

VISION OF THE INSTITUTION

To ignite the minds of the students through academic excellence so as to bring about social transformation and prosperity.

MISSION OF THE INSTITUTION

1. To expand the frontiers of knowledge through Quality Education.
2. To provide valued added Research and Development.
3. To embody a spirit of excellence in Teaching, Creativity, Scholarship and Outreach.
4. To provide a platform for synergy of Academy, Industry and Community.
5. To inculcate high standards of Ethical and Professional Behavior.

VISION OF CSE DEPARTMENT

To build a strong teaching-learning base with a flair for innovation and research that responds to the dynamic needs of the software industry and the society.

MISSION OF CSE DEPARTMENT

1. To provide strong foundation both in theory and applications of Computer Science & Engineering, so as to solve real-world problems
2. To empower students with state-of-art knowledge and up to date technological skills, making them globally competent
3. To promote research, innovation and entrepreneurship with focus on industry and social outreach
4. To foster civic minded leadership with ethics and values among students

PROGRAM EDUCATIONAL OBJECTIVES OF CSE DEPARTMENT

1. Graduates will have knowledge of mathematics, science, engineering fundamentals, and in-depth studies in Computer Science Engineering, and will be able to apply them for formulating, analysing and solving real world problems.
2. Graduates will succeed in earning coveted entry level positions in leading Computer Software and Hardware Firms in India and abroad.
3. Graduates will succeed in the pursuit of advanced degrees and research in engineering or other fields and will have skills for continued, independent, lifelong learning and professional development throughout life.
4. Graduates will have good communication skills, leadership qualities, ethical values and will be able to work in teams with due attention to their social responsibilities.

PROGRAM OUTCOMES OF CSE DEPARTMENT

Engineering Graduates will be able to:

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **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.
3. **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **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.
6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **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.
11. **Project management and finance:** Demonstrate knowledge and understanding of the 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.
12. **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 OF CSE DEPARTMENT

1. An ability to demonstrate basic knowledge in databases, programming languages and algorithm analysis in the development of software applications.
2. An ability to design and develop projects using open source tools and efficient data structures.

B.Tech. FOUR YEAR DEGREE COURSE

R19 Regulations

(Applicable for the batches admitted from 2019-2020)



VISHNU INSTITUTE OF TECHNOLOGY: BHIMAVARAM

(Autonomous)

Approved by AICTE & Affiliated to JNTUK, Kakinada

Accredited with 'A' Grade by NAAC & NBA

Vishnupur, Bhimavaram, West Godavari Dist., Andhra

Pradesh, India. PIN - 534202

Email: info@vishnu.edu.in, Website: www.vishnu.edu.in

THE DEGREE OF BACHELOR OF TECHNOLOGY - REGULAR
(With effect from 2019-20)

RB 0.0	TITLE AND DURATION OF THE COURSE
	The course shall be called the degree course in Bachelor of Technology, abbreviated as B.Tech.
	The course shall be of four academic years duration divided into eight semesters, each semester having duration of minimum 16 weeks.
	The calendar of events in respect of the course shall be fixed by the Institute from time to time.
	The external examination in all the subjects shall be conducted at the end of each semester for all the eight semesters.
	Students joining the B.Tech. programme shall have to complete the programme in a stipulated time frame of 8 years from the date of joining and students joining the B.Tech. Programme in the third semester directly through Lateral Entry Scheme (LES) shall have to complete the programme in a stipulated time frame of 6 years from the date of joining. Otherwise, they shall forfeit their seat in B.Tech. Programme and their admission shall stand cancelled.
	When a student is detained for lack of credits / shortage of attendance, he/she may be re- admitted into the same semester / year in which he/she has been detained. However, the academic regulations under which he/she was first admitted shall continue to be applicable.
RB 1.0	ELIGIBILITY FOR ADMISSION
RB 1.1	Admissions are done as per the norms prescribed by the Government. The Government orders issued from time to time in this regard shall prevail.
RB 1.2	The Candidate shall be an Indian National.
RB 1.3	The Candidate should have passed the qualifying examination, i.e., Intermediate or equivalent on the date of admission.
RB 1.4	Seats in each programme in the college are classified into CATEGORY-A (70% of intake) and CATEGORY – B (30% of intake) besides lateral entry.
RB 1.5	Category ‘A’ Seats shall be filled by the Convener, EAMCET Admissions. Category ‘B’ Seats shall be filled by the College as per the guidelines of Andhra Pradesh State Council of Higher Education. ‘Lateral Entry’ candidates shall be admitted into the Third semester directly based on the rank secured by the candidate in Engineering Common Entrance Test (ECET) in accordance with the instructions given by the Convener, ECET and the Government of Andhra Pradesh.
RB 2.0	AWARD OF B.TECH. DEGREE
RB 2.1	A Regular Student shall be declared eligible for the award of the B.Tech. Degree, if he/she pursues a course of study in not less than four and not more than eight academic years. A Lateral Entry Student admitted into III semester shall be declared eligible for the award of the B.Tech. Degree, if he/she pursues a course of study in not less than three and not more than six academic years.

RB 2.2	<p>Each discipline of the B.Tech. programme is designed to have a total of 160 credits and the student shall have to complete the courses and earn all credits as per the requirements for award of the degree.</p> <p>Students joining the B.Tech. programme in the third semester directly through Lateral Entry Scheme (LES) shall have to complete the courses, excluding first year courses and credits as per the requirements for award of the degree.</p>
RB 2.3	<p>The B.Tech. Degree shall be conferred on a candidate who has satisfied the following requirements.</p> <p>A Regular student (four year programme) should register for 160 credits. In order to become eligible for the award of B.Tech. Degree, the student must obtain 160 credits.</p> <p>A Lateral Entry student should register for (160- first Year credits) credits and should obtain all the credits. However, it is mandatory for the students to complete the noncredit courses</p>
RB 3.0	MINIMUM INSTRUCTION DAYS
RB 3.1	The minimum instruction days for each semester shall be 90 working days.
RB 4.0	COURSES OF STUDY
	<p><u>Branch Code- Branch Abbreviation</u></p> <p>01-CE (Civil Engineering)</p> <p>02-EEE (Electrical and Electronics Engineering)</p> <p>03-ME (Mechanical Engineering)</p> <p>04-ECE (Electronics and Communication Engineering)</p> <p>05-CSE (Computer Science & Engineering)</p> <p>12-IT (Information Technology)</p>
RB 4.1	<p>Groups of Courses: The Courses in the B.Tech. Programme is of four kinds: Core, Professional Elective, Open Elective, and Mandatory Audit Course.</p> <p>Core Course: These are courses which are to be compulsorily studied by a student and it is the core requirement to complete the programme in a said branch.</p> <p>Professional Elective Course: A student can choose a course (subject) from a pool of courses of branch concerned, which add proficiency to the students.</p> <p>Open Elective Course: These are the courses offered by the other branches. These courses are designed to lead to knowledge enhancement in multi disciplinary domains.</p> <p>Mandatory Audit Course: These courses allow a student to attend classes without the benefit of a grade for a course. An undergraduate student who audits a course does so, for the purpose of self-enrichment and academic exploration.</p>
RB 5.0	DISTRIBUTION AND WEIGHTAGE OF MARKS
RB 5.1	The performance of a student in each semester shall be evaluated subject wise with a maximum of 100 marks for theory and 100 marks for practical subject. The Project-I shall be evaluated for 50 marks, Project-II evaluated for 200 marks, , Socially Relevant Projects for 50 marks, internship for 50 marks and seminar for 50 marks.
RB 5.2	For theory subjects, the distribution shall be 40 marks for Internal Evaluation and 60 marks for the End Examinations.

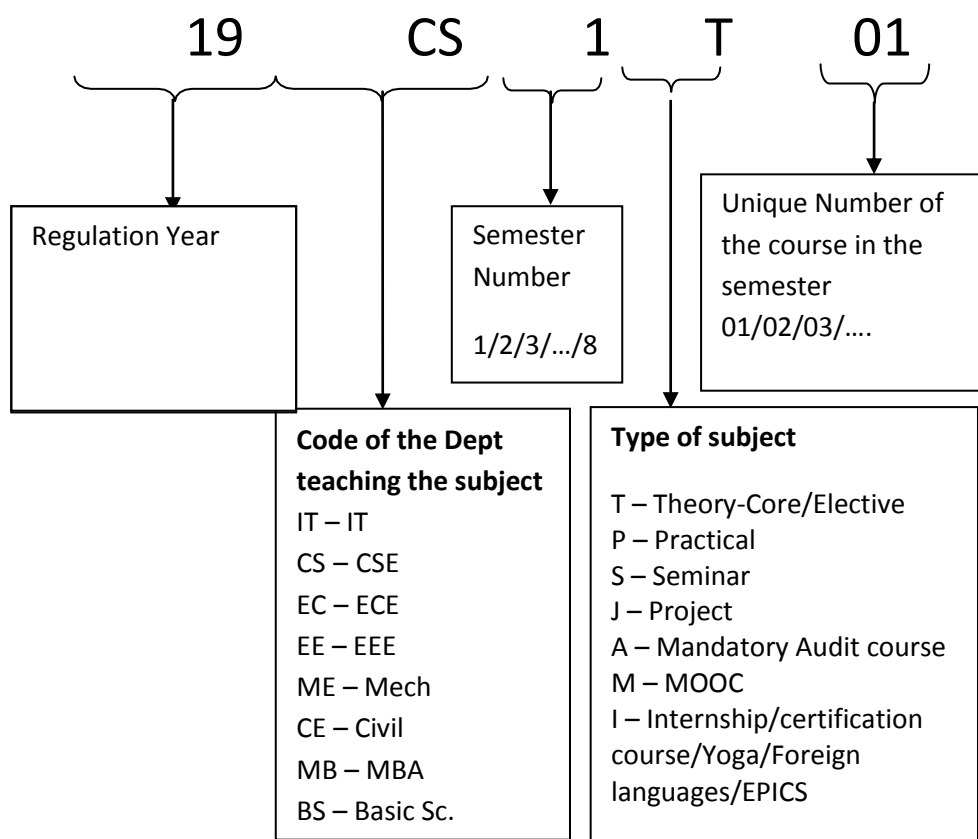
RB 5.3	<p>The Internal evaluation 40 marks shall be awarded as follows: 20 marks for Descriptive, 10 marks for Quiz and 10 marks for Assignment.</p> <p>The descriptive examination is for 90 minutes duration conducted for 30 marks. Each descriptive examination question paper consists of three questions (either - or type) from three units. Three questions to be answered, one from each unit. The descriptive examination conducted for 30 Marks is to be brought down to total marks of 20. The quiz examination is for 20 minutes duration (Conducted with 20 multiple choice questions with a weightage of ½ Mark each). Thought provoking questions shall be covered in Quiz examination.</p> <p>After every two Units, one Assignment/Tutorial shall be conducted. Two questions from each Unit and maximum of 4 questions must be set in Assignment. Assignment/Tutorial consists of Theory, Design, Analysis, Simulation, Algorithms, Drawing, etc. as the case may be. Out of the 3 Assignments / tutorials, average of best of the 2 Assignments shall be considered for awarding of marks.</p> <p>For theory subjects, during the semester there shall be 2 MID tests. As the syllabus is framed for 6 units, the First MID examination (both descriptive and quiz) is conducted on the first three units and Second MID examination (both descriptive and quiz) is considered from last three units of each subject. Average of two Mid tests (both descriptive and quiz) shall be considered as final marks of the MID. Eg: A student got 18 marks out of 20 marks in Descriptive-1, 8 marks out of 10 marks in Quiz-1 and 8 marks out of 20 marks in Descriptive-2 and 2 marks out of 10 marks in Quiz-2. Assignment-1 = 9 out of 10, Assignment-2 = 4 out of 10 and Assignment-3 = 10 out of 10.</p> <p>The student Internal marks are = $((26+10)/2 + ((9+10)/2) = 27.5$ is rounded to 28 marks out of 40 marks. If a student is absent from any one MID examination, he/she can appear for a Grand Test after MID-2. The Grand Test will be conducted with questions covering the entire syllabus. The marks in the grand test is reduced to 40 marks and to be considered for the respective mid.</p>
RB 5.4	<p>The end semester examination is conducted for 60 marks. It consists of 6 questions (either - or type) with 10 marks each. For design subjects (like Design Drawing Concrete Structures, Steel Structures, Building Planning and Drawing), the pattern will consist of 2 parts (part-A and B), where in part-A 2 questions will be given with each question carrying 24 marks, out of which the student has to answer one question and part-B consists of 6 questions with each question carrying 12 marks each, out of which the student has to answer 3 questions.</p>
RB 5.5	<p>For practical subjects, there shall be continuous evaluation during the semester for 40 internal marks. Out of the 40 marks for internal, day-to-day work 15 marks, Record 10 marks and 15 marks to be awarded by conducting an internal laboratory test. The end examination shall be conducted for 60 marks by the internal examiner and the external examiner.</p>
RB 5.6	<p>For the subject having design and/or drawing (such as Engineering Graphics, Engineering Drawing, Machine Drawing, Design Drawing Concrete Structures, Steel Structures, Building Planning and Drawing), the distribution shall be 40 marks for internal evaluation (20 marks for day-to-day work, and 20 marks for MID tests) and 60 marks for end examination. The average of 2 MIDs shall be considered as final marks of the MID.</p>
RB 5.7	<p>For the seminar, the student shall collect the information on a specialized topic and prepare a technical report showing his/her understanding over the topic, and submit to the department, which shall be evaluated by the Departmental Committee</p>

	consisting of the Head of the Department, a seminar supervisor and a senior faculty member. The seminar report shall be evaluated for 50 marks. There shall be no external examination for seminar.	
RB 5.8	Out of a total of 200 marks for the Project-II, 80 marks shall be for Internal Evaluation and 120 marks for the End Semester Examination. The End Semester Examination (Viva – Voce) shall be conducted by the Committee. The Committee consists of an external examiner, Head of the Department and Supervisor of the Project. The evaluation of project work shall be conducted at the end of the Eighth semester. The Internal Evaluation marks shall be on the basis of two seminars given by each student on the topic of his/her project and evaluated by an Internal Committee, consisting of Head of the department, the supervisor of the project and a senior faculty member.	
RB 5.9	For the Project-I, 50 marks shall be for the Internal Evaluation. Viva- Voce shall be conducted by the Committee. The Committee consists of the Head of the Department, one Senior Faculty Member and the Supervisor of the Project. The Viva–Voce may be conducted along with respective semester lab external examinations. There shall be no external examination for mini projects.	
RB 5.10	Laboratory marks and the internal marks awarded by the department are not final. The marks are subjected to be scrutinized and scaled by the Institute wherever it is felt desirable. The internal and laboratory marks awarded by the department shall be referred to a Committee if required. The Committee shall arrive at a scaling factor and the marks shall be scaled as per the scaling factor. The recommendations of the Committee are final and binding. The laboratory records and internal test papers shall be preserved for two years after the final examinations of that semester in the respective departments as per the norms of the Institute and shall be produced to the Committees as and when they ask for.	
RB 6.0	PROGRAMME STRUCTURE	
	Basic Science Courses	15-16%
	Engineering Science Courses	10-19%
	Humanities and Social Science Courses	6-9%
	Professional Core Courses	31-40%
	Professional Elective Courses	7-13%
	Project / Internships / Certification Courses/ Seminar	8-9%
	Open Elective Courses	5-10%
	Mandatory Audit Courses	-
RB 7.0	SCHEME OF INSTRUCTION FOR I, II, III AND IV YEARS	
RB 7.1	The Schemes of Instruction and syllabi of all B.Tech. programmes are given separately, which are approved by the BOS concerned and the Academic Council.	
RB 8.0	CONTACT HOURS AND CREDITS	
RB 8.1	One hour of lecture/Tutorial is equivalent to one credit and one hour of practical work/field work is equivalent to 0.5 credit.	
RB 8.2	THEORY / TUTORIAL CLASSES Each course is prescribed with a fixed number of lecture periods per week. During lecture periods, the course instructor shall deal with the concepts of the course. For certain courses, tutorial periods are prescribed in order to give exercises to the students and to closely monitor their learning abilities and achievements.	

RB 8.3	LABORATORY / DRAWING COURSES A minimum prescribed number of experiments/drawings/jobs/programmes have to be performed by students, who shall complete these in all aspects and get each experiment evaluated by the teacher concerned and certified by the Head of the Department concerned at the end of the semester.
RB 9.0	MEDIUM OF INSTRUCTION
	The Medium of Instruction and examination is in English.

RB 10	ATTENDANCE REQUIREMENTS
RB 10.1	In each semester, the candidate has to put in a minimum attendance of 75% with a provision of condonation of 10% of the attendance by the Principal on the specific recommendation of the HOD, showing some reasonable cause such as medical grounds, participation in University level sports, cultural activities, seminars, workshops, paper presentation etc.
RB 10.2	Students, having shortage of attendance and got condonation for attendance, shall have to pay requisite fee towards condonation.
RB 10.3	Shortage of attendance below 65% in aggregate shall not be condoned.
RB 10.4	Students whose shortage of attendance is not condoned will be detained and the student has to re-register for that semester when it is offered by the department.
RB 10.5	Rules for calculation of attendance for the re-admitted candidates who were detained for want of attendance or who had break – in study for various reasons: a) No. of classes conducted shall be counted from the day one of the semester concerned, irrespective of the date of payment of tuition fee. b) They should submit a written request to the Principal, along with a challan paid towards tuition and other fee, for re-admission before the commencement of class-work. c) Student should come to know about the date of commencement of class-work of the semester into which he/she wishes to get re-admission. The information regarding date of commencement of class-work for each semester is available in the college notice boards/ website.
RB 11.0	CONDITIONS FOR PASS AND AWARD OF CREDITS FOR A COURSE
RB 11.1	A candidate shall be declared to have passed in individual theory/drawing course if he/she secures a minimum of 40% aggregate marks (40 marks out of 100, Internal and semester end examination marks put together), subject to a minimum of 35% marks (21 marks out of 60) in semester end examination. For successful completion of mandatory audit course, the student must get a satisfactory grade from the department offering the course. If fails, he/she has to reappear whenever the course is offered.
RB 11.2	A candidate shall be declared to have passed in individual lab/project course if he/she secures a minimum of 40% aggregate marks (Internal and semester end examination marks put together), subject to minimum of 35% marks in semester end examination.
RB 11.3	The student has to pass the failed course by appearing the supplementary examination as per the requirement for the award of degree.
RB 11.4	On passing a course of a programme, the student shall earn assigned credits in that course.

RB 12.0	TRANSITORY REGULATIONS
RB 12.1	A candidate, who is detained or discontinued in the semester, on readmission shall be required to pass all the courses in the curriculum prescribed for such batch of students in which he/she joins subsequently. However, exemption shall be given to those candidates who have already passed in such courses in the earlier semester(s) and substitute subject may be offered as approved by College Academic Committee and ratified by the Academic Council.
RB 12.2	A student shall be eligible for promotion to the next semester of B.Tech. programme, if he/she satisfies the conditions as stipulated in Regulation RB10.
RB 12.3	<p>A student will be promoted from II year to III year if he fulfills the academic requirement of 40% of the credits up to either II year I semester or II year II semester from all the examinations, whether or not the candidate takes the examinations and secures prescribed minimum attendance in II year II semester.</p> <p>A student shall be promoted from III year to IV year if he fulfils the academic requirements of 40% of the credits up to either III year I semester or III year II semester from all the examinations, whether or not the candidate takes the examinations and secures prescribed minimum attendance in III year II semester.</p> <p>For Lateral Entry Candidates</p> <p>A student shall be promoted from III year to IV year if he fulfils the academic requirements of 40% of the credits up to either III year I semester or III year II semester from all the examinations, whether or not the candidate takes the examinations and secures prescribed minimum attendance in III year II semester.</p>
RB 13.0	COURSE CODE AND COURSE NUMBERING SCHEME: The subject codes shall be given by the Department teaching the subject. Each subject code contains 8 characters. The 8 Characters for each subject shall be coded as per the following guidelines.



	<p>While giving the subject codes the Departments can follow the following steps.</p> <ol style="list-style-type: none"> Collect the requirements from various Departments.(subjects which they have to teach for other Departments) Prepare a list of all the subjects the Departments have to teach in that semester (for their Department as well as the other Departments based on the requirements they have collected in point i.) Give subject codes to all these subjects following the guidelines given. Communicate these subject codes(identified in point i) to various Departments. Use the subject codes identified in point iii to the subjects in their course structure. 																																													
RB 14.0	CONSOLIDATED GRADE CARD																																													
	A consolidated grade card containing credits and grades obtained by the candidate shall be issued after completion of the four year B.Tech. Programme.																																													
RB 15.0	METHOD OF AWARDING LETTER GRADES AND GRADE POINTS FOR A COURSE																																													
RB 15.1	A letter grade and grade point shall be awarded to the student in each course based on his/her performance as per the grading system given below																																													
	<table border="1"> <thead> <tr> <th>Marks Range Theory/Lab (Max – 100)</th> <th>Marks Range for subjects with Max – 50</th> <th>Letter Grade</th> <th>Level</th> <th>Grade Point</th> </tr> </thead> <tbody> <tr> <td>≥ 90</td> <td>≥ 45</td> <td>O</td> <td>Outstanding</td> <td>10</td> </tr> <tr> <td>≥ 80 < 90</td> <td>≥ 40 < 45</td> <td>S</td> <td>Excellent</td> <td>9</td> </tr> <tr> <td>≥ 70 < 80</td> <td>≥ 35 < 40</td> <td>A</td> <td>Very Good</td> <td>8</td> </tr> <tr> <td>≥ 60 < 70</td> <td>≥ 30 < 35</td> <td>B</td> <td>Good</td> <td>7</td> </tr> <tr> <td>≥ 50 < 60</td> <td>≥ 25 < 30</td> <td>C</td> <td>Fair</td> <td>6</td> </tr> <tr> <td>≥ 40 < 50</td> <td>≥ 20 < 25</td> <td>D</td> <td>Satisfactory</td> <td>5</td> </tr> <tr> <td>< 40</td> <td>< 20</td> <td>F</td> <td>Fail</td> <td>0</td> </tr> <tr> <td></td> <td></td> <td></td> <td>Absent</td> <td>0</td> </tr> </tbody> </table>	Marks Range Theory/Lab (Max – 100)	Marks Range for subjects with Max – 50	Letter Grade	Level	Grade Point	≥ 90	≥ 45	O	Outstanding	10	≥ 80 < 90	≥ 40 < 45	S	Excellent	9	≥ 70 < 80	≥ 35 < 40	A	Very Good	8	≥ 60 < 70	≥ 30 < 35	B	Good	7	≥ 50 < 60	≥ 25 < 30	C	Fair	6	≥ 40 < 50	≥ 20 < 25	D	Satisfactory	5	< 40	< 20	F	Fail	0				Absent	0
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RB 15.2	<p>Calculation of Semester Grade Points Average(SGPA)* for semester: The Performance of each student at the end of each semester is indicated in terms of SGPA. The SGPA is calculated as below:</p> $SGPA (S_i) = \frac{\sum(C_i \times G_i)}{\sum C_i} \text{ (for all courses passed in that semester)}$ <p>Where C_i is the number of credits of the i^{th} course and G_i is the grade point scored by the student in the i^{th} course.</p> <p>* SGPA is calculated for the candidates who passed all the courses in that semester</p>																																													
RB 15.3	Calculation of Cumulative Grade Points Average (CGPA)																																													
	<p>The CGPA is calculated as below:</p> $CGPA = \frac{\sum(C_i \times S_i)}{\sum C_i} \text{ (for entire programme)}$ <p>Where S_i is the SGPA of the i^{th} semester and C_i is the total number of credits in that semester. The SGPA and CGPA shall be rounded off to 2 decimal points and reported in the transcripts</p>																																													
RB 15.4	Equivalent Percentage for CGPA is = (CGPA-0.75) x 10																																													

RB 16.0	<p>REVALUATION</p> <p>As per the notification issued by the Controller of Examination, the student can submit the application for revaluation, along with the fee receipt for revaluation of his/her answer script(s) of theory course(s), if he/she is not satisfied with the Grade obtained. The Controller of Examination shall arrange for revaluation of those answerscript(s).</p>
RB 16.1	<p>For Revaluation, a new external examiner, other than the first examiner, shall re-evaluate the answer script(s). If there is any change in marks (below 15% of the maximum External marks) the highest of the two marks will be considered and if there is any change in marks (Equal or above 15% of the maximum External marks), the script will be evaluated by the third valuator. The marks of all the three valutors are compared and the average of two nearer marks will be awarded to the student.</p>
RB 17.0	<p>SUPPLEMENTARY EXAMINATIONS.</p> <p>Supplementary examinations shall be conducted twice in an academic year, along with regular semester end examinations.</p>
RB 18.0	<p>READMISSION CRITERIA.</p> <p>A candidate, who is detained in a semester due to lack of attendance/ credits, has to obtain written permission from the Principal for readmission in the same semester after duly fulfilling all the required norms stipulated by the college in addition to paying an administrative fee of Rs.1,000/-</p>
RB 19.0	<p>BREAK IN STUDY.</p> <p>Student, who discontinues his/her studies for whatsoever may be the reason, can get readmission into appropriate semester of B.Tech. programme after break-in study only with the prior permission of the Principal of the College provided, such candidate shall follow the transitory regulations applicable to such batch in which he/she joins. An administrative fee of Rs.1000/- per year of break in study in addition to the prescribed tuition fee and special fee has to be paid by the candidate to condone his/her break in study.</p>
RB 20.0	<p>AWARD OF DIVISION.</p> <p>The award of division for the candidates who admitted into respective B.Tech. programmes in the year 2019-2020 and onwards should be as per JNTUK regulations.</p> <p>For the purpose of awarding First Class with Distinction, the student must get CGPA within 4 years in case of candidates admitted through EAMCET & Management Quota or within 3 years in case of Lateral Entry candidates admitted through ECET, without appearing for any supplementary examinations. Detained candidates are not eligible for the award of First Class with Distinction.</p> <p>For the purpose of awarding First, Second and Pass Class, CGPA obtained in the examinations appeared within the maximum period allowed for the completion of course shall be considered.</p>
RB 21.0	<p>BETTERMENT /IMPROVEMENT OF CUMULATIVE GRADE POINT AVERAGE</p>

RB 21.1	A candidate, after becoming eligible for the award of the Degree, may reappear for the external Examination in any of the theory courses as and when conducted, for the purpose of improving the CGPA. But this reappearance shall be within a period of two academic years after becoming eligible for the award of the Degree, subject to fulfillment of Regulation RB 2.0.
RB 21.2	However, this facility shall not be availed by a candidate to reappear either for Internal Examination or for Semester End Examinations in Practical courses (including Project Viva- voce) and also for Semester End Examinations evaluated internally for the purpose of improvement.
RB 21.3	Modified Grade Card and New Consolidated Grade Card shall be issued after incorporating new Grades and Credits.
RB 22.0	ADVANCED SUPPLEMENTARY EXAMINATIONS
	Candidate(s), who fails in Theory or Lab courses of 4 th year second semester, can appear for advanced supplementary examinations conducted within one month after declaration of the revaluation results. However, those candidates who fail in this advanced supplementary examinations of IV year second semester shall appear for subsequent examination along with regular candidates in the examinations conducted at the end of the respective academic year.
RB 23.0	MALPRACTICES The Principal/chief superintendent shall refer the cases of malpractices in internal assessment tests and Semester End Examinations to a Malpractice Enquiry Committee, constituted for the purpose. The Principal shall take necessary action, against the erring students based on the recommendations of the Committee as per JNTUK Malpractice regulations.
RB 24.0	The physically challenged candidates who have availed additional examination time and a scribe during their Intermediate/EAMCET examinations shall be given similar concessions on production of relevant proof/documents.
RB 25.0	The students who are suffering from contagious diseases are not allowed to appear either internal or Semester end examinations with other students. A separate room will be allotted for such type of students.
RB 26.0	The students who participate in coaching/tournaments held at State/National/International levels through University / Indian Olympic Association during Semester end external examination period shall be promoted to subsequent semesters till the entire course is completed as per the guidelines of University Grants Commission Letter No. F. 1-5/88 (SPE/PES), dated 18-08-1994.
RB 27.0	The Principal shall deal with any academic problem, which is not covered under these rules and regulations, in consultation with the Heads of the Departments in an appropriate manner, and subsequently such actions shall be placed before the Academic Council for ratification. Any emergency modification of Regulation, approved in the Heads of the Departments meetings, shall be reported to the Academic Council for ratification.

RB 28.0	The Academic Council, from time to time, may revise or amend or change the Regulations, schemes of examination and/or syllabi.
RB 29.0	ELECTIVES Minimum 20% of intake of students is compulsory for offering regular electives.
RB 30.0	INTERNSHIP For internship, minimum period shall be one month. However, it can be completed in 3 to 4 slots /intervals which shall be a minimum of five day slot.

MALPRACTICES RULES

Disciplinary Action for / Improper Conduct in Examinations

S.NO	Nature of Malpractices / Improper conduct	Punishment
1.(a)	Possesses or keeps accessible in examination hall, any paper, note book, programmable calculators, Cell phones, pager, palm computers or any other form of material concerned with or related to the subject of the examination (theory or practical) in which he is appearing but has not made use of (material shall include any marks on the body of the candidate which can be used as an aid in the subject of the examination)	Expulsion from the examination hall and cancellation of the performance in that subject only.
1.(b)	Gives assistance or guidance or receives it from any other candidate orally or by any other body language methods or communicates through cell phones with any candidate or persons in or outside the exam hall in respect of any matter.	Expulsion from the examination hall and cancellation of the performance in that subject only of all the candidates involved. In case of an outsider, he will be handed over to the police and a case is registered against him.
2	Has copied in the examination hall from any paper, book, programmable calculators, palm computers or any other form of material relevant to the subject of the examination (theory or practical) in which the candidate is appearing.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted to appear for the remaining examinations of the subjects of that Semester/year. The Hall Ticket of the candidate is to be cancelled and held with the Institution.
3	Impersonates any other candidate in connection with the examination.	The candidate who has impersonated shall be expelled from examination hall. The candidate is also debarred and forfeits the seat. The performance of the original candidate who has been impersonated, shall be cancelled in all the subjects of the examination (including practicals and project work) already appeared and shall not be allowed to appear for examinations of the remaining subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all Institution examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat. If the imposter is an outsider, he will be handed over to the police and a case is registered against him.
4	Smuggles in the Answer book or additional sheet or takes out or arranges to send out the question paper during the examination or answer book or additional sheet, during or after the examination.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining

		examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all Institution examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
5	Uses objectionable, abusive or offensive language in the answer paper or in letters to the examiners or writes to the examiner requesting him to award pass marks.	Cancellation of the performance in that subject.
6	Refuses to obey the orders of the Chief Superintendent/Assistant– Superintendent / any officer on duty or misbehaves or creates disturbance of any kind in and around the examination hall or organizes a walk out or instigates others to walk out, or threatens the officer-in charge or any person on duty in or outside the examination hall of any injury to his person or to any of his relations whether by words, either spoken or written or by signs or by visible representation, assaults the officer-incharge, 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.	In case of students of the college, they shall be expelled from examination halls and cancellation of their performance in that subject and all other subjects the candidate(s) has (have) already appeared and shall not be permitted to appear for the remaining examinations of the subjects of that semester/year. The candidates also are debarred and forfeit their seats. In case of outsiders, they will be handed over to the police and a police case is registered against them.
7	Leaves the exam hall taking away answer script or intentionally tears of the script or any part thereof inside or outside the examination hall.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all Institution examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
8	Possess any lethal weapon or firearm in the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred

		and forfeits the seat.
9	If student of the college, who is not a candidate for the particular examination or any person not connected with the college indulges in any malpractice or improper conduct mentioned in clause 6 to 8.	Student of the colleges expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat. Person(s) who do not belong to the College will be handed over to police and, a police case will be registered against them.
10	Comes in a drunken condition to the examination hall.	Expulsion from the examination hall and cancellation of the Performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year.
11	Copying detected on the basis of internal evidence, such as, during valuation or during special scrutiny.	Cancellation of the performance in that subject and all other subjects the candidate has appeared including practical examinations and project work of that semester/year examinations.
12	If any malpractice is detected which is not covered in the above clauses 1 to 11 shall be reported to the Institution for further action to award suitable punishment.	

Malpractices identified by squad or special invigilators

1. Punishments to the candidates as per the above guidelines.
2. Punishment for institutions: (if the squad reports that the college is also involved in encouraging malpractices)
 - (i) A show cause notice shall be issued to the college.
 - (ii) Impose a suitable fine on the college.
 - (iii) Shifting the examination centre from the college to another college for a specific period of not less than one year.

* * * *

VISHNU INSTITUTE OF TECHNOLOGY

(AUTONOMOUS)

(Approved by AICTE & Affiliated to JNTU-Kakinada)

(Accredited by NBA& NAAC 'A' Grade)






Vishnupur, BHIMAVARAM – 534 202

Ragging

Prohibition of ragging in
Educational institutions Act 26 of 1997

Salient Features

- Ragging within or outside any educational institution is prohibited.
- Ragging means doing an act which causes or is likely to cause Insult or Annoyance of Fear or Apprehension or Threat or Intimidation or outrage of modesty or Injury to a student.

	Imprisonment upto		Fine Upto
Teasing, Embarrassing & Humiliation	 6 Months	+	Rs. 1,000/-
Assaulting or Using Criminal force or Criminal intimidation	 1 Year	+	Rs. 2,000/-
Wrongfully restraining or confining or causing hurt	 2 Years	+	Rs. 5,000/-
Causing grievous hurt, kidnapping or Abducts or rape or committing unnatural offence	 5 Years	+	Rs. 10,000/-
Causing death or abetting suicide	 10 Months	+	Rs. 50,000/-

LET US MAKE VIT A RAGGING FREE COLLEGE

VISHNU INSTITUTE OF TECHNOLOGY

(AUTONOMOUS)

(Approved by AICTE & Affiliated to JNTU-Kakinada)

(Accredited by NBA& NAAC 'A' Grade)

Vishnupur, BHIMAVARAM – 534 202

 **Ragging**

**ABSOLUTELY
NOT TO RAGGING**

1. Ragging is prohibited as per Act 26 of A.P. Legislative Assembly, 1997.
2. Ragging entails heavy fines and/or imprisonment.
3. Ragging invokes suspension and dismissal from the College.
4. Outsiders are prohibited from entering the College and Hostel without permission.
5. Girl students must be in their hostel rooms by 7.00 p.m.
6. All the students must carry their Identity Cards and show them when demanded.
7. The Principal and the Wardens may visit the Hostels and inspect the rooms any time.

LET US MAKE VIT A RAGGING FREE COLLEGE

B.Tech (CSE)
R19 Course Structure

R19 Course Structure for B.Tech.(CSE) (With effect from 2019-2020)

I YEAR I SEMESTER							
S.No	Subjects	L	T	P	C	I	E
1	Mathematics-I (Linear Algebra and Calculus)	2	1	-	3	40	60
2	Applied Chemistry	3	-	-	3	40	60
3	Problem Solving and Programming Using Python	3	-	-	3	40	60
4	Elements of Electrical and Electronic Engineering	3	-	-	3	40	60
5	Engineering Graphics and Design	1	-	3	2.5	40	60
6	Applied Chemistry Lab	-	-	3	1.5	40	60
7	Problem Solving and Programming Lab	-	-	3	1.5	40	60
8	Electrical and Electronic Engineering Lab	-	-	3	1.5	40	60
9	Environmental Science	3	-	-	-	0	0
Total		15	1	12	19	320	480
						800	

I YEAR II SEMESTER							
S.No	Subjects	L	T	P	C	I	E
1	Communicative English	2	-	-	2	40	60
2	Mathematics –II (Probability and Statistics)	3	1	-	4	40	60
3	Applied Physics	3	-	-	3	40	60
4	AI Tools, Techniques and Applications	2	1	-	3	40	60
5	English Communication Skills Lab	-	-	3	1.5	40	60
6	Applied Physics Lab	-	-	3	1.5	40	60
7	AI Tools, Techniques and Applications Lab	-	-	3	1.5	40	60
8	Computer Programming Lab	-	-	3	1.5	40	60
9	Engineering Workshop and IT Workshop	-	-	3	1.5	40	60
10	Constitution of India / Essence of Indian Traditional Knowledge	3	-	-	-	0	0
Total		13	2	15	19.5	360	540
						900	

II YEAR I SEMESTER							
S.No	Subjects	L	T	P	C	I	E
1	Discrete Mathematical Structures	2	1	-	3	40	60
2	Internet of Things (IoT)	3	-	-	3	40	60
3	Data Structures and Algorithms	3	-	-	3	40	60
4	Computer Organization & Architecture	3	-	-	3	40	60
5	Object Oriented Programming through Java	3	-	-	3	40	60
6	Quantitative Aptitude I	3	-	-	0	0	0
7	IOT Lab	-	-	3	1.5	40	60
8	DS Lab	-	-	3	1.5	40	60
9	OOPS through Java Lab	-	-	3	1.5	40	60
Total		17	1	9	19.5	320	480
						800	

II YEAR II SEMESTER							
S.No	Subjects	L	T	P	C	I	E
1	Software Engineering	3	-	-	3	40	60
2	Design Thinking & Product Innovation	2	-	-	2	40	60
3	Database Management Systems	3	-	-	3	40	60
4	Web Technologies	3	-	-	3	40	60
5	Digital Logic Design	3	-	-	3	40	60
6	Logical Reasoning	2	-	-	1.5	20	30
7	Socially Relevant Project (15 Hrs/Sem)	-	-	1	0.5	20	30
8	Business English Communication Lab	-	-	3	1.5	40	60
9	Design Thinking & Product Innovation Lab	-	-	2	1	40	60
10	DBMS Lab	-	-	3	1.5	40	60
11	Web Technologies Lab	-	-	3	1.5	40	60
Total		16	0	12	21.5	400	600
						1000	

III YEAR I SEMESTER							
S.No	Subjects	L	T	P	C	I	E
1	Formal Languages & Automata Theory (FLAT)	3	-	-	3	40	60
2	Design and Analysis of Algorithms	3	-	-	3	40	60
3	Operating Systems	3	-	-	3	40	60
4	Professional Elective I						
	1. Software Testing Methodologies	3	-	-	3	40	60
	2. Natural Language Processing						
	3. Full Stack Web Development						
	4. 3D Design and Printing						
Open Elective I (Inter Disciplinary Elective I)							
5	1. Electronic Devices and Circuits(EDC)	3	-	-	3	40	60
	2. Robotics						
	3. Embedded Systems						
	4. Integrated Circuits and Applications						
	5. Statistics with R Programming						
6	Mathematic-III (Differential Calculus and Number Theory & Applications)	2	1	-	3	40	60
7	Socially Relevant Projects (15 Hrs /Sem)	-	-	1	0.5	20	30
8	Quantitative Aptitude II	2	-	-	1	20	30
9	PE-I Lab	-	-	3	1.5	40	60
10	Language Processor Lab	-	-	3	1.5	40	60
Total		19	1	7	22.5	360	540
						900	

III YEAR II SEMESTER							
S.No	Subjects	L	T	P	C	I	E
1	Computer Networks	3	-	-	3	40	60
2	Data Science & Visualization	3	1	-	4	40	60
3	Compiler Design	3	-	-	3	40	60
Professional Elective II							
4	1. Software Project Management	3	-	-	3	40	60
	2. Big Data Analytics						
	3. NoSql Databases						
	4. Multimedia and Animation						
Open Elective II (Inter Disciplinary Elective II)							
5	1. Digital Image Processing	3	-	-	3	40	60
	2. Green Building Technologies						
	3. Information Theory and Coding						
	4. Principles of Signal Processing						
	5. MAT LAB Programming and ML Tool Box						
6	CN Lab	-	-	3	1.5	40	60
7	Data Science Lab	-	-	3	1.5	40	60
8	Advanced English Communication Skills Lab	-	-	3	1.5	40	60
9	Socially Relevant Projects (15 hrs / semester)	-	-	1	0.5	20	30
10	Industrial Training/ Internship/ Research Projects in National Laboratories/Academic Institutions *	-	-	-	-	-	-
Total		15	1	10	21	340	510
						850	

IV YEAR I SEMESTER							
S.No	Subjects	L	T	P	C	I	E
1	Network Security and Cryptography	3	-	-	3	40	60
Professional Elective III / MOOC*							
2	1. Software Architectures	3	-	-	3	40	60
	2. Deep Learning						
	3. Dev Ops						
	4. Augmented Reality and Virtual Reality						
Professional Elective IV / MOOC*							
3	1. UML & DP	3	-	-	3	40	60
	2. Data Mining						
	3. Micro Services						
	4. Game Development						
Open Elective III / MOOC*							
4	1. Rapid Manufacturing Processes	3	-	-	3	40	60
	2. Bio-Medical Engineering						
	3. Remote Sensing and GIS						
	4. TV Engineering						
	5. Control Systems						
Humanities Elective I / MOOC*							
5	1. Management Science	3	-	-	3	40	60
	2. Life Sciences for Engineering						
	3. Foreign Language						
6	Network Security Lab	-	-	3	1.5	40	60
7	PE Lab	-	-	3	1.5	40	60
8	Project I (Mini Project)	-	-	2	1	20	30
9	Industrial Training/Internship/Research Projects in National Laboratories/Academic Institutions	-	-	-	2	20	30
Total		15	0	8	21	320	480
						800	

IV YEAR II SEMESTER							
S.No	Subjects	L	T	P	C	I	E
Professional Elective V							
1	1. Real-Time Systems	3	-	-	3	40	60
	2. Smart Agents and Applications						
	3. Mobile Application Development						
	4. Block Chain Technologies						
Open Elective IV							
2	1. Entrepreneurship	3	-	-	3	40	60
	2. Nano Technology						
	3. Electronic Measurements and Instrumentation						
	4. Principles of Communication Systems						
	5. Digital Control Systems						
Humanities Elective II							
3	1. Managerial Economics and Financial Analysis	3	-	-	3	40	60
	2. IPR & PE						
	3. Education, Technology and Society						
4	Project II	-	-	14	7	80	120
Total		9	0	14	16	200	300
						500	

* Note: The MOOC Subjects are to be selected from the state-of-the-art technical subjects, identified by BOS, by the time the student reaches IV B.Tech.

Total Course Credits = 38.5 + 41 + 43.5 + 37=160 Credits

**I B.Tech I SEMESTER
CSE
R19 SYLLABUS**

Year/Semester	I B. Tech/I Sem	L	T	P	C
Regulation Year	2019-20	2	1	0	3
Subject	Mathematics-I (Linear Algebra & Calculus)				

Course Objectives: To enable the students to

1. Know the importance of matrices to solve linear equations using matrices
2. Identify and solve various differential equations using corresponding methods
3. Apply methods of solving higher order linear differential equations
4. Comprehend the theory of maxima and minima of a function of two variables.
5. Analyze the techniques of tracing the curves and evaluate the lengths, areas, volumes of objects using multiple integrals

UNIT –I: Matrices - Linear system of equations

Introduction, Different types of matrices, Rank-Echelon form - Normal form, Solution of a System of Linear Equations – Non-homogeneous and homogeneous equations, Gauss- Jordan method, Gauss – Elimination Method, LU Decomposition, Applications of electric circuits.

UNIT- II: Eigen values - Eigen vectors

Eigen values - Eigen vectors – Properties– Cayley-Hamilton Theorem - finding inverse and power of a matrix by using Cayley-Hamilton theorem, Diagonalization of matrices, Spectral Decomposition, Principal Component Analysis and Singular Value Decomposition

UNIT –III: Differential Equations of First Order and First Degree

Differential equations of first order and first degree–Exact and Non - exact differential equations, Linear and Bernoulli differential equations. Orthogonal trajectories, Newton’s Law of cooling, Law of natural growth and decay-R and R-C Circuits.

UNIT –IV: Linear Differential Equations of Higher Order

Higher order homogenous and non - homogenous linear differential equations with constant coefficients - Particular integrals for the functions of type e^{ax} , $\sin(ax+b)$, $\cos(ax+b)$, Polynomial of x , $e^{ax} V(x)$, L-C-R Circuits

Unit – V: Partial Differentiation

Functions of several variables- Partial derivatives, Total derivative, Chain rule, Change of variables, Jacobians, Functional dependence. Generalized Mean Value theorem –Taylor’s

theorem and Maclaurin's theorem (without proof) for a function of two variables, Maxima and Minima of functions of two variables, Lagrange's method of undetermined multipliers

Unit –VI: Multiple Integrals and Applications

Review of Curve tracing-Cartesian-Polar and Parametric curves

Multiple integrals - double integrals - change of variables (Cartesian and Polar coordinates), Change of order of integration and Evaluation of triple integrals, computing area, surface areas and volume.

Text Books:

1. B. S. Grewal, Higher Engineering Mathematics, 42nd Ed., Khanna Publishers, New Delhi, 2012
2. Erwin. Kreyszig, Advanced Engineering Mathematics, 9th Ed., Wiley, 2012

References:

1. T.K.V.Iyengar, B. Krishna Gandhi, S. Ranganathan and M.V.S.S.N.Prasad, Engineering Mathematics, Volume-I, 12th Ed., S. Chand Publishers, 2014
2. B. V. Ramana, Engineering Mathematics, 4th Ed., Tata McGraw Hill, New Delhi, 2009
3. D. S. Chandrashekharaiyah, Engineering Mathematics, Volume 1, Prism Publishers, 2010
4. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, reprint, 2008.

Course Outcomes: After completing this course, the students will be able to

1. Solve linear system of equations in engineering problems
2. Find Eigenvalues and Eigenvectors of a matrix in engineering studies.
3. Model engineering problems as a differential equation and solve analytically.
4. Model engineering problems as a differential equation and solve analytically the higher order differential equations.
5. Find out local /global optimum of functions of several variables.
6. Compute areas, surface areas and volumes.

Year/Semester	I B. Tech/I Sem	L	T	P	C
Regulation Year	2019-20	3	0	0	3
Subject	Applied Chemistry				

COURSE OBJECTIVES:

1. Plastics are nowadays used in household appliances; also, they are used as composites in aerospace industries.
2. Fuels as a source of energy are a basic need of any industry, particularly industries like thermal power stations, steel industry, fertilizer industry etc., and hence they are introduced.
3. The basics for the construction of galvanic cells. Also, if corrosion is to be controlled, one has to understand the mechanism of corrosion which itself is explained by electrochemical theory.
4. With the increase in demand, a wide variety of materials are coming up; some of them have excellent engineering properties and these materials are introduced.
5. Understanding of crystal structures will help to understand the conductivity, semiconductors and superconductors.
6. With the increase in demand for power and also with depleting sources of fossil fuels, the demand for alternative sources of fuels is increasing. Some of the prospective fuel sources are introduced.

UNIT -I: HIGH POLYMERS AND PLASTICS

Polymerization: Introduction- Methods of polymerization --Thermoplastics and Thermosetting plastics – Compounding and fabrication (4/5 techniques)- Preparation, properties and applications of polyethylene, PVC, Bakelite Teflon. Conducting polymers, Fibber Reinforced Plastics and Biodegradable Polymers.

Elastomers – Natural rubber - vulcanization – Synthetic rubbers: Buna S, Buna N and Thiokol – Applications of elastomers.

UNIT -II: FUEL TECHNOLOGY

Fuels: - Introduction – Calorific value - HCV and LCV – Bomb calorimeter – Numerical problems – Coal — Proximate and ultimate analysis –Significance of the analyses – Liquid fuels – Petroleum- Refining – Cracking – Petrol knocking – Diesel knocking - Octane and Cetane ratings – Anti-knock agents –Gaseous fuels – Natural gas, LPG and CNG. – Biofuels- Biodiesel and Power alcohol

UNIT -III: ELECTROCHEMICAL CELLS AND CORROSION

Galvanic cells (Construction and working) – Electro chemical series and uses of this series- Standard electrodes (Hydrogen and Calomel electrodes) Batteries: Dry Leclanche Cell - Ni-Cd cells - Li cells.

Corrosion: - Definition – Theories of Corrosion (dry & wet corrosion) – Formation of galvanic cells by different metals, differential aeration - waterline corrosion – Pitting corrosion - Factors which influence the rate of corrosion - Protection from corrosion: Methods of application on metals (Galvanizing, Tinning, Electroplating, Electroless plating)

UNIT -IV: CHEMISTRY OF ADVANCED MATERIALS

Nano materials: - Introduction – Bottom up and Top down approach- Sol gel method- Self assembled layers Characterisation of nano materials by BET and TEM - Carbon nano tubes and fullerenes: Types, Preparation (Arc discharge and Laser ablation and Chemical Vapour Deposition methods) properties and applications

Liquid crystals: - Introduction – Types – Applications

Superconductors: - Type-I & Type-II, properties & applications.

Green synthesis: - Principles – Aqueous phase method, Super critical fluid Extraction method and Bio catalytic methods of synthesis-Applications.

UNIT -V: SOLID STATE CHEMISTRY

Types of solids – Crystal defects- Frenkel and Schottky defects – Spinel and Inverse spinel. Hall effect and applications.

Semiconductors: Preparation of pure semiconductors by Zone refining, distillation and Czochralski crystal pulling technique- Doping- Epitaxy, diffusion and Ion implantation technique- Intrinsic and Extrinsic semiconductors - Applications.

Insulators: Electrical Insulators and their applications.

UNIT -VI: NON-CONVENTIONAL ENERGY SOURCES

Solar Energy: - Introduction, application of solar energy – photovoltaic cell: design, working and its importance.

Non-conventional energy sources:

- I. Hydropower include setup a hydropower plant (schematic diagram)
- II. Geothermal energy: Introduction-schematic diagram of a geothermal power plant
- III. Tidal and wave power: Introduction- Design and working-movement of tides and their effect on sea level.

IV. Biomass energy

Fuel cells: - Introduction - cell representation, H₂-O₂ fuel cell: Design and working, advantages and limitations. Types of fuel cells: methanol-oxygen - phosphoric acid fuel cells.

Text Books:

1. Engineering Chemistry by Jain and Jain; Dhanpat Rai Publishing Co.
2. Engineering Chemistry by Shikha Agarwal; Cambridge University Press, 2015 edition.

Reference Books:

1. Engineering Chemistry by Prasanth Rath, Cengage Learning, 2015 edition.
2. A text book of engineering Chemistry by S. S. Dara; S. Chand & Co Ltd., Latest Edition.

Course Outcomes:

1. The advantages and limitations of plastic materials and their use in design would be understood.
2. Fuels which are used commonly and their economics, advantages and limitations are discussed.
3. Reasons for corrosion and some methods of corrosion control would be understood.
4. The students would be now aware of materials like nano-materials and fullerenes and their uses. Similarly, liquid crystals and superconductors are understood. The importance of green synthesis is well understood and how they are different from conventional methods is also explained.
5. Conductance phenomenon is better understood.
6. The students are exposed to some of the alternative fuels and their advantages and limitations.

Year/Semester	I B. Tech/I Sem	L	T	P	C
Regulation Year	2019-20	3	0	0	3
Subject	Problem Solving and Programming using Python				

Course Objectives:

1. To introduce programming through Visual programming tool – Code.org
2. To teach problem solving through Flow charts
3. To elucidate problem solving through python programming language
4. To introduce function-oriented programming paradigm through python
5. To train in development of solutions using modular concepts
6. To teach practical Pythonic solution patterns

UNIT – I: Knowing the Computer and Learn Coding Constructs by Visual Tools

Definition and Block Diagram of a Computer. Principle of Abstraction, Memory hierarchy Operating System, System Calls and Interrupt definition. - Base conversion. Representing various data types in computer memory using bits (from integer (including negative), floating points etc. to text, images, audio and video). Language Hierarchy – Machine Language to High level. Compiler vs interpreter.

UNIT – II: Computational Thinking through Flowcharting

Simple logic building through flowcharting. Flow chart symbols, Input/Output, Assignment, operators, conditional if, repetition.

Example problems: Finding maximum of 3 numbers, Unit converters, Interest calculators, multiplication tables, GCD of 2 numbers. Fibonacci generation, prime number generation. Minimum, Maximum and average of n numbers, Linear search, Binary Search.

UNIT – III:

Computational Thinking, Algorithm, Pseudocode, Time/Space complexity. Only Big O notation. Python: Numbers, Variables, operators, expressions, Input/Output statements, Conditional If, while and for loops, basic math functions, User defined Functions, parameters to functions, positional, keyword and default arguments, recursion.

Example problems: problems from unit 2, Sieve of erathosenes, finding LCM, factorization, checking power of 2, checking for perfect-square, factorial, a^b , sqrt with binary search etc.

UNIT -IV

Python Sequences: List and List Operations, Using Lists to represent Matrices, Strings, String operations, Tuples, Exceptions and Debugging.

Example problems: counting characters, words and sentences in text, search and replace, finding median, max, min, mean, Matrix multiplication, sum of diagonals, dutch national flag, implementing linear, binary search, bubble sort

UNIT – V: Data Structures and Idiomatic Programming in Python

Dictionaries, Sets, Files. Modules, Packages and namespaces. Classes and Objects. Lambda functions, Comprehensions.

Example Problems: find unique/distinct elements in a string/list, sorting words in text based on frequency, finding common elements in two lists, count occurrences of some text in a file, etc.

UNIT -VI: Web Application Development

How internet works. Intro to Web 1.0, 2.0 and 3.0. Simple web applications using HTML5, CSS3, JavaScript (very basic DOM manipulation only) and Flask. Storing data in cloud data stores. Deploying app on GCP. Intro to Source Control and GIT.

Course Outcomes: Student should be able to

1. Visually describe programming logic using flowcharts
2. Develop Python programs for numerical and text based problems
3. Express and evaluate logic of simple programs
4. Choose relevant python data structure to solve problems
5. Develop simple static pages in html, css and serve them through flask

Text Books:

1. Think Python: How to Think Like a Computer Scientist , Allen B. Downey, 2nd Edition

Reference Books:

2. Core python programming, W Chun Pearson
3. Python programming a modern approach, Vamsi Kurama, pearson

Web resources:

1. <https://studio.code.org/s/20-hour/>
2. <http://www.ict.ru.ac.za/Resources/cspw/thinkcspy3/thinkcspy3.pdf>
3. <https://snakify.org>

Year/Semester	I B. Tech/I Sem	L	T	P	C
Regulation Year	2019-20	3	0	0	3
Subject	Elements of Electrical and Electronic Engineering				

Learning Objectives:

- 1 To learn the basic principles of electrical law's and analysis of networks.
- 2 To understand the principle of operation and construction details of DC machines.
- 3 To understand the principle of operation and construction details of transformer.
- 4 To study the operation of PN junction diode, half wave, full wave rectifiers and OP-AMPs.
- 5 To learn the operation of PNP and NPN transistors and various amplifiers.

UNIT - I

DC Circuits: Electrical circuit elements (R - L and C) - Ohm's-Law, Kirchhoff laws - Series and parallel connection of resistances with DC excitation. Mesh Analysis and Nodal Analysis. Superposition Theorem

UNIT - II

AC Circuits: Representation of sinusoidal waveforms - peak and rms values - phasor representation - real power - reactive power - apparent power - power factor - Analysis of single-phase ac circuits consisting of RL- RC- RLC series circuits.

UNIT - III

DC Machines: Principle and operation of DC Generator - EMF equations - OCC characteristics of DC generator – principle and operation of DC Motor – Performance Characteristics of DC Motor - Speed control of DC Motor

UNIT - IV

AC MACHINES: Principle and operation of Single-Phase Transformer - OC and SC test on transformer - principle and operation of Induction Motor [Elementary treatment only.

UNIT-V

RECTIFIERS & LINEAR ICs: PN junction diodes, diode applications (Half wave and bridge rectifiers). Characteristics of operation amplifiers (OP- AMP) - application of OP-AMPs (inverting, non-inverting, integrator and differentiator).

UNIT-VI

TRANSISTORS: PNP and NPN junction transistor, transistor as an amplifier, single stage CE Amplifier, frequency response of CE amplifier, concepts of feedback amplifier.

Course Outcomes:

- i. Able to analyse the various electrical networks.
- ii. Able to understand the operation of DC generators, 3-point starter and conduct the Swinburne's Test.
- iii. Able to analyse the performance of transformer.
- iv. Able to analyse the operation of half wave, full wave rectifiers and OP- AMPS.
- v. Able to explain the single stage CE amplifier and concept of feedback amplifier.

TEXT BOOKS:

1. Electronic Devices and Circuits, R.L. Boylestad and Louis Nashelsky, 9th edition, PEI/PHI2006.
2. Electrical Technology by Surinder Pal Bali, Pearson Publications.
3. Electrical Circuit Theory and Technology by John Bird, Routledge Taylor & Francis Group

REFERENCE BOOKS:

1. Basic Electrical Engineering by M.S.Naidu and S.Kamakshiah, TMH Publications.
2. Fundamentals of Electrical Engineering by Rajendra Prasad, PHI Publications, 2nd edition.
3. Basic Electrical Engineering by Nagsarkar, Sukhija, Oxford Publications, 2nd edition.
4. Industrial Electronics by G.K. Mittal, PHI.

Year/Semester	I B. Tech/I Sem	L	T	P	C
Regulation Year	2019-20	1	0	3	2.5
Subject	Engineering Graphics & Design				

Course Objectives:

1. Engineering drawing being the principle method of communication for engineers, the objective is to introduce the students, the techniques of constructing the various types of polygons, curves and scales.
2. The objective is also to visualize and represent the 3D objects in 2D planes with proper dimensioning, scaling etc.

UNIT-I

Polygons: Construction of regular polygons by general methods, inscribing and describing polygons on circles.

Curves: Ellipse, Parabola and Hyperbola by general methods, Tangent & Normal and Ellipse by Oblong Method and Arcs of Circles Method

UNIT-II

Scales: Plain scale, Diagonal scale and Vernier scale.

Orthographic Projections: Introduction to Projections, Horizontal plane, Vertical plane, Profile plane, importance of reference lines.

Projections of points in various quadrants.

UNIT-III

Projections of straight lines inclined to one plane, inclined to both the planes, traces

UNIT-IV

Projections of planes: inclined to one reference plane; inclined to both the reference planes.

UNIT-V

Projections of Solids – Projections of Prisms, Pyramids, Cones and Cylinders simple positions, the axis inclined to one of the reference planes.

UNIT-VI

Conversion of isometric views to orthographic views; Conversion of orthographic views to isometric views.

Course Outcomes:

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

1. Understand and construct the polygons and curves in engineering applications.
2. Visualize objects in 3D space and draw Orthographic Projections.
3. Interpret Orthographic and Isometric views of objects.

Text Books:

1. Engineering Drawing by N.D. Bhatt, Charotar Publishing House Pvt. Ltd
2. Engineering Drawing by Agarwal & Agarwal, Tata McGraw Hill
3. Engineering Drawing + AutoCAD by K. Venugopal, V. Prabhu Raja, New Age

Reference Books:

1. Engineering Drawing by K.L.Narayana& P. Kannaiah, Scitech Publications
2. Engineering Graphics for Degree by K.C. John, PHI Learning
3. Engineering Graphics by PI Varghese, McGrawHill Publishers.
4. Engineering Drawing by P.S. Gill, S.K. Kataria& Sons
5. Engineering Drawing by Venkata Reddy – B.S. Publications.

Year/Semester	I B. Tech/I Sem	L	T	P	C
Regulation Year	2019-20	0	0	3	1.5
Subject	Applied Chemistry Lab				

List of Experiments:

1. Trial experiment - Determination of HCl using standard Na₂CO₃ solution.
2. Determination of alkalinity of a sample containing Na₂CO₃ and NaOH.
3. Determination of KMnO₄ using standard Oxalic acid solution.
4. Determination of Copper using standard K₂Cr₂O₇ solution.
5. Determination of temporary and permanent hardness of water using standard EDTA.
6. Determination of Vitamin – C
7. Determination of P^H of the given sample solution using P^H meter.
8. Conductometric titration between strong acid and strong base.
9. Potentiometric titration between strong acid and strong base.
10. Estimation of copper by Colorometry
11. Estimation of KCl by Ion exchange resin method.
12. Photo Chemical Reduction of Ferric Salt (Blue-Printing)
13. Adsorption of acetic acid on charcoal.
14. Determination of rate of corrosion.
15. Preparation of a polymer.

Reference Books:

1. A Textbook of Quantitative Analysis, Arthur J. Vogel.
2. Dr. Jyotsna Cherukuris (2012) Laboratory Manual of engineering chemistry-II, VGS
3. Techno Series
4. Chemistry Practical Manual, Lorven Publications
5. Practical Engineering Chemistry, K. Mukkanti (2009) B.S. Publication

Course Outcomes:

The experiments introduce volumetric analysis; redox titrations with different indicators; EDTA titrations; then they are exposed to a few instrumental methods of chemical analysis. Thus, at the end of the lab course, the student is exposed to different methods of chemical analysis and use of some commonly employed instruments .

Year/Semester	I B. Tech/I Sem	L	T	P	C
Regulation Year	2019-20	0	0	3	1.5
Subject	Problem Solving and Programming Lab				

Laboratory Experiments:

- 1) code.org fast intro to programming.
- 2) Construct flowcharts to
 - a) Calculates the maximum, minimum and average of N numbers
 - b) Develops a calculator to convert time, distance, area, volume and temperature from one unit to another.
- 3) Construct flowcharts with separate procedures to
 - a) calculates simple and compound interest for various parameters specified by the user
 - b) calculates the greatest common divisor using iteration and recursion for two numbers as specified by the user.
- 4) Construct flowcharts with procedures to
 - a) generate first N numbers in the Fibonacci series
 - b) generate N Prime numbers
- 5) Design a flowchart to perform Linear search on list of N unsorted numbers(Iterative and recursive)
- 6) Design a flowchart to perform Binary search on list of N sorted numbers(Iterative and recursive)
- 7) Design a flowchart to determine the number of characters and lines in a text file specified by the user
- 8) Design a Python script to convert a Binary number to Decimal number and verify if it is a Perfect number.
- 9) Design a Python script to determine if a given string is a Palindrome using recursion
- 10) Design a Python script to sort numbers specified in a text file using lists.
- 11) Design a Python script to determine the difference in date for given two dates in YYYY:MM:DD format($0 \leq \text{YYYY} \leq 9999$, $1 \leq \text{MM} \leq 12$, $1 \leq \text{DD} \leq 31$) following the leap year rules.
- 12) Design a Python Script to determine the Square Root of a given number without using inbuilt functions in Python.
- 13) Design a Python Script to determine the time difference between two given times in HH:MM:SS format.($0 \leq \text{HH} \leq 23$, $0 \leq \text{MM} \leq 59$, $0 \leq \text{SS} \leq 59$)

- 14) Design a Python Script to find the value of (Sine, Cosine, Log, PI, e) of a given number using infinite series of the function.
- 15) Design a Python Script to convert a given number to words
- 16) Design a Python Script to convert a given number to roman number.
- 17) Design a Python Script to generate the frequency count of words in a text file.
- 18) Design a Python Script to print a spiral pattern for a 2 dimensional matrix.
- 19) Design a Python Script to implement Gaussian Elimination method.
- 20) Design a Python script to generate statistical reports(Minimum, Maximum, Count, Average, Sum etc) on public datasets.
- 21) Design a tic tac toe game in HTML/CSS/JavaScript with timer.
- 22) Project: Design a simple website with flask backend. For example: a) student book loan/sell site for hostel, b) Manage ToDo list, c) pizza order site, d) birthday cake site etc.

Text Book:

<http://www.ict.ru.ac.za/Resources/cspw/thinkcspy3/thinkcspy3.pdf>

Course outcomes: Student should be able to

1. Explain basing working of computer and program execution.
2. Develop flowcharts to solve the given problems.
3. Develop Python programs for numerical and text based problems.
4. Develop Python programs using beautiful Pythonic idiomatic practices.
5. Develop web applications with python based backend and deploy them in the cloud.

Year/Semester	I B. Tech/I Sem	L	T	P	C
Regulation Year	2019-20	0	0	3	1.5
Subject	Electrical & Electronics Engineering lab				

Section A: Electrical Engineering:

1. Verification of Kirchoffs Laws
2. Verification of Superposition Theorem.
3. Swinburne's test on D.C. Shunt machine (Predetermination of efficiency of a given D.C. Shunt machine working as motor and generator).
4. OC and SC tests on single phase transformer (Predetermination of efficiency and regulation at given powerfactors).
5. Speed control of D.C. Shunt motor by
6. Armature Voltage control b) Field flux control method
7. Brake test on D.C. Shunt Motor.

Section B: Electronics Engineering:

1. PN junction Diode characteristics A. Forward bias, B. Reverse bias. (Cut in voltage & Resistance calculations)
2. Transistor CE Characteristics (Input and Output).
3. Full wave Rectifier with and without filters.
4. CE Amplifiers.

Year/Semester	I B. Tech/I Sem	L	T	P	C
Regulation Year	2019-20	3	0	0	0
Subject	Environmental Science				

OBJECTIVES: To make the students to get awareness on environment, to understand the importance of protecting natural resources, ecosystems for future generations and pollution causes due to the day to day activities of human life to save earth from the inventions by the engineers.

UNIT – I Multidisciplinary nature of Environmental Science and Ecosystems.

Definition, Scope and Importance and sustainability – Need for public awareness- Human population and Environment.

Ecosystems: Concept of an ecosystem. - Structure and function of an ecosystem. – Types of ecosystems- Forest, Grassland, Desert and Aquatic ecosystems- Food chains, food webs and ecological pyramids.

UNIT – II Natural Resources

Forest resources: Use and over – exploitation, deforestation – Timber extraction – Mining, dams and other effects on forest and tribal people

Water resources: Conflicts over water, dams – benefits and problems

Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources.

Energy resources: Growing energy needs- renewable and non-renewable energy sources.

Food resources – World food problems

Land resources- Wasteland reclamation.

Role of an individual in conservation of natural resources.

UNIT – III Biodiversity and its conservation

Definition: Genetic, species and ecosystem diversity- classification - Value of biodiversity: consumptive use, productive use, social - Biodiversity at national and local levels. Hot-spots of biodiversity - Threats to biodiversity - Endangered and endemic species of India - conservation of biodiversity.

UNIT – IV Environmental Pollution

Definition, Cause, effects and control measures of Air pollution, Water pollution, Soil pollution, Noise pollution, Nuclear hazards. Role of an individual in prevention of pollution. - Pollution case studies.

Solid Waste Management: Sources, effects and control measures of urban and industrial solid wastes.

Biomedical and e - waste management.

Global Environmental Challenges: Global warming and climate change, acid rains, ozone layer depletion.

UNIT – V Social Issues and the Environment

Urban problems related to energy -Water conservation, rain water harvesting-Resettlement and rehabilitation of people. Environmental Protection Act –Air Act. –Water Act - Wildlife Protection Act -Forest Conservation Act- Public awareness.

International protocols: Stockholm and Rio Summit, Kyoto protocol and Montreal protocol.

UNIT – VI Environmental Management

Impact Assessment and its significance - various stages of EIA- Environmental audit, Ecotourism.

The student Visit of an Industry / Ecosystem.

TEXT BOOKS:

1. A Textbook of Environmental Studies, Shaashi Chawla, TMH, New Delhi.
2. Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission.
3. Environmental Studies, R. Rajagopalan, 2nd Edition, 2011, Oxford University Press.

REFERENCE BOOKS:

1. Environmental Studies, K. V. S. G. Murali Krishna, VGS Publishers, Vijayawad
2. Text Book of Environmental Studies, Deeshita Dave & P. Udaya Bhaskar, Cengage Learning.
3. Text book of Environmental Science and Technology – Dr. M. Anji Reddy , BS Publications
4. Environment Studies, Anubha Kaushik, C P Kaushik, New Age International Publishers, 2014
5. Environmental Studies, P. N. Palanisamy, P. Manikandan, A. Geetha, and K. Manjula Rani; Pearson Education, Chennai

Course Outcomes:

Students will be able to

1. Articulate the basic structure, functions, and processes of key social systems affecting the environment.
2. Explain how Natural resources should be used.
3. Identify the threats to biodiversity.
4. Understand Causes, effects and control measures of environmental pollution.
5. Gain knowledge about watershed management and environmental ethics.
6. Gain a rigorous foundation in various scientific disciplines as they apply to environmental science, such as ecology, evolutionary biology, hydrology, and human behaviour.