TOTAL			13	2	12	21	270	630	900

B. TECH - MECHANICAL ENGINEERING

REGULATIONS: VCE-R18

II YEAR I SEMESTER									
Code	Course	Category	Periods per Week			Credits	Scheme of Examination Maximum Marks		
			L	T	P		Internal	External	Total
A4023	Managerial Economics and Financial Analysis	HSMC	3	0	0	3	30	70	100
A4208	Basic Electrical and Electronics Engineering	ESC	3	0	0	3	30	70	100
A4305	Mechanics of Solids	PCC	3	1	0	4	30	70	100
A4306	Thermodynamics	PCC	3	0	0	3	30	70	100
A4307	Material Science and Metallurgy	PCC	3	0	0	3	30	70	100
A4308	Mechanics of Solids Laboratory	PCC	0	0	3	1.5	30	70	100
A4309	Metallurgy Laboratory	PCC	0	0	2	1	30	70	100
A4209	Basic Electrical and Electronics Engineering Laboratory	ESC	0	0	3	1.5	30	70	100
A4019	Verbal Ability and Logical Reasoning	HSMC	1	0	0	1	30	70	100
A4013	Gender Sensitization*	MC	2	0	0	0	30*	70*	100*
TOTAL			18	1	8	21	270	630	900
II YEAR II SEMESTER									
Code	Course	Category	Periods per Week			Credits	Scheme of Examination Maximum Marks		
			L	T	P		Internal	External	Total
A4012	Probability and Statistics	BSC	3	0	0	3	30	70	100
A4310	Applied Thermodynamics	PCC	3	0	0	3	30	70	100
A4311	Kinematics of Machinery	PCC	3	1	0	4	30	70	100
A4312	Fluid Mechanics and Hydraulic Machines	PCC	3	0	0	3	30	70	100
A4313	Manufacturing Process	PCC	3	0	0	3	30	70	100
A4314	Machine Drawing	PCC	0	0	4	2	30	70	100
A4315	Fluid Mechanics and Hydraulic Machines Laboratory	PCC	0	0	3	1.5	30	70	100
A4316	Manufacturing Process Laboratory	PCC	0	0	3	1.5	30	70	100
A4017	Quantitative Aptitude - I	BSC	1	0	0	1	30	70	100
A4014	Environmental Science*	MC	2	0	0	0	30*	70*	100*
TOTAL			18	1	10	22	270	630	900

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

B. TECH - MECHANICAL ENGINEERING

REGULATIONS: VCE-R18

III YEAR I SEMESTER									
Code	Course	Category	Periods per Week			Credits	Scheme of Examination Maximum Marks		
			L	T	P		Internal	External	Total
A4317	Design of Machine Elements-I	PCC	3	0	0	3	30	70	100
A4318	Dynamics of Machinery	PCC	3	0	0	3	30	70	100
A4319	Metrology and Machine Tools	PCC	3	0	0	3	30	70	100
	Open Elective - I	OEC	3	0	0	3	30	70	100
	Professional Elective - I	PEC	3	0	0	3	30	70	100
A4320	Theory of Machines Laboratory	PCC	0	0	2	1	30	70	100
A4321	Thermal Engineering Laboratory	PCC	0	0	3	1.5	30	70	100
A4322	Metrology and Machine Tools Laboratory	PCC	0	0	3	1.5	30	70	100
A4323	Mini Project / Summer Internship - I	PROJ	0	0	4	2	100	-	100
A4020	Professional Communication Skills	HSMC	0	0	2	1	30	70	100
A4015	Essence of Indian Traditional Knowledge*	MC	2	0	0	0	30*	70*	100*
TOTAL			17	0	14	22	370	630	1000
III YEAR II SEMESTER									
Code	Course	Category	Periods per Week			Credits	Scheme of Examination Maximum Marks		
			L	T	P		Internal	External	Total
A4324	Design of Machine Elements-II	PCC	3	0	0	3	30	70	100
A4325	Heat Transfer	PCC	3	0	0	3	30	70	100
	Open Elective - II	OEC	3	0	0	3	30	70	100
	Professional Elective - II	PEC	3	0	0	3	30	70	100
	Professional Elective - III	PEC	3	0	0	3	30	70	100
A4326	Heat Transfer Laboratory	PCC	0	0	3	1.5	30	70	100
A4327	CAD/ CAM Laboratory	PCC	0	0	3	1.5	30	70	100
A4328	Mechanical Engineering Laboratory - I	PCC	0	0	4	2	30	70	100
A4329	Technical Seminar	PROJ	0	0	4	2	100	-	100
A4018	Quantitative Aptitude - II	BSC	1	0	0	1	30	70	100
A4016	Indian Constitution*	MC	2	0	0	0	30*	70*	100*
TOTAL			18	0	14	23	370	630	1000

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

B. TECH - MECHANICAL ENGINEERING

REGULATIONS: VCE-R18

IV YEAR I SEMESTER									
Code	Course	Category	Periods per Week			Credits	Scheme of Examination Maximum Marks		
			L	T	P		Internal	External	Total
A4024	Management Science	HSMC	3	0	0	3	30	70	100
	Open Elective - III	OEC	3	0	0	3	30	70	100
	Professional Elective - IV	PEC	3	0	0	3	30	70	100
A4330	Mechanical Engineering Laboratory - II	PCC	0	0	3	1.5	30	70	100
A4331	Mechanical Engineering Laboratory - III	PCC	0	0	3	1.5	30	70	100
A4332	Project Phase - I	PROJ	0	0	8	4	100	-	100
A4333	Mini Project / Summer Internship – II	PROJ	0	0	0	2	100	-	100
TOTAL			9	0	14	18	350	350	700
IV YEAR II SEMESTER									
Code	Course	Category	Periods per Week			Credits	Scheme of Examination Maximum Marks		
			L	T	P		Internal	External	Total
	Open Elective - IV	OEC	3	0	0	3	30	70	100
	Professional Elective - V	PEC	3	0	0	3	30	70	100
	Professional Elective - VI	PEC	3	0	0	3	30	70	100
A4334	Project Phase - II	PROJ	0	0	14	7	60	140	200
TOTAL			9	0	14	16	150	350	500

**SYLLABI FOR
I YEAR SEMESTER**

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. ME I Year I Sem.

VCE-R18

LINEAR ALGEBRA AND ORDINARY DIFFERENTIAL EQUATIONS

(Common to All Branches)

Course Code: A4001

L	T	P	C
3	1	0	4

Course Overview:

This course offers more advanced topics of mathematics required to analyze the problems in engineering. Topics to be covered in this course include: Solution of system of linear equations, Eigen values and Eigen vectors, Quadratic forms, Differential equations and their applications, Laplace transforms and its applications to ordinary differential equations. The mathematical skills derived from this course provides necessary base to analytical and theoretical concepts occurring 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.
- CO2. Examine the nature of Quadratic form using Eigen values and Eigen vectors.
- CO3. Solve the first and higher order linear ordinary differential equations.
- CO4. Make use of ordinary differential equations to solve, Rate of growth/decay, Newton’s law of cooling, Electrical circuits and Simple harmonic motion problems.
- CO5. Apply Laplace transforms to solve ordinary differential equations.

Course Articulation Matrix:

COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2												
CO2	3	2												
CO3	3	2												
CO4	3	2												
CO5	3	2												

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. ME I Year I Sem.

VCE-R18

LINEAR ALGEBRA AND ORDINARY DIFFERENTIAL EQUATIONS
(Common to All Branches)

Course Code: A4001

L	T	P	C
3	1	0	4

SYLLABUS

UNIT – I

(8 Lectures)

THEORY OF MATRICES: Real, Complex matrices and their properties, Rank of a matrix by reducing to Echelon form and Normal form, Inverse of a matrix by Gauss-Jordan method, Consistency of system of linear equations using the rank of a matrix.

UNIT – II

(10 Lectures)

EIGEN VALUES, EIGEN VECTORS AND QUADRATIC FORMS: Linear dependence and independence of vectors, Linear transformation, Eigen values and Eigenvectors of a matrix, Properties of Eigen values and Eigen vectors of real and complex matrices, Cayley-Hamilton theorem (statement and verification), Inverse and powers of a matrix using Cayley-Hamilton theorem, Diagonalization of a matrix, Quadratic forms up to three variables: Rank, index, signature and nature of quadratic forms, Reduction of quadratic form to canonical form by orthogonal transformation.

UNIT – III

(9 Lectures)

ORDINARY DIFFERENTIAL EQUATIONS OF FIRST ORDER: Differential equations of first order and first degree: Exact equations and equations reducible to exact form using integrating factors, Linear and Bernoulli's equations. Equations not of first degree: Equations solvable for p , Equations solvable for y , Equations solvable for x and Clairaut's equation, Applications: Newton's law of cooling, Law of natural growth and decay.

UNIT – IV

(9 Lectures)

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

UNIT-V

(9 Lectures)

LAPLACE TRANSFORMS: Laplace transforms of elementary functions, First shifting theorem, Change of scale property, Multiplication by t^n , Division by t , Laplace transforms of derivatives and integrals, Laplace transform of unit step function, Second shifting theorem, Laplace transform of periodic function, Evaluation of some kind of integrals by Laplace transforms, Inverse Laplace transforms, Finding inverse Laplace transforms by different methods, Convolution theorem (without proof), Solving ordinary differential equations by Laplace transform method.

TEXT BOOKS:

1. B.S.Grewal, *Higher Engineering Mathematics*, 43rd Edition, Khanna Publishers, New Delhi, 2014.
2. B.V.Ramana, *Engineering Mathematics*, 23rd Reprint, Tata Mc Graw Hill Education Private Limited, New Delhi, 2010.

REFERENCE BOOKS:

1. Erwin Kreyszig, *Advanced Engineering Mathematics*, 9th Edition, John Wiley & Sons, 2006.
2. N.P. Bali and Manish Goyal, *A text book of Engineering Mathematics*, Laxmi Publications, 2010.
3. D. Poole, *Linear Algebra: A Modern Introduction*, 2nd Edition, Brooks/Cole, 2005.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. ME I Year I Sem.

VCE-R18

OSCILLATIONS, WAVES AND OPTICS
(Common to CE & ME)

Course Code: A4005

L T P C
4 0 0 4

Course Overview:

This course promotes an understanding of the nature and essence of physical principles and fosters implementation of the scientific approach in the analysis of real life situations. The student is encouraged to develop problem solving techniques and appreciate the influence of physics in everyday life. To achieve this one should have strong knowledge over simple harmonic motion, harmonic oscillators, transverse and longitudinal waves. Certainly this course is worthy to understand the principles of optics. This course also cover concepts related to wave optics and lasers.

Prerequisite(s): NIL

Course Outcomes:

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

- CO1. Solve for the solutions and describe the behavior of a damped and driven harmonic oscillator.
- CO2. Construct travelling and standing solutions to the wave equation.
- CO3. Use the geometrical approximation, including Fermat's principle, the ray equation and paraxial matrix formalism for refractive and reflective surfaces.
- CO4. Apply wave optics and diffraction theory to a range of problems.
- CO5. Estimate the properties of various lasers and the propagation of laser beams.

Course Articulation Matrix:

COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2											
CO2	3	2												
CO3	3	3	2											
CO4	3	3												
CO5	3	2												

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. ME I Year I Sem.

VCE-R18

OSCILLATIONS, WAVES AND OPTICS
(Common to CE & ME)

Course Code: A4005

L T P C
4 0 0 4

SYLLABUS

UNIT - I

(12 Lectures)

SIMPLE HARMONIC MOTION, DAMPED AND FORCED SIMPLE HARMONIC OSCILLATOR: Mechanical and electrical simple harmonic oscillators, complex number notation and phasor representation of simple harmonic motion, damped harmonic oscillator – heavy, critical and light damping, energy decay in a damped harmonic oscillator, quality factor, forced mechanical and electrical oscillators, electrical and mechanical impedance, steady state motion of forced damped harmonic oscillator, power absorbed by oscillator.

UNIT - II

(12 Lectures)

NON-DISPERSIVE TRANSVERSE AND LONGITUDINAL WAVES IN ONE DIMENSION AND INTRODUCTION TO DISPERSION: Transverse wave on a string, the wave equation on a string, Harmonic waves, reflection and transmission of waves at a boundary, impedance matching, standing waves and their eigen frequencies, longitudinal waves and the wave equation for them, acoustics waves and speed of sound, standing sound waves.

Waves with dispersion, water waves, superposition of waves and Fourier method, wave groups and group velocity.

UNIT - III

(12 Lectures)

THE PROPAGATION OF LIGHT AND GEOMETRIC OPTICS: Fermat's principle of stationary time and its applications e.g. in explaining mirage effect, laws of reflection and refraction, Light as an electromagnetic wave and Fresnel equations, reflectance and transmittance, Brewster's angle, total internal reflection, and evanescent wave. Introduction to Optical fibres, Acceptance angle, Numerical aperture, step and graded index fibre, losses in optical fibres.

UNIT - IV

(12 Lectures)

WAVE OPTICS: Huygens' principle, superposition of waves and interference of light by wavefront splitting and amplitude splitting; Young's double slit experiment, Newton's rings, Michelson interferometer, Mach-Zehnder interferometer.

Farunhofer diffraction from a single slit and a circular aperture, the Rayleigh criterion for limit of resolution and its application to vision; Diffraction gratings and their resolving power.

UNIT - V

(12 Lectures)

LASERS: Einstein's theory of matter radiation interaction and A and B coefficients; amplification of light by population inversion, different types of lasers: gas lasers (He-Ne, CO₂), solid-state lasers (ruby, Neodymium), semiconductor laser (homo-junction); Properties of laser beams: mono-chromaticity, coherence, directionality and brightness, laser speckles, applications of lasers in science, engineering and medicine.

TEXT BOOKS:

1. H. J. Pain. *The Physics of Vibrations and Waves*, 6th edition, Wiley, India, 2006.
2. I. G. Main. *Vibrations and Waves in Physics*, Cambridge University Press, England, 2012.
3. N. Bajaj. *The physics of Waves and Oscillations*, 1st edition, McGraw Hill Education, India, 2017.
4. A. Ghatak. *Optics*, 5th edition, India: McGraw Hill Education, 2012.

REFERENCE BOOKS:

1. B.K. Pandey and S. Chaturvedi, *Engineering Physics*, Cengage Learning India Pvt. Ltd., New Delhi, 2014.
2. R. Fitzpatrick. *Oscillations and Waves: An Introduction*. CRC Press (Taylor & Francies Group), United States, 2017.
3. Trager and Frank. *Handbook of Lasers and Optics*. Springer, India, 2012.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. ME I Year I Sem.

VCE-R18

PROGRAMMING FOR PROBLEM SOLVING
(Common to CE, ME, CSE & IT)

Course Code: A4501

L T P C
3 1 0 4

Course Overview:

The course is a Basic Engineering course for all computation aspiring students. It is designed to provide a comprehensive study of the C programming language that covers the fundamental principles of computer programming, with an emphasis on problem solving strategies using structured programming techniques. The syntax and constructs of data types, control statements, arrays, functions and pointers are elaborated. The derived data types like structures are discussed. 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. Select right identifiers, data types and operators for effective computation.
- CO2. Write programs using control statements.
- CO3. Write programs demonstrating use of arrays, strings and their applications.
- CO4. Demonstrate the applications of function and recursion.
- CO5. Write programs for simple real life problems using pointers and structures.

Course Articulation Matrix:

COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2												
CO2		3												
CO3			3		2									
CO4			3		2									
CO5			3		2									

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. ME I Year I Sem.

VCE-R18

PROGRAMMING FOR PROBLEM SOLVING
(Common to CE, ME, CSE & IT)

Course Code: A4501

L	T	P	C
3	1	0	4

SYLLABUS

UNIT – I **(8 Lectures)**

INTRODUCTION TO PROGRAMMING: Introduction to components of Computer Systems.

ALGORITHM DEVELOPMENT: Steps to solve logical and numerical problems. Representation of Algorithm, Flowchart and Pseudo code with examples.

INTRODUCTION TO THE C LANGUAGE: C program structure, identifiers, data types, Formatting input/output, Syntax and Logical Errors in compilation, object and executable code.

UNIT – II **(10 Lectures)**

OPERATORS: Arithmetic, Logical, Relational, Conditional, Assignment, Increment and Decrement operators.

EXPRESSIONS: Arithmetic Expressions, Operator precedence and associativity.

DECISION MAKING AND LOOPING: Writing and evaluation of decision making, branching and looping.

UNIT – III **(10 Lectures)**

ARRAYS: Definition, Types of Arrays, declaration and Initialization of n-Dimensional Arrays and Character array, String manipulation.

SEARCHING AND SORTING: Linear search, Bubble sort and Selection sort.

UNIT – IV **(9 Lectures)**

FUNCTIONS: Functions, Parameter passing in functions through call by value, passing arrays to functions, storage classes.

RECURSION: Recursion as a different way of solving problems. Example programs, such as finding factorial, Fibonacci series.

UNIT – V **(8 Lectures)**

POINTERS: Definition, Declaration, Pointer arithmetic, Pointer to Pointer, Pointer to an array (base pointer), Dynamic memory allocation, Command Line arguments, idea of call by reference in functions.

STRUCTURES: Defining, Declaring and initialization of structures, nested structures, Array of Structures.

TEXT BOOKS:

1. B. A. Fouruzan and R. F. Gilberg, C Programming & Data Structures, 3rd Edition, CENGAGE, Learning, India, 2014.

REFERENCE BOOKS:

1. Brian W. Kernighan and Dennis M. Ritchie, *The C Programming Language*, 2nd Edition, Prentice Hall of India, 2015.
2. E. Balagurusamy, *Programming in ANSI C*, 7th Edition Tata McGraw-Hill, 2017.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. ME I Year I Sem.

VCE-R18

ENGINEERING GRAPHICS AND COMPUTER AIDED DRAFTING
(Common to CE, ME, EEE & ECE)

Course Code: A4301

L T P C
0 0 3 1.5

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. The drawing technique is emphasized in how to draw an object graphically and projection drawing from different point of view. In the end, the student is capable of drawing different components. Rather than using conventional tools for drawing, students are made to use CAD software. The use of CAD process provides enhanced graphics capabilities which allows any designer to conceptualize his ideas, modify the design very easily, perform animation and use colors, fonts and other aesthetic features.

Prerequisite (s): Nil

Course Outcomes:

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

- CO1. Construct various types of scales and curves commonly used in engineering practice.
- CO2. Distinguish between first, second, third and fourth angle projections of systems.
- CO3. Estimate sheet metal requirement for making regular solids.
- CO4. Compare isometric and orthographic views of an object.
- CO5. Select CAD tools for modelling regular solids.

Course Articulation Matrix:

COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2												
CO2	3	2												
CO3	3	2												
CO4					1									
CO5	3				2									

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. ME I Year I Sem.

VCE-R18

ENGINEERING GRAPHICS AND COMPUTER AIDED DRAFTING
(Common to CE, ME, EEE & ECE)

Course Code: A4301

L	T	P	C
0	0	3	1.5

SYLLABUS

UNIT – I

INTRODUCTION TO ENGINEERING DRAWING: Introduction to engineering drawing: Principles of Engineering Graphics and their significance, usage of Drawing instruments, Conic sections including the Rectangular Hyperbola (General method only); Cycloid, Epi-cycloid, Hypocycloid; Scales – Plain, Diagonal.

UNIT-II

ORTHOGRAPHIC PROJECTIONS AND PROJECTIONS OF REGULAR SOLIDS: Principles of Orthographic Projections-Conventions - Projections of Points and lines inclined to both planes; Projections of planes inclined to both Planes; Projections of Regular Solids: Prism, Cylinder, Pyramid, Cone-inclined to both planes.

UNIT – III

SECTIONAL VIEWS AND DEVELOPMENT OF SURFACES OF RIGHT REGULAR SOLIDS: Sectional views of right regular solids: Prism, Cylinder, Pyramid, Cone-Development of surface of right regular solids: Prism, Cylinder, Pyramid, Cone.

UNIT – IV

ISOMETRIC PROJECTIONS: Principles of Isometric projection – Isometric Scale, Isometric Views, Conventions; Isometric Views of lines, Planes, Simple and compound Solids; Conversion of Isometric Views to Orthographic Views and Vice-versa.

UNIT – V

COMPUTER BASED DRAWING OVERVIEW OF COMPUTER GRAPHICS: Overview of Computer Graphics, Customisation, Demonstration of a simple team design project: listing the computer technologies that impact on graphical communication, Demonstrating knowledge of the theory of CAD software; Customisation & CAD Drawing: consisting of set up of the drawing page and the printer, including scale settings, Setting up of units and drawing limits; ISO and ANSI standards for coordinate dimensioning and tolerancing; Orthographic constraints, Snap to objects manually and automatically; Producing drawings by using various coordinate input entry methods to draw straight lines, Applying various ways of drawing circles; **Annotations, layering & other functions:** applying dimensions to objects, applying annotations to drawings; Setting up and use of Layers, layers to create drawings ; **Demonstration of a simple team design project:** Geometry and topology of engineered components: creation of engineering models and their presentation in standard 2D blueprint form and as 3D wire-frame and shaded solids.

TEXT BOOKS:

1. Bhatt N.D., Panchal V.M. & Ingle P.R., *Engineering Drawing*, Charotar Publishing House, 2014.
2. Basant Agrawal B. & Agrawal C. M., *Engineering Graphics*, TMH Publication, 2016.

REFERENCE BOOKS:

1. Narayana, K.L. & P Kannaiah, *Text book on Engineering Drawing*, Scitech Publishers, 2016.
2. K. Balaveera Reddy et al, *Computer Aided Engineering Drawing*, CBS Publications, 2017.
3. Shah, M.B. & Rana B.C., *Engineering Drawing and Computer Graphics*, Pearson Education, 2008.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. ME I Year I Sem.

VCE-R18

OSCILLATIONS, WAVES AND OPTICS LABORATORY
(Common to CE & ME)

Course Code: A4006

L T P C
0 0 2 1

Course Overview:

This laboratory course deals with understanding the fundamental physics concepts like frequency, oscillations, wave optics and lasers. This course helps to learn the methodology of investigating problems in physics and also provides to gain knowledge in different techniques and working principles related to waves and light propagation. This course also makes the students familiar with instrumental methods and various material properties. This basic knowledge will enable the scientific fervor to solve the societal issues.

Prerequisite (s): Nil

Course Outcomes:

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

- CO1. Evaluate the rigidity modulus and spring constant of the given materials to interpret the material properties.
- CO2. Estimate the acceleration due to gravity (g) and frequency of AC power supply.
- CO3. Determine the wavelength of a given light source and thickness of a wire by using interference mechanism.
- CO4. Estimate the dispersive power and refractive index of various light sources.
- CO5. Apply the principles of optics to evaluate the characteristics of lasers and optical fibres.

Course Articulation Matrix:

COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2		1										
CO2	3	3	2											
CO3	3	3	2	1										
CO4	3	2		1										
CO5	3	2												

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. ME I Year I Sem.

VCE-R18

OSCILLATIONS, WAVES AND OPTICS LABORATORY
(Common to CE & ME)

Course Code: A4006

L	T	P	C
0	0	2	1

LIST OF EXPERIMENTS

1. Determine the rigidity modulus of the material of a given wire using Torsional Pendulum.
2. Determine the spring constant by using coupled oscillator.
3. Determine the frequency of an AC supply using Sonometer.
4. Determine the frequency of a tuning fork by using Melde's arrangement.
5. Measurement of numerical aperture and acceptance angle of a given Optical Fiber.
6. Determine the bending and transmission losses in Optical Fibers.
7. Determine the dispersive power of the material of a given prism.
8. Determine the wavelengths of the spectral lines of the mercury spectrum using grating.
9. Determine the wavelength of sodium light using Newton's Rings.
10. Determine the wavelength of a given source of Laser light using diffraction grating.

TEXT BOOKS:

1. Geeta Sanon. *B.Sc. Practical Physics*. 1st edition, S. Chand and Company, India, 2007.
2. S. D. Gupta, N. Ghosh and A. Banerjee. *Wave Optics*, CRC Press (Taylor & Francies Group), United States, 2015.
3. M. Nelkon and J. M. Ogborn. *Advanced Level Practical Physics*. 4th edition, Heinemann Educational Publishers, London, 1985.

REFERENCES BOOKS:

1. M. Ghosh and D. Bhattacharya. *A Textbook of Oscillations, Waves and Acoustics*. 3rd edition, S. Chand Publisher, India, 2006.
2. D. Meschede. *Optics, Light and Lasers: The Practical Approach to Modern Aspects of Photonics and Laser Physics*. 2nd edition, Wiley-VCH, Germany, 2007.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. ME I Year I Sem.

VCE-R18

PROGRAMMING FOR PROBLEM SOLVING LABORATORY
(Common to CE, ME, CSE & IT)

Course Code: A4502

L T P C
0 0 3 1.5

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. Thorough treatment is given to the topics of arrays, functions and pointers. The course also elucidates the use of structures. Comprehensive hands on exercises are integrated throughout to reinforce learning and develop real competency.

Prerequisite(s): NIL

Course Outcomes:

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

- CO1. Demonstrating use of control statements, arrays and strings.
- CO2. Demonstrating use of functions and recursive functions.
- CO3. Design and implement C programs for simple real life problems using pointers and structures.
- CO4. Debug erroneous programs related to the course.

Course Articulation Matrix:

COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	3											
CO2	2		3											
CO3	2		3		3									
CO4			3		3									

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. ME I Year I Sem.

VCE-R18

PROGRAMMING FOR PROBLEM SOLVING LABORATORY
(Common to CE, ME, CSE & IT)

Course Code: A4502

L	T	P	C
0	0	3	1.5

LIST OF PROGRAMS

1. Programs using I/O statements and various operators.
2. Programs using expression evaluation and precedence
3. Programs using decision making statements and branching statements.
4. Programs using loop statements.
5. Programs to demonstrate applications of n dimensional arrays.
6. Programs to demonstrate searching and sorting.
7. Programs to demonstrate use of string manipulation functions.
8. Programs using user-defined functions.
9. Programs to demonstrate parameter passing mechanism.
10. Programs to demonstrate recursion
11. Programs to demonstrate use of pointers.
12. Programs to demonstrate command line arguments.
13. Programs to demonstrate dynamic memory allocation.
14. Programs to demonstrate applications of structures.
15. Programs to demonstrate file operations.

TEXT BOOKS:

1. B. A. Fouruzan and R. F. Gilberg, C Programming & Data Structures, 3rd Edition, CENGAGE, Learning, India, 2014.

REFERENCE BOOKS:

1. Yashavant Kanetkar, *Let Us C*, 15th Edition, BPB Publications, 2017

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. ME I YearI Sem.

VCE-R18

SOCIAL INNOVATION
(Common to ME, CSE & IT)

Course Code: A4021

L T P C
0 0 2 1

Course Overview:

Social Innovation is an open ended course to develop social connectedness in engineering students through social awareness and social consciousness. This can be done through live field exposure along with faculty led conceptual presentations, real case reviews; self-study assignments, literature and field survey. Through this course, the students are expected to use their engineering knowledge to provide innovative solutions to existing social problems. This course also develops critical thinking ability among the students.

Prerequisite(s): NIL

Course Outcomes:

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

- CO1. Develop awareness on social issues faced by local regions.
- CO2. Interpret and classify societal issues as simple, complicated and complex problems.
- CO3. Identify the core problem's cause and effect.
- CO4. Propose an innovative idea to solve the identified problem.

Course Articulation Matrix:

COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1						3	2					1		
CO2				3		2	2					1		
CO3	2	3				2	2					2		
CO4	3		2	2	1	2	2	1	2	2	2	2		

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. ME I Year I Sem.

VCE-R18

SOCIAL INNOVATION
(Common to ME, CSE & IT)

Course Code: A4021

L	T	P	C
0	0	2	1

SYLLABUS

Module – 1:

INTRODUCTION TO SOCIAL INNOVATION: Core definitions, core elements and common features of social innovation, a typology of social innovation, Awakening social consciousness.

Module – 2:

CREATE MINDSETS: Seven mindsets – Empathy, Optimism, Iteration, Creative confidence, Making it, Embracing ambiguity, Learning from failures.

Module – 3:

WICKED PROBLEMS: Distinguish between simple, complicated and complex problems; describe the characteristics of wicked problems, breakdown a given problem by unpacking its complexity.

Module – 4:

CRITICAL THINKING FOR SOCIAL INNOVATION: Definition, engineering thinking and learning, distinguish between creativity and innovation.

Module – 5:

MODELS FOR CREATIVE THINKING: Appreciative Inquiry (AI), Asset Based Community Development (ABCD) and Concept of Bricolage.

Module – 6:

PROCESS OF SOCIAL INNOVATION: Community study, develop questionnaire, identifying the causes of a particular problem.

Module – 7:

PROCESS OF SOCIAL INNOVATION: Identify needs, record your learning's.

Module – 8:

PROCESS OF SOCIAL INNOVATION: Generate ideas, select promising ideas, prototyping and testing.

Module – 9:

SOCIAL INNOVATION ACROSS FOUR SECTORS: The non-profit sector, public sector, the private sector, the informal sector, links between and cross sectors.

Module – 10:

STAGES OF INNOVATION: Social organizations and enterprises, social movements, social software and open source methods, common patterns of success and failure.

TEXT BOOKS:

1. Robin Murray, Julie Caulier-Grice, Geoff Mulgan, *The open book of social innovation: Ways to Design, Develop and Grow Social Innovation*, The Young Foundation, 2010.
2. Julie Caulier-Grice, Anna Davies, Robert Patrick & Will Norman, The Young Foundation (2012) Social Innovation Overview: A deliverable of the project: *The theoretical, empirical and policy foundations for building social innovation in Europe* (TEPSIE), European Commission – 7th Framework Programme, Brussels: European Commission, DG Research.
3. www.designkit.org/resources - IDEO Design Kit - The Field Guide to Human Centered Design

REFERENCE BOOKS:

1. Geoff Mulgan, *Social Innovation: What it is, Why it matters and How it can be accelerated*, The Young Foundation, 2007.
2. Asset Based Community Development (ABCD) Model – <http://www.nurtureddevelopment.org/asset-based-community-development/>
3. Diana Whitney & Amanda Trosten-Bloom, *"The Power of Appreciative inquiry – A Practical Guide to Positive Change"*, 2nd Edition, Berrett-Koehler Publishers, Inc, 2010.

**SYLLABI FOR
I YEAR II SEMESTER**

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. ME I Year II Sem.

VCE-R18

ADVANCED CALCULUS
(Common to All Branches)

Course Code: A4002

L T P C
3 1 0 4

Course Overview:

This course offers more advanced topics of mathematics required to analyze the problems in engineering. Topics to be covered in this course include: Evaluation of improper integrals, functions of single, several variables and their applications, Multiple integrals, Vector differential and integral calculus, Fourier series and Fourier transforms. The mathematical skills derived from this course provides necessary base to analytical and theoretical concepts occurring in the program.

Prerequisite(s): NIL

Course Outcomes:

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

- CO1. Evaluate improper integrals and examine the extremum of a function of several variables.
- CO2. Make use of multiple integrals to find the area and volume of a solid.
- CO3. Determine scalar potential function for irrotational force fields.
- CO4. Evaluate line, surface and volume integrals using vector integral theorems.
- CO5. Develop Fourier series and Fourier transforms of a function.

Course Articulation Matrix:

COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2												
CO2	3	2												
CO3	3	2												
CO4	3	2												
CO5	3	2												

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. ME I Year II Sem.

VCE-R18

ADVANCED CALCULUS
(Common to All Branches)

Course Code: A4002

L	T	P	C
3	1	0	4

SYLLABUS

UNIT – I (10 Lectures)

CALCULUS:Evaluation of improper integrals: Beta and Gamma functions and their properties, Rolle's Theorem, Lagrange's mean value theorem and Cauchy's mean value theorem, Taylor's and Maclaurin's series. Functions of several variables: Limit, continuity and partial derivatives of functions of two variables (not to be examined), Jacobians, Functional dependence, Maxima and minima of functions of two variables, Lagrange's method of undetermined multipliers.

UNIT – II (9 Lectures)

MULTIPLE INTEGRALS:Double integrals, Change of order of integration, Change of variables, Area enclosed by plane curves, Triple integrals, Change of variables, Area, volume, mass and centre of gravity (constant and variable densities).

UNIT – III (8 Lectures)

VECTOR DIFFERENTIATION:Scalar and vector point functions, Gradient, Directional derivative, Tangent plane and normal line to the surface, Divergence, Curl and their related properties, Scalar potential function, Laplacian operator, Vector identities.

UNIT – IV (9 Lectures)

VECTOR INTEGRATION:Line integral, work done, Surface integrals, Volume integrals. Vector integral theorems: Green's theorem in a plane, Stoke's theorem and Gauss divergence theorem (without proof) and related problems, Irrotational fields.

UNIT – V (9 Lectures)

FOURIER SERIES AND FOURIER TRANSFORMS:Euler's formulae, Dirichlet's conditions, Fourier series for functions having period $2l$, Fourier series for even and odd functions, Half range Fourier sine and cosine series. Fourier integral theorem (without proof), Fourier sine and cosine integrals, Fourier transforms, Fourier sine and cosine transforms, Inverse Fourier transforms.

TEXT BOOKS:

1. B.S. Grewal, *Higher Engineering Mathematics*, 43rd Edition, Khanna Publishers, New Delhi, 2014.
2. B.V. Ramana, *Higher Engineering Mathematics*, 23rd Reprint, Tata Mc-Graw Hill Education Private Limited, New Delhi, 2015.

REFERENCE BOOKS:

1. Erwin Kreyszig, *Advanced Engineering Mathematics*, 9th Edition, John Wiley & Sons, 2006.
2. N.P. Bali and Manish Goyal, *A text book of Engineering Mathematics*, Laxmi Publications, 2010.
3. G.B. Thomas and R.L. Finney, *Calculus and Analytic Geometry*, 9th Edition, Pearson Education, 2002.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. ME I Year II Sem.

VCE-R18

ENGINEERING CHEMISTRY
(Common to CE, ME, EEE & ECE)

Course Code: A4007

L T P C
4 0 0 4

Course Overview:

This course emphasizes a strong base in physical chemistry and organic chemistry to spread over an orientation towards the materials and drug synthesis. This course also focuses on the general applications of chemical principles to the analysis and evaluation of engineering problems such as Water and its treatment, batteries and fuel cells.

Prerequisite(s): NIL

Course Outcomes:

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

- CO1. Apply knowledge of three - dimensional arrangements of atoms, molecules and their effects on chemical reactions.
- CO2. Evaluate the behaviour, and interactions between matter and energy at both the atomic and molecular levels.
- CO3. Identify differences and similarities of the Batteries.
- CO4. Apply major chemical reactions in the synthesis of various drugs.
- CO5. Make use of different methods for softening hardness of water.

Course Articulation Matrix:

COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2												
CO2	3	2												
CO3	3													
CO4	3													
CO5	3						2							

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. ME I Year II Sem.

VCE-R18

ENGINEERING CHEMISTRY
(Common to CE, ME, EEE & ECE)

Course Code: A4007

L	T	P	C
4	0	0	4

SYLLABUS

UNIT - I

(10 Lectures)

ATOMIC AND MOLECULAR STRUCTURE: Introduction, Concept of atomic and molecular orbitals, Molecular orbital theory, and Molecular orbital energy level diagrams of diatomic molecules - O₂ and N₂. Crystal field theory – crystal field splitting in Octahedral, Tetrahedral and Square planar complexes.

UNIT - II

(14 Lectures)

STEREOCHEMISTRY OF CARBON COMPOUNDS: Isomerism: Definition and their classification: Constitutional isomers: Definition, examples of chain, functional and positional isomers. Stereoisomers: Definition, examples of enantiomers and diastereomers. Optical activity: Definition, chiral centres. Chiral molecules: Definition and criteria - asymmetric and dissymmetric molecules. Examples of asymmetric molecules (Glyceraldehyde, Lactic acid, Alanine) and dissymmetric molecules (trans-1, 2-dichlorocyclopropane). R, S nomenclature, Cahn-Ingold-Prelog rules. Geometrical isomerism of alkenes – cis, trans and E, Z configuration.

UNIT - III

(12 Lectures)

ELECTROCHEMISTRY AND BATTERIES: Electrochemical cells -Types, cell notation, cell reaction and cell emf - concentration cells – Electrode and Electrolyte concentration cells, numerical problems.

Electrochemical series and its applications. Electrode potential, standard electrode potential, types of electrodes –Hydrogen, Calomel and Quinhydrone electrode. Batteries: Primary battery (Zinc- Carbon Battery) and Secondary battery (lead acid and lithium ion battery) - Applications. Fuel cells: Concept of Fuel-Cells. Hydrogen –Oxygen fuel cell – advantages and applications.

UNIT - IV

(14 Lectures)

ORGANIC REACTIONS, DRUG MOLECULES AND SPECTROSCOPY: Introduction, Types of organic reactions, reactions involving substitution (S_N¹, S_N²), addition of H₂, X₂ and HX to C-C double bond – Markownikoff and Anti-Markownikoff rule, elimination (E1 and E2), reduction: Hydrogenation by H₂ by Nickel and Pd/C (any two examples for each). Drugs: Introduction and classification. Structure, preparation and uses of commonly used drug molecules- paracetamol, aspirin and ibuprofen. Spectroscopy: Introduction. Principle, selection rules and applications of Vibrational, rotational and electronic spectroscopy.

UNIT - V

(10 Lectures)

WATER TECHNOLOGY: Introduction, Hardness of water, causes of hardness and types of hardness: temporary and permanent – expression and units of hardness. Numerical problems. Potable water and its specifications. Treatment of water for drinking-filtration, sedimentation, chlorination and ozonization. Boiler troubles: Causes and effects. Sludges, scales and caustic embrittlement. Internal treatment of boiler feed water – Calgon conditioning, Phosphate conditioning, Colloidal conditioning – Softening of water by ion- exchange process. Desalination of water – Reverse osmosis.

TEXT BOOKS:

1. Jain & Jain. *Engineering Chemistry*: Dhanapathrai Publications., 2015.
2. Prsanta Rath, B. Rama Devi, Ch. Venkata Ramana Reddy & Subhendu Chakroborty, *Engineering Chemistry*: Cengage Publications., 2018.
3. B. H. Mahan, Rollie. J. Meyers. *University chemistry*: Pearson publications, 4th edition, 2009.
4. C. N. Banwell. *Fundamentals of Molecular Spectroscopy*: McGraw Hill Education India, 4th edition, 2016.
5. GL David Krupadanam, Vijaya Prasad, Varaprasad Rao K. *Drugs: Universities Press (India) Limited*.

REFERENCE BOOKS:

1. B. L. Tembe, Kamaluddin and M. S. Krishnan. *Engineering Chemistry (NPTEL Web-book)*
2. Peter Atkins, Julio de Paula's *Physical Chemistry*, Oxford University Press, Tenth Edition, 2014.
3. D. Nasipuri, *Stereochemistry of Organic Compounds – Principles and Applications*, 3rd Edition, New Age International (P) Limited.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. ME I Year II Sem.

VCE-R18

ENGINEERING MECHANICS
(Common to CE & ME)

Course Code: A4303

L T P C
3 1 0 4

Course Overview:

Engineering Mechanics is one of the important subject which deals with mechanics of various structures and components. The course uses the Laws of Mechanics to predict forces and motion of bodies. The course is the key prerequisite course to sequences of courses dealing with such as Solid Mechanics, Fluid Dynamics and Rigid Body Dynamics.

Prerequisite(s): Physics and Mathematics

Course Outcomes:

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

- CO1. Apply the laws of mechanics to evaluate resultant force.
- CO2. Solve the problems using equations of equilibrium through free body diagram.
- CO3. Analyze the frictional forces to maintain the equilibrium.
- CO4. Identify the centroid and centre of gravity of a body by using principle of moments and calculate the area moment of inertia and mass moment of inertial of a body.
- CO5. Utilize the basic concepts of kinematics and kinetics to solve the problem.

Course Articulation Matrix:

COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2												
CO2	2	2												
CO3	2	2												
CO4	2	2												
CO5	2	2												

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. ME I Year II Sem.

VCE-R18

ENGINEERING MECHANICS
(Common to CE & ME)

Course Code: A4303

L	T	P	C
3	1	0	4

SYLLABUS

UNIT – I

(10 Lectures)

INTRODUCTION TO ENGINEERING MECHANICS: Introduction to Engineering Mechanics – Basic Concepts. Resultants of Force System: Parallelogram law – Forces and components- Resultant of coplanar Concurrent Forces – Components of forces in Space – Moment of Force – principle of moments – Coplanar Applications – Couples – Resultant of any Force System. Equilibrium of Force Systems: Free Body Diagrams, Equations of Equilibrium – Equilibrium of planar Systems.

UNIT - II

(8 Lectures)

FRICTION: Friction covering, Types of friction, Limiting friction, Laws of Friction, Static and Dynamic Friction; Motion of Bodies, Ladder friction, wedge friction, screw jack.

UNIT - III

(9 Lectures)

CENTROID AND CENTRE OF GRAVITY: Centroid and Centre of Gravity, Centroid of simple figures from first principle, centroid of composite sections, Pappus theorems.

Centre of Gravity and its implications, centre of gravity of composite sections.

UNIT - IV

(9 Lectures)

MOMENT OF INERTIA: Area moment of inertia- Definition, Moment of inertia of plane sections from first principles, Theorems of moment of inertia, Moment of inertia of standard sections and composite sections.

Mass moment inertia of circular plate, Cylinder, Cone, Sphere, mass moment of inertia of composite bodies.

UNIT - V

(9 Lectures)

DYNAMICS OF PARTICLES: Displacements, Velocity and acceleration, their relationship – Rectilinear motion – Curvilinear motion -Newton's laws of motion – Work Energy Equation–Conservation of energy, Impulse and Momentum principle-direct central collisions-coefficient of restitution.

TEXT BOOKS:

1. Timoshenko and Young, *Engineering Mechanics*-Mc-Graw Hill-India, 2017.
2. F. P. Beer and E. R. Johnston, *Vector Mechanics for Engineers*, Vol I - Statics, Vol II, – Dynamics, 9th Ed, Tata McGraw Hill, 2017.

REFERENCE BOOKS:

1. R. C. Hibbler, *Engineering Mechanics: Principles of Statics and Dynamics*, Pearson Press, 2017.
2. Irving H. Shames, *Engineering Mechanics*, 4th Edition, Prentice Hall, 2017.
3. Reddy Vijaykumar K. and K. Suresh Kumar, *Singer's Engineering Mechanics*, 2016,
4. N.H. Dubey, *Engineering Mechanics-Statics and Dynamics*, Mc-Graw Hill-India, 2013.
5. Shanes and Rao, *Engineering Mechanics*, Pearson Education, 2006.
6. Tayal A.K., *Engineering Mechanics*, Umesh Publications, 2010.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. ME I Year II Sem.

VCE-R18

FUNCTIONAL ENGLISH
(Common to All Branches)

Course Code: A4009

L T P C
3 0 0 3

Course Overview:

In view of the growing importance of English as a tool for global communication and the consequent emphasis on training students to acquire language skills, the syllabus of English has been designed to develop linguistic and communicative competencies of Engineering students. In English classes, the focus should be on the development of competence in the areas of grammar and vocabulary and skills development in terms of reading and writing. For this, the teachers should use the prescribed text for detailed study. The students should be encouraged to read the texts/poems silently leading to reading comprehension. Reading comprehension passages are given for practice in the class. The time should be utilized for working out the exercises given after each excerpt, and also for supplementing the exercises with authentic materials of a similar kind. For instance, newspaper articles, advertisements, promotional material etc could be deployed as supplementary material to enhance their communication skills. The focus of the syllabus is on language acquisition and skill development.

Prerequisite (s): NIL

Course Outcomes:

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

- CO1. Demonstrate an understanding of the significance of humanity, love and service to mankind.
- CO2. Utilize appropriate vocabulary in the given contexts.
- CO3. Build competence in grammar.
- CO4. Develop effective academic reading skills.
- CO5. Develop effective academic writing skills.

Course Articulation Matrix:

COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1						2								
CO2										3				
CO3										3				
CO4										3		1		
CO5										3		2		

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. ME I Year II Sem.

VCE-R18

FUNCTIONAL ENGLISH
(Common to All Branches)

Course Code: A4009

L	T	P	C
3	0	0	3

SYLLABUS

UNIT - I

(9 Lectures)

Vocabulary: Word Formation – Prefixes – Suffixes – Guessing the meanings of the words using prefixes and suffixes- Standard Abbreviations

Grammar: Articles

Reading: Presidential Address by APJ Abdul Kalam: Techniques for effective comprehension -Skimming and Scanning-Types of texts – Summarizing

Writing: Sentences – Paragraphs – Cohesion – Coherence – Logical, Lexical and Grammatical Devices – Punctuation – Types of Paragraphs: Description – Definition – Classification.

UNIT – II

(8 Lectures)

Vocabulary: Synonyms – Antonyms

Grammar: Prepositions

Reading: The Road Not Taken (Robert Frost): Reading using different strategies:Types of Reading – Extensive and Intensive-Do's and Dont's of reading

Writing: Letter Writing – Formats, Styles, Parts – Letters of Requisition, Letters of Inquiry, Letters of Apology.

UNIT - III

(10 Lectures)

Vocabulary: Homonyms, Homophones, Homographs, Foreign Words - Redundancies – Clichés

Grammar – Changing words from one form to another – Concord – Tenses: Present, Past and Future Active and Passive Voice.

UNIT - IV

(9 Lectures)

Vocabulary: Idiomatic Expressions - One Word Substitutes

Grammar: Noun-Pronoun Agreement – Misplaced Modifiers

Reading: Good Manners (J C Hill): Practice in reading different types of texts efficiently - Predicting the Content – Understanding the gist - Note Making- Understanding Coherence- Sequencing Sentences

Writing: Information Transfer: Bar Charts – Flow Charts – Tree Diagrams.

UNIT - V

(9 Lectures)

Reading: *Exercises for practice

Writing: Essay writing: Introduction – Conclusion- Précis Writing: Introduction – Steps to Effective Précis writing – Guidelines.

*Reading material from Text books and Reference books

TEXT BOOKS:

1. *Fluency in English – A Course book for Engineering Students* (by Board of Editors: Orient BlackSwan Pvt. Ltd, Hyderabad, 2016.
2. Raman, Meenakshi , Sharma, Sangeeta, *Technical Communication- Principles and Practice*, 3rd Edition, Oxford University Press, New Delhi. Print, 2015.

REFERENCE BOOKS:

1. Green, David *Contemporary English Grammar –Structures and Composition*, MacMillan India, 2014.
2. Rizvi, M. Ashraf, *Effective Technical Communication*, Tata Mc Graw –Hill, 1995.
3. Michael Swan, *Practical English Usage*, 3rd Edition, Oxford University Press, 1995.
4. Wood F. T, *Remedial English Grammar for Foreign Students*, Macmillan, 2007.
5. Zinsser William, *On Writing Well*, Harper Resource Book, 2001.
6. Liz Hamp- Lyons, Ben Heasley, *Study writing*, Cambridge University Press, 2006.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. ME I Year II Sem.

VCE-R18

ENGINEERING WORKSHOP
(Common to CE, ME, EEE & ECE)

Course Code: A4302

L T P C
0 0 3 1.5

Course Overview:

This is the backbone of the real industrial environment which helps to develop and enhance relevant technical hand skills required by the technician working in the various engineering industries and workshops. The course intends to impart basic knowledge and how various hand tools and their usage in different sections of manufacturing. Irrespective of branch, the budding engineer's use of workshop practices in day to day industrial as well domestic life helps to dissolve the problems and develop prototype models whenever necessary. The workshop experiences would help to build the understanding of the complexity of the industrial job, along with time and skills requirements of the job with safety measures. Workshop curricula build the hands on experiences which would help to learn manufacturing processes and production technology to build learners innovative ideas to develop by models. Workshop practice is also important since only practice can make the man perfect. The students are advised to undergo each skill experience of blooms taxonomy levels like remembrance, understanding and application with special emphasis on attitude of enquiry to know why and how for the various instructions and practices imparted to them in each shop.

Prerequisite(s): NIL

Course Outcomes:

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

- CO1. Demonstrate the applications of manufacturing tools & joining process.
- CO2. Produce basic components using workshop trades.
- CO3. Identify and apply the tools for different trades of engineering workshop practice.
- CO4. Recognize the circuit and its operational features in house wiring.
- CO5. Explain the different materials that are used in workshop trades.

Course Articulation Matrix:

COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3				1	2			1					
CO2	3				1	2			1					
CO3	3				1	2			1					
CO4	2				1	2			1					
CO5	2				1	2			1					

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. ME I Year II Sem.

VCE-R18

ENGINEERING WORKSHOP
(Common to CE, ME, EEE & ECE)

Course Code: A4302

L T P C
0 0 3 1.5

LIST OF EXPERIMENTS

PART – A (TRADES FOR LECTURES & VIDEOS)

Note: Minimum one Hour Lecture on each Trade, to be discussed by any class room teaching technique in following trades.

Manufacturing Methods:

1. Casting, Forming, Joining, Machining, Advanced Manufacturing Methods
2. CNC machining , Additive Manufacturing
3. Fitting Operation & Power Tools , Carpentry , Plastic Molding , Glass Cutting, Metal Casting
4. Welding (Arc Welding & Gas Welding), Brazing, Sheet Metal Forming

PART-B (TRADES FOR PRACTICE)

1. Fitting Trade:

- | | |
|---------------------------|---------------------------------|
| a. L-Fitting Joint | b. V- Fitting Joint |
| c. Square - Fitting Joint | d. Semicircular - Fitting Joint |

2. Carpentry Trade:

- | | |
|--------------------------------|-----------------------------------|
| a. Lap Joint (Two Experiments) | b. Bridle Joint (Two Experiments) |
|--------------------------------|-----------------------------------|

3. House wiring Trade:

- a. House Wiring (5 Experiments)

4. Welding Trade:

- | | |
|----------------------------------|----------------------------------|
| a. Arc Welding (Two Experiments) | b. Gas Welding (Two Experiments) |
|----------------------------------|----------------------------------|

5. Foundry Trade:

- | | |
|-------------------------|---------------------------|
| a. Single Piece Pattern | b. Multiple Piece Pattern |
|-------------------------|---------------------------|

6. Tin Smithy Trade:

- | | |
|---------------------|-------------------------------|
| a. Open Scoop | b. Funnel |
| c. Rectangular Tray | d. Square & Cylindrical Pipes |

7. Black Smithy Trade:

- | | |
|-----------------------------------|-------------|
| a. Round to Square and Vice Versa | |
| b. S - Hook | c. O - Ring |

Note: Minimum one experiment from each Trade with total of 12 Experiments.

TEXT BOOKS:

1. B. L. Juneja, "*Workshop Practice*", 1st Edition, Cengage Learning India Private Limited, New Delhi, 2015.
2. H.S. Bawa, "*Workshop Practice*", 3rd Edition, Mc Graw Hill Education, New Delhi, 2017.
3. S.K.Garg, "*Workshop Technology (Manufacturing process)*" 4th Edition, Laxmi Publications (P) Ltd., New Delhi, 2017.

REFERENCE BOOKS:

1. K.Venkata Reddy, "*Workshop Manual*", 6th Edition Reprint, BSP Publications, Hyderabad, 2018.
2. S Gowri & T Jeyapoovan, "*Engineering Practices Lab Manual*", 5th Edition, Vikas Publishing House Private Limited, New Delhi, 2017.
3. Singh, Rajender, "*Introduction to Basic Manufacturing Process & Workshop Technology*", 2nd Edition, New Age International (P) Ltd. New Delhi, 2014.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. ME I Year II Sem.

VCE-R18

ENGINEERING CHEMISTRY LABORATORY
(Common to CE, ME, EEE & ECE)

Course Code: A4008

L T P C
0 0 2 1

Course Overview:

This course emphasizes a strong background to carryout chemical analysis. The objective of engineering chemistry laboratory is to understand various instrumental techniques, physical properties of organic liquids, separation techniques, and organic synthesis to inculcate the knowledge of engineering chemistry discipline. The experiments on water treatment are proved to be vital in engineering applications on industrial level.

Prerequisite(s): NIL

Course Outcomes:

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

- CO1. Measure molecular/system properties such as surface tension, viscosity, conductance of solutions and redox potentials.
- CO2. Apply various titrations for the estimation of strengths of solutions and hardness of water.
- CO3. Identify different samples from a mixture by using various separation techniques.
- CO4. Estimate rate constants of reactions from concentration of reactants/products as a function of time.
- CO5. Evaluate the percentage of yield of chemical substances by organic synthesis.

Course Articulation Matrix:

COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2												
CO2	3	3												
CO3	3	2												
CO4	3	1												
CO5	3	1												

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. ME I Year II Sem.

VCE-R18

ENGINEERING CHEMISTRY LABORATORY
(Common to CE, ME, EEE & ECE)

Course Code: A4008

L	T	P	C
0	0	2	1

LIST OF EXPERIMENTS

1. Estimation of strength of hydrochloric acid by conductometric titration.
2. Estimation of strength of hydrochloric acid by potentiometric titration.
3. Estimation of Iron in Mohr's salt by potentiometric titration.
4. Estimation of hardness of water by complexometry using EDTA
5. Determination of chloride content in water by Argentometry.
6. Determination of viscosity of a given fluid by Ostwald's viscometer.
7. Determination of surface tension of a given liquid by using Stalagmometer
8. Synthesis of Aspirin and Paracetamol.
9. Thin layer chromatography calculation of R_f values. Eg. ortho and para nitro phenols.
10. Verification of Freundlich adsorption isotherm of acetic acid on Charcoal.
11. Determination of partition coefficient of acetic acid between butanol and water.
12. Determination of the rate constant of acid catalyzed hydrolysis of methylacetate.

REFERENCE BOOKS:

1. S.S.Dara, *Experiments and Calculations in Engineering Chemistry*, S-Chand Publications, Revised edition., 2008.
2. Dr.M.P.S Murali Krishna and M.Gopala Krishna, *Chemistry Lab Manual*, VGS Publications.
3. Dr. A.Ravi Krishnan, Dr.T.Syeda Jeelani Basri, and Mrs.M.B.Lakshmi, *Engineering Chemistry Laboratory Manual*.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. ME I Year II Sem.

VCE-R18

ENGINEERING MECHANICS LABORATORY
(Common to CE & ME)

Course Code: A4304

L T P C
0 0 3 1.5

Course Overview:

Engineering mechanics laboratory has equipment for demonstrating and verifying fundamental principles. The laboratory is designed for understanding of Statics and Dynamics, consists of friction apparatus, reaction of beams apparatus, polygon of forces apparatus, extension of spring apparatus, centrifugal force apparatus, screw jack, worm & wheel, shafts and pendulums are demonstrated by small scale apparatus.

Prerequisite(s): Physics and Mathematics

Course Outcomes:

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

- CO1. Examine basic laws of Mechanics by using experiment setup.
- CO2. Determine the co-efficient of friction between wood and various surface.
- CO3. Apply the basic concepts of mechanics to find the Mechanical Advantage, velocity ratio and mechanical efficiency.
- CO4. Calculate moment of Inertia of an irregular body using Computation method.
- CO5. Analyze the different force systems by using graphical method.

Course Articulation Matrix:

COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2											
CO2	3	2	2											
CO3	3	2	2											
CO4	3	1	1											
CO5	3	1	1											

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. ME I Year II Sem.

VCE-R18

ENGINEERING MECHANICS LABORATORY
(Common to CE & ME)

Course Code: A4304

L	T	P	C
0	0	3	1.5

LIST OF EXPERIMENTS

1. To verify the law of Force Polygon with the help of force polygon apparatus.
2. To verify the law of Moments using Parallel Force apparatus. (simply supported type).
3. To determine the co-efficient of friction between wood and various surface (like Leather, Wood, Aluminum) on an inclined plane.
4. To determine the mechanical advantage, Velocity ratio and efficiency of a screw jack.
5. To determine the mechanical advantage, Velocity ratio and Mechanical efficiency of the Wheel and Axle.
6. To determine the Mechanical Advantage, Velocity Ratio of worm and Worm Wheel.
7. To verify the law of moments using Bell crank lever.
8. To determine the centre of Gravity by graphical Method.
9. Verification of Lami's Theorem.
10. To Determine the resultant of Coplanar force system by graphical Method.
11. To Determine the resultant of concurrent force system by graphical Method.
12. To determine the Moment of Inertia of Flywheel.
13. To determine the co-efficient of friction for different materials.
14. To determine the natural frequency, radius of gyration and mass moment of inertia of the given rectangular rod experimentally.
15. To determine the radius of gyration and the moment of Inertia of a given circular plate.
16. To find the forces in the members of Jib Crane.

Note: Minimum 12 experiments are to be conducted from the above.

TEXT BOOKS:

1. Timoshenko and Young, *Engineering Mechanics*, Mc-Graw Hill-India, 2017.
2. F. P. Beer and E. R. Johnston, *Vector Mechanics for Engineers*, Vol I - Statics, Vol II, – Dynamics, 9th Ed, Tata McGraw Hill, 2017.
3. R.K. Rajput, *A text book of applied mechanics*, 3rd Ed, Laxmi publications, New Delhi, 2012.
4. A.K. Sharma, *Engineering Mechanics Practical*, Laxmi publications, New Delhi, 2009.

REFERENCE BOOKS:

1. R. C. Hibbler, *Engineering Mechanics: Principles of Statics and Dynamics*, Pearson Press, 2017.
2. Irving H. Shames, *Engineering Mechanics*, 4th Edition, Prentice Hall, 2017.
3. Reddy Vijaykumar K. and K. Suresh Kumar, *Singer's Engineering Mechanics*, 2016.
4. N.H. Dubey, *Engineering Mechanics-Statics and Dynamics*, Mc-Graw Hill-India, 2013.
5. Shanes and Rao, *Engineering Mechanics*, Pearson Education, 2006.
6. Tayal A.K., *Engineering Mechanics*, Umesh Publications, 2015.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. ME I Year II Sem.

VCE-R18

ENGLISH LANGUAGE COMMUNICATION SKILLS LABORATORY
(Common to All Branches)

Course Code: A4010

L T P C
0 0 2 1

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 and intonation, making effective oral presentations – both extempore and prepared, role- play, telephonic skills, asking for and giving directions, etc. The lab encourages students to work in a group, engage in peer-reviews and inculcate team spirit through various exercises related to listening to native speakers' accent and participating in speaking activities.

Prerequisite(s): NIL

Course Outcomes:

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

- CO1. Improve his/her pronunciation.
- CO2. Take part in role-plays and perform effectively in real-life situations.
- CO3. Choose appropriate words and phrases to make effective telephonic conversations.
- CO4. Minimize stage fear and make effective presentations.
- CO5. Build sustained conversations.

Course Articulation Matrix:

COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1										3		2		
CO2										3		2		
CO3										3				
CO4									3	3				
CO5									3	3				

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. ME I Year II Sem.

VCE-R18

ENGLISH LANGUAGE COMMUNICATION SKILLS LABORATORY
(Common to All Branches)

Course Code: A4010

L T P C
0 0 2 1

LIST OF EXPERIMENTS

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

Module – 1:

CALL: Introduction to Phonetics - Speech Sounds – Vowels and Consonants

ICS: Ice-Breaking activity and JAM session.

Module – 2:

CALL: Past Tense Marker and Plural Marker – Syllable Structure – Consonant Clusters - Minimal Pairs

Module – 3:

ICS: Situational Dialogues – Role-Play – Expressions in Various Situations: Greetings: Self-introduction and Introducing others – Apologies – Requests – Complaints – Congratulating – Expressing sympathy/condolences.

Module – 4:

CALL: Basic Rules of Word Accent – Stress Shift – Weak Forms and Strong Forms

Module – 5:

ICS: Asking for and Giving Directions – Giving Instructions – Seeking Clarifications – Thanking and Responding – Agreeing and Disagreeing – Seeking and Giving Advice – Making Suggestions

Module– 6:

CALL: Neutralization of Mother Tongue Influence-Common Indian Variants in Pronunciation – Differences between British and American pronunciation

Module – 7:

CALL: Intonation Patterns-Types of Tones - Sentence Stress

Module – 8:

ICS: Social and Professional Etiquette - Telephone Etiquette

Module – 9:

ICS: Oral Presentation Skills (short presentations) - Making a Presentation-Prepared –Extempore

Module – 10:

ICS: Listening-Types of Listening-Steps to effective Listening –Business Listening Comprehension exercises

REFERENCE BOOKS:

1. Mohanraj, J., *Let Us Hear Them Speak*, Sage Texts. Print, New Delhi, 2015.
2. Hancock, M., *English Pronunciation in Use Intermediate*, Cambridge University Press. Print, Cambridge, 2009.
3. Sanjay Kumar and Pushp Lata, *Communication Skills*, Oxford University Press, 2011.
4. *Exercises in Spoken English*, Parts I-III CIEFL, Oxford University Press, Hyderabad.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. ME I Year II Sem.

VCE-R18

ENGINEERING EXPLORATION
(Common to ME, CSE & IT)

Course Code: A4022

L T P C
0 0 2 1

Course Overview:

This course starts with differentiating science and engineering, scientist and engineer, followed by describing engineering graduate attributes and what engineers “do”. This course offers the fundamental principles, concepts of engineering, as well as the influences of engineering on society and also hands-on and experiential learning opportunities in specific areas of engineering. This course focuses on data collection and analysis, engineering problem-solving, mathematical modeling, contemporary tools (software and hardware), professional practice and expectations (e.g. communication, teamwork, ethics) and the diversity of fields and majors within engineering. Topics to be covered in this course include: engineering design process in multidisciplinary domain, and unique platform to showcase any idea into functional prototype, project management skills, exploring engineering skills with ethical and sustainability perspective.

Prerequisite(s): NIL

Course Outcomes:

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

- CO1. Compare and contrast the contributions of different types of engineers in the development of a product, process or system.
- CO2. Apply the common engineering design process to solve complex problems and arrive at viable solution.
- CO3. Explore various contemporary software and hardware tools to provide solutions for the problems.
- CO4. Apply skills needed for successful team work including the basics of project management and written and oral communication.
- CO5. Identify the key elements of professional codes of ethics as well as the ethical and societal issues related to the disciplines and their impact on society and the world.

Course Articulation Matrix:

COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1		3										2		
CO2	3	2	3	3			1							
CO3			2		3		2	2						
CO4									3	3	3			
CO5						3	1	3						

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

B. Tech. ME I Year II Sem.

VCE-R18

ENGINEERING EXPLORATION
(Common to ME, CSE & IT)

Course Code: A4022

L	T	P	C
0	0	2	1

SYLLABUS

Module – 1:

Introduction to Engineering and Engineering Study: Difference between science and engineering, scientist and engineer needs and wants.

Module – 2:

Various disciplines of engineering, some misconceptions of engineering, Expectation for the 21st century engineer and Graduate Attributes.

Module – 3:

Engineering Design Process, Multidisciplinary facet of design, Importance of analysis in engineering design, general analysis procedure.

Module – 4:

Introduction to mechatronics system, generation of multiple solution, decision matrix, Concepts of reverse engineering.

Module – 5:

Introduction to various platform based development (Arduino) programming and its essentials.

Module – 6:

Introduction to sensors, transducers and actuators and its interfacing with arduino.

Module – 7:

Engineering Ethics: Identifying Engineering as a Profession, Significance of Professional Ethics, Code of Conduct for Engineers.

Module – 8:

Identifying Ethical Dilemmas in different tasks of engineering, Applying Moral Theories and codes of conduct for resolution of Ethical Dilemmas.

Module – 9:

Sustainability: Introduction to sustainability, Sustainability leadership, Life cycle assessment.

Module – 10:

Project Management: Introduction, Significance of team work, Importance of communication in engineering profession.

Module – 11:

Project management tools: Checklist, Timeline, Gantt Chart, Significance of documentation.

TEXT BOOKS:

1. Philip Kosky, Robert T. Balmer, William D. Keat, George Wise, *Exploring Engineering : An Introduction to Engineering and Design*, Academic Press, 3rd edition, 2012.
2. Byron Francis, *Arduino: The Complete Beginner's Guide*, Create space Independent Publishers, 2016.
3. M. Govindarajan, S. Natarajan & V. S. Senthil Kumar, *Engineering Ethics*, 1st Edition, Phi Learning, 2009.

REFERENCES BOOKS:

1. Neerparaj Raj, *Arduino Projects for Engineers*, 1st edition, BPB Publications, 2016.
2. Simon Monk, *Programming Arduino : Getting Started with Sketches*, 2nd Edition, McGraw-Hill Education, 2016.
3. W. Richard Bowen, *Engineering Ethics – Outline of an aspirational approach*, Springer London.

Frequently asked Questions and Answers about autonomy

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

autonomous status is more responsive to the needs of the industry. As a result, there will be a lot of scope for industry oriented skill development built-in into the system. The graduates from an autonomous college will therefore represent better employability.

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



VARDHAMAN COLLEGE OF ENGINEERING (AUTONOMOUS)

Undertaking by Students/Parents

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

I, Mr. / Ms. ----- joining I Year I Semester / I Year II Semester for the academic year 2018-2019 / 2019-2020 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 and I will not bring **Mobile Phone** to the College campus.
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 **Midterm Exam / Alternative Assessment** in each subject. I will submit the **assignments** given in time to improve my performance.
6. I will not involve in any form of **ragging** inside or outside the campus. I am fully aware that Ragging is an **offence** and punishable as per JNTUH/UGC rules and the law.
7. I will **pay** tuition fees, examination fees and any other **dues** within the stipulated time as required by the Institution / authorities, failing which I will not be permitted to attend the classes.
8. I will **not cause or involve** in any sort of **violence or disturbance** both within and outside the college campus.
9. If I **absent myself continuously for 3 days**, my **parents** will have to meet the HOD concerned/ Principal.
10. I hereby **acknowledge** that I have **received** a copy of **R18 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(s) 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 the Student

Roll No:

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Signature of the Parent

Name & Address with Phone Number



VARDHAMAN COLLEGE OF ENGINEERING (AUTONOMOUS)

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Signature of the Student

Roll No:

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Signature of the Parent

Name & Address with Phone Number