**ACADEMIC REGULATIONS,**

**COURSE STRUCTURE**

**AND**

**DETAILED SYLLABUS**

**for**

**(A-18)**

**I Year and II Year**

**B. Tech CIVIL ENGINEERING (CE)**

**(Applicable for batches admitted from 2018-19)**

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**SREENIDHI INSTITUTE OF SCIENCE AND TECHNOLOGY**

**(An Autonomous Institution approved by UGC and affiliated to JNTUH)**

**Yamnampet, Ghatkesar, Hyderabad - 501 301**

**January, 2019**

B. Tech (Civil Engineering)

Program objective:

B. Tech in Civil Engineering program prepares the graduates with necessary knowledge, skills, and tools to analyze, plan and design solutions for basic Civil Engineering problems covering the domains of structures, transportation, surveying, and water resources and hydraulic systems with awareness to environmental preservation and sustainable development.

The first two years of this program have a set of introductory courses, such as Mathematics, Physics, English, Computer Languages (C, C++, Java), Technical Seminars, providing the students with a firm foundation in mathematics, physical sciences, computer languages, and communication skills. These courses include weekly labs in which students use state-of-the art equipment and software tools to analyze and solve practical engineering problems.

The last two years of the program focus on the core civil engineering subjects covering the concepts and techniques used in the analysis, design and development of practical civil engineering problems including investigative and solution tools.

In addition, students can choose from a set of professional elective streams covering various specialized domains in civil engineering. These advanced courses give broad opening for research and help students when they pursue higher studies in that stream. A generous allotment of open elective streams allows students to learn in-demand skills such as data base management systems, advanced managerial techniques, foreign languages etc.

Having completed the course, the student is well prepared to perform independently within a structured professional framework or pursue higher studies.

**DEPARTMENT OF CIVIL ENGINEERING**

**Vision**

* To become a reputed department for Civil Engineering education and applied research in the country with focus on producing professionally competent and highly recognized engineers**.**

**Mission**

1. To prepare and provide conductive environment for Civil Engineering graduates to become competent and quick learners of the latest emerging technologies on the engineering horizon.
2. To become a hub of technical know-how in Civil Engineering and allied domains for the service of industry bodies, governmental bodies, and society at large.
3. To ensure our students are confident with latest and emerging technologies, that affect the traditional roles of civil engineers, so that they could push the envelope to be relevant in the fast changing technical field as practicing engineers, entrepreneurs, or research personnel.
4. Also, the Department aims to train socially and environmentally sensitive professionals as Civil Engineering profession has high contact and visibility with the public.

**Programme Educational Objectives:**

1. Graduates will have a strong foundation in fundamentals of mathematics, natural and environmental sciences, and basic engineering skills with abilities of problem analysis, design and development of optimal solutions to engineering problems.
2. Graduates can apply the knowledge of theory, tools of investigation, and use of modern tools to solve complex problems and become professionally competent and globally employable engineers to assess health, safety, legal, societal, and environmental and sustainable issues maintaining ethical principles.
3. Graduates will have ability to work effectively as an individual, a team member, a leader or an entrepreneur with awareness of gender sensitiveness apart from having good communication, project and finance management skills.
4. Encouraging the graduates to pursue higher studies in internationally reputed institutes or research and development activities thus making them life-long learners.

**Programme Outcomes**

The Programme Outcomes (**POs**) of the B.Tech (Civil Engineering) programme are listed below:

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and specialization of CivilEngineering 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 in the area of Civil Engineering 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 useful for Civil Engineering and related areas 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 Civil 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 finalize technical and financial aspects of a project and to manage 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 changes through individual/group assignments such as technical seminars, lab projects, group projects, mini and main projects in the area of Civil Engineering or in multi disciplinary areas.

**Correlation between the POs and the PEOs**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PEOs** | **Programme Outcomes** | | | | | | | | | | | |
| **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| **I** |  |  |  |  |  |  |  |  |  |  |  |  |
| **II** |  |  |  |  |  |  |  |  |  |  |  |  |
| **III** |  |  |  |  |  |  |  |  |  |  |  |  |
| **IV** |  |  |  |  |  |  |  |  |  |  |  |  |

**Program Specific Objectives (PSOs):**

1. Develop a strong foundation of basic sciences and its applications for Civil Engineering Problems, apply the concepts of analysis and investigation using modern tools to design and solve Civil Engineering problems. *[CORE]*
2. Possess professional skills to investigate, analyze, and design practical solutions to Civil Engineering problems such as basic structures design, basic water conveyance and treatment systems design, basic transportation systems design, and basic survey maps and building drawings development, etc. [*Practical*]
3. Comprehend and apply technological advancements for real life engineering problems using modern instruments and modern analytical and software tools to analyze, plan, design, and implement solutions. [*Tools*]
4. Possess skills to communicate, be a team member, demonstrate professional ethics and exhibit concern for societal and environmental wellbeing for sustainable professional development. *[ENV, Team, Society and Life long learning, professional]*

**ACADEMIC REGULATIONS**

**FOR B.TECH. REGULAR STUDENTS**

**WITH EFFECT FROM**

**THE ACADEMIC YEAR 2018-19**

**(A-18)**

**1.0 Under-Graduate Degree Programme in Engineering & Technology (E&T)**

**1.1** SNIST offers a 4-year (8 semesters) **Bachelor of Technology** (B.Tech.) degree programme, under Choice Based Credit System (CBCS) with effect from the academic year 2018-19 in the following branches of Engineering.

|  |  |
| --- | --- |
| **Sl. No.** | **Branch** |
|  | Civil Engineering |
|  | Electrical and Electronics Engineering |
|  | Mechanical Engineering |
|  | Electronics and Communication Engineering |
|  | Computer Science and Engineering |
|  | Information Technology |
|  | Electronics and Computer Engineering |

**1.2. Credits (Semester system for I year)**

The existing credit system of giving one credit for a lecture hour/ tutorial hour per week and giving 0.5 credit for every hour of practical and drawing shall be continued in these regulations also.

**2.0 Eligibility for admission**

**2.1** Admission to the Under graduate courses merit rank obtained by graduate programs shall be made either on the basis of the rank of the candidate in entrance test conducted by the Telangana State Government (EAMCET) or the University or on the basis of any other order of merit approved by the University, subject to reservations as prescribed by the government from time to time. However admissions under Management / NRI Category shall be made on the relevant orders issued by Govt. of Telangana from time to time.

**2.2** The medium of instruction for the entire under graduate programme of study in E&T will be **English** only.

**3.0 B.Tech. Programme structure**

**3.1** A student after securing admission shall pursue the under graduate programme in B.Tech. in a minimum period of **four** academic years (8 semesters), and a maximum period of **eight** academic years (16 semesters) starting from the date of commencement of first year first semester, failing which student shall forfeit seat in B.Tech course. However, the student can take two more years for appearing the examinations to clear the backlog subjects.

In the First year it is structured to provide 39 credits and the credits in II , III and IV years should not exceed 127 credits as per AICTE model curriculum for the B.Tech. programme.

Each student shall secure 166 total credits (with CGPA ≥ 5) for the completion of the under graduate programme for the award of the B.Tech. degree. However, any revision made in this regard and approved by the Academic Council of the college by Parent University shall be implemented from the date of the revision.

**3.2 UGC/AICTE** specified definitions/ descriptions are adopted appropriately for various terms and abbreviations stated below.

**3.2.1 Semester scheme**

Each under graduate programme is of 4 academic years (8 semesters) with the academic year being divided into two semesters of 22 weeks ( 90 instructional days) each, each semester having - ‘Continuous Internal Evaluation (CIE)’ and ‘Semester End Examination (SEE)’.

Choice Based Credit System (CBCS) and Credit Based Semester System (CBSS) as indicated curriculum / course structure as suggested by AICTE are followed.

**3.2.2 Credit courses**

* A student in a semester has to earn credits which shall be assigned to each subject/ course in an L: T: P: C (lecture periods: tutorial periods: practical periods: credits) structure based on the following general pattern.
* One credit for one hour/ week offered in the entire semester for theory lecture (L) / Tutorial (T) courses.
* One credit for two hours/ week offered in the entire semester for laboratory/ practical (P) courses.
* The orientation program recommended by AICTE in the model curriculum consisting of courses like Mandatory Induction program for 3 weeks like Physical Activity such as Yoga , Pranayama other games and sports in which the students are interested, Creative Arts , Universal Human Values, Literary, Proficiency Modules ( English and Computer Literacy ) , Lectures by Eminent People, Visits to local Areas and Familiarization to Dept/ Branch & Innovations does not carry any credits.
* However there will be an end examination and will also reflect in the Memo of Marks. The grading will be as follows

|  |  |
| --- | --- |
| **% of Marks Secured in a Subject/Course** | **Letter Grade** |
| Greater than or equal to 90% | O  (Outstanding) |
| 80 and less than 90% | A+  (Excellent) |
| 70 and less than 80% | A  (Very Good) |
| 60 and less than 70% | B+  (Good) |
| 50 and less than 60% | B  (Average) |
| 40 and less than 50% | C  (Pass) |
| Below 40% | F (FAIL) |
| Absent | Ab |

* Other mandatory courses i.e ., Environmental Science, Indian Constitution , Essence of Indian Traditional Knowledge also will not have credits but evaluation will be done as per the above table.

**3.2.3 Subject Course Classification**

All subjects / courses offered for the under graduate programme in E&T (B.Tech. Degree programmes) are broadly classified as follows. The Institution has followed almost all the guidelines issued by AICTE/UGC.

The groups of the subjects shall be as given in the table given hereunder along with the credits suggested by AICTE

|  |  |  |
| --- | --- | --- |
| **Sl.**  **No.** | **Category** | **Suggested Breakup of Credits**  **(Total 160)** |
| 1 | Humanities and social sciences including Management courses | 12\* |
| 2 | Basic Science courses | 25\* |
| 3 | Engineering Science courses including workshop, drawing, basics of electrical / mechanical / computer etc | 24\* |
| 4 | Professional core courses | 48\* |
| 5 | Professional Elective courses relevant to chosen specialization / branch | 18\* |
| 6 | Open Electives from other technical and / or emerging subjects | 18\* |
| 7 | Project work, seminar and internship in industry or elsewhere | 15\* |
| 8 | Mandatory courses (Environmental Sciences, Induction training, Indian constitution, Essence of Indian Traditional Knowledge) | (Non-credit) |
|  | Total | 160\* |

The Academic council of the institution has approved the total number of credits to be 165. The various groups of subjects mentioned above shall have credits suggested above with minor variations.

**4.0 Course registration**

**4.1** A ‘faculty advisor or counselor’ shall be assigned to a group of 20 students, who will advise student about the under graduate programme, its course structure and curriculum, choice/option for Professional and open Electives based on their employment potential / further studies.

**4.2** The student will progress semester after semester as the Institute is following cohort system to satisfying the conditions of promotion to the next semester.

**4.3 In the present system there shall be five subjects in each professional elective stream and three subjects in open elective stream.** A student can opt for a stream of professional/ open electives which should be submitted to the faculty advisor/ Councilor and copy of it to the Examination section through the Head of the department. A copy of it will be retained with the Head of the department/ faculty advisor / councilor and the student.

4.4. **The student can take extra credits and can complete the program in 3 ½ years but original degree will be issued along with his / her batch mates after 4 years.**

**4.5. If a student acquires 20 credits extra than the required credits as per the regulations he will be awarded honors.**

4.6 The purpose of offering Elective Streams in both Professional and Open Electives is to facilitate the students to have a minor specialization based on their interest, so that they will have multi disciplinary exposure. Hence , a student is to take a stream of Electives in either in Professional / Open Elective. He shall not be permitted to opt for other elective subjects in other streams in subsequent semesters.

**4.7** Dropping of Electives may be permitted, only after obtaining prior approval from the faculty advisor / counselor (subject to retaining a minimum of 16 credits), ‘**within a period of 15 days** from the beginning of the current semester.

**5.0 Subjects / courses to be offered**

**5.1** A typical section (or class) nominal strength for each semester shall be 60.

**5.2** A subject / course may be offered to the students, **only if** a minimum of 30 students opt for it. The maximum strength of a section is limited to 80.

**6.0 Attendance requirements:**

**6.1** 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 (excluding attendance in mandatory courses, Internship during II year, NCC / NSO and NSS) for that semester.

**6.2** Shortage of attendance in aggregate upto 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.

**6.3** A stipulated fee shall be payable towards condoning of shortage of attendance.

**6.4** Shortage of attendance below 65% in aggregate shall **NO CASE** be condoned.

**6.5 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.

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

**7.0 Academic requirements**

The following academic requirements have to be satisfied, in addition to the attendance requirements mentioned in item no.6.

7.1 **A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject / course, if student secures not less than 35% marks (26 out of 75 marks) in the semester end examination, and a minimum of 40% of marks in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together; in terms of letter grades, this implies securing ‘C’ grade or above in that subject / course.**

**7.2** A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to UG mini-project and seminar, if student secures not less than 40% marks (i.e. 40 out of 100 allotted marks) in each of them. The student would be treated as failed, if student

(i) does not submit a report on UG mini-project, or does not make a presentation of the same before the evaluation committee as per schedule, or

(ii) does not present the seminar as required in the IV year I Semester, or

(iii) secures less than 40% marks in UG mini-project/ seminar evaluations.

Student may reappear once for each of the above evaluations, when they are scheduled again; if student fails in such ‘one reappearance’ evaluation also, student has to reappear for the same in the next subsequent semester, as and when it is scheduled.

**7.3 Promotion Rules based upon credits**

|  |  |  |
| --- | --- | --- |
| **S. No.** | **Promotion** | **Conditions to be fulfilled** |
| 1 | First year First Semester to Second Semester | Regular course of study of first year first semester and should have satisfied the minimum requirement of attendance to appear I year I semester. |
| 2 | First year to second year first semester | i. Regular course of study of first year First and second semesters.  ii. Must have secured at least 50% of credits upto first year second semester from all the relevant regular and supplementary examinations, whether the student takes those examinations or not. |
| 3. | II Year I Semester to II Semester | Regular course of study of second year first semester. |
| 4 | Second year to third year first semester | i. Regular course of study of First and second semesters of second year.  ii. Must have secured at least 60% of credits upto 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 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 60% of 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. |

**7.4** A student shall register for all subjects as specified and listed in the course structure, fulfills all the attendance and academic requirements for all credits, ‘earn all credits’ by securing SGPA 5.0 (in each semester) and CGPA (at the end of each successive semester) 5.0 to successfully complete the under graduate programme.

**7.5** After securing total credits as specified for the successful completion of the entire under graduate programme, the student can avail exemption of two subjects i.e upto 6 credits, that is, one open elective and one professional elective subject or two professional elective subjects for optional drop out from total credits earned; resulting total credits specified for under graduate programme performance evaluation, i.e., the performance of the student in these credits shall alone be taken into account for the calculation of ‘the final CGPA of 5.0 (at the end of under graduate programme, which takes the SGPA of the IV year II semester into account)’ , and shall be indicated in the grade card of IV year II semester.

However, the performance of student in the earlier individual semesters, with the corresponding SGPA and CGPA for which grade cards have already been given will not be altered.

**7.6** If a student registers for some more ‘**extra subjects’** (in the parent department or other departments / branches of Engg.) other than those listed subjects as specified in the course structure of his Department, the performances in those ‘ **extra subjects**’ will not be taken into account while calculating the SGPA and CGPA. For such ‘**extra subjects’** registered, Percentage % of marks and letter grade alone will be indicated in the grade card as a performance measure, subject to completion of the attendance and academic requirements as stated in regulations 6 and 7.1 to 7.5 above.

**7.7** A student eligible to appear in the semester end examination for any subject / course, but absent from it or failed (thereby failing to secure **‘C’** grade or above) may reappear for that subject/ course in the supplementary examination as and when conducted. In such cases, CIE assessed earlier for that subject / course will be carried over, and added to the marks obtained in the supplementary examination for evaluating performance in that subject.

**7.8** A student **detained in a semester due to shortage of attendance, may be re-admitted when the same semester is offered in the subsequent academic years for the fulfillment of academic requirements**.

The academic regulations under which student has been readmitted shall be applicable. However, no grade allotments or SGPA / CGPA calculations will be done for the entire semester in which student has been detained.

**7.9** A student detained **due to lack of credits, shall be promoted to the next academic year only after acquiring the required academic credits.**

The academic regulations under which student has been readmitted shall be applicable to him / her.

**8.0 Evaluation - Distribution and weightage of marks**

8.1 The performance of a student in each semester shall be evaluated subject-wise for a maximum of 100 marks for a theory and 100 marks for a practical subject.

In addition, industry-oriented mini-project, group project, Project – I will also be evaluated for 100 marks, Project – II for 200 marks, Technical Seminar and comprehensive viva for 100 marks each.

The continuous internal evaluation for Project – I in IV year I semester shall consist of :

|  |  |  |
| --- | --- | --- |
| **Sl.No** | **Description** | **Marks** |
| 1 | Literature survey and presenting seminar at the end of 6 weeks | 10 marks |
| 2 | Report | 5 marks |
| 3 | Demonstration/presentation at the end of 14 weeks | 10 marks |
| 4 | Total sessional marks | 25 marks |

Semester end examination - 75 marks

Pattern of external evaluation for Project – I

|  |  |  |
| --- | --- | --- |
| **Sl.No** | **Description** | **Marks** |
| 1 | Final report | 15 marks |
| 2 | Presentation | 10 marks |
| 3 | Demonstration/defence of project | 50 marks |
| 4 | Total sessional marks | 75 marks |

The continuous internal evaluation for Project – II in IV year II semester shall consist of :

|  |  |  |
| --- | --- | --- |
| **Sl.No** | **Description** | **Marks** |
| 1 | Progress of Project work and the corresponding interim report as evaluated by Project Review Committee at the end of 6 weeks | 5 marks |
| 2 | Seminar at the end of 6 weeks | 5 marks |
| 3 | Progress of Project work as evaluated by Project Review Committee at the end of 11 weeks | 5 marks |
| 4 | Seminar at the end of 11 weeks | 5 marks |
| 5 | Evaluation by Project Review Committee at the end of 15 weeks | 10 marks |
| 6 | Final Project Report | 5 marks |
| 7 | Final presentation and defence of project | 15 marks |
| 8 | Total | 50 marks |

Division of marks for External Evaluation for project II – 150 Marks

|  |  |  |
| --- | --- | --- |
| **Sl.No** | **Description** | **Marks** |
| 1 | Final Project Report | 30 marks |
| 2 | Presentation | 20 marks |
| 3 | Demonstration / Defense of Project | 100 marks |
| 4 | **TOTAL** | **150 marks** |

8.2 For all the other theory and lab subjects the distribution of marks shall be 25 for Continuous Internal Evaluation (CIE) and 75 for the Semester End-Examination (SEE).

* 1. **Theory Subjects**

**8.3.1 Pattern for Continuous Internal Evaluation ( CIE) 25 marks**

**Subjects except Foreign languages (15+2+3+2=25 Marks)**

The following procedure is to be adopted for awarding internal marks of 25 for all the B. Tech., M. Tech., and MBA students from the Academic Year 2018-19

The distribution of marks for continuous internal evaluation ( 25 marks) is shown below. Average of two Mid Tests will be taken for final award of marks.

1. Part – A of Mid Test will have 10 questions – 5 marks
2. Part – B of Mid Test will have 3 questions (1 from each unit) and student

has to answer 2 questions - 10 marks

1. Assignment – I three questions from each unit – total of 9 questions

to be submitted before first mid test - 2 marks

Similarly assignment – II will be given to be Submitted before II Mid Test

and average of two assignments will be considered.

1. Part – C Mid Test Question Paper Will have 3 questions – One from

each unit taken from assignment questions. Student has to answer

1 question out of 3 questions - 3 marks

1. Attendance - 3 marks
2. Class notes - 2 marks

Three marks are assigned for each theory course for those students who put in attendance in a graded manner as given below:

|  |  |  |
| --- | --- | --- |
| **S.No.** | **Attendance Range** | **Marks Awarded** |
| 1. | 65 % and above but less than 75% | 1 |
| 2. | 75% and above and upto 85% | 2 |
| 3. | More than 85% | 3 |

Marks for attendance shall be added to each subject based on average of attendance of all

subjects put together.

**i) Award of final sessional marks :**  Mid-examination marks, average marks of two assignments, marks for class notes, Attendance, shall be added and the total marks are awarded as final sessional marks towards Continuous Internal Evaluation ( CIE) for 25 marks as detailed below.

|  |  |  |
| --- | --- | --- |
| **S. No** | **Item** | **Marks** |
| 1. | Average of two Mid Tests | 15 |
| 2. | Average of two assignments | 2 |
| 3 | Assignment test in Mid Test paper (Part – C) | 3 |
| 4 | Class Notes | 2 |
| 5 | Attendance | 3 |
|  | **Total** | **25** |

**(ii) Foreign languages**

|  |  |  |
| --- | --- | --- |
| **S. No** | **Item** | **Marks** |
| 1 | 2 written tests (Average of two to be taken) | 12 marks |
| 2 | Oral Comprehension | 04 marks |
| 3 | Assignment & Class notes | 06 marks |
| 4 | Attendance | 03 marks |
|  | **Total marks** | **25 marks** |

**b) Pattern for External Examinations - (75 marks)**

• There shall be external examination in every theory course and its shall consists of two parts (Part-A & Part-B). The total time duration for this semester end examination will be 3 hours.

• **Part-A** shall have 25 marks, which is compulsory. It will have 10 short questions out of which 5 questions are set with 3 marks each and another 5 questions are set with 2 marks each. There shall be atleast one question to each of the six units and the number of questions from any unit shall not exceed two.

• **Part-B** of the question paper shall have essay type questions for 50 marks and shall have 8 questions out of which any 5 are to be answered. At least one question must appear from each Unit. . Seventh question must have 2 to 3 bits taken from 1st, 2nd, and 3rd units and 8th question also with 2 to 3 bits taken from 4th, 5th and 6th units, such that not more than 2 questions shall be from any one unit. All the questions carry equal marks.

**8.4**  **Pattern of Evaluation for Lab subjects** - **(100 marks)**

8.4.1 For practical subjects there shall be a continuous evaluation during the semester for 25 sessional marks and 75 marks for semester end examination. Out of the 25 marks for Continuous Internal Evaluation, the distribution of marks is as follows

|  |  |  |
| --- | --- | --- |
| **S. No** | **Item** | **Marks** |
| 1. | Day to Day work | 05 marks |
| 2. | Final Record and viva | 06 marks |
| 3. | Average of two tests including viva | 05 marks |
| 4. | Lab Based Project Report viva and demo | 06 marks |
| 5. | Attendance | 03 marks |
| **Total** | | **25 marks** |

8.4.2 The semester end examination for 75 marks for the lab subjects shall be conducted by an external examiner and an internal examiner appointed by the Chief Superintendent of Examinations of the college. The marks are distributed as follows:

|  |  |  |
| --- | --- | --- |
| **S. No** | **Item** | **Marks** |
| 1. | Procedure to experiment and Tabulation | 15 marks |
| 2. | Conduct of experiment, observation, Calculation | 30 marks |
| 3. | Results including graphs, discussions and conclusion | 20 marks |
| 4. | Viva voce and Record | 10 marks |
| Total | | 75 marks |

**8.4.3 In case computer based examinations**

|  |  |  |
| --- | --- | --- |
| **S. No** | **Item** | **Marks** |
| 1. | Flow chart and algorithms | 15 marks |
| 2. | Program writing and execution | 30 marks |
| 3. | Result and conclusions | 20 marks |
| 4. | Viva voce and Record | 10 marks |
| Total | | 75 marks |

8.5 **For the subject having design and / or drawing, (such as Engineering Drawing and Machine Drawing), the distribution shall be 25 marks for internal evaluation (10 marks for day-to-day work including drawing, home assignment work, 10 marks for average of two internal tests and 2 marks for class notes 3 marks for attendance) and 75 marks for end semester examination.**

There shall be two internal tests in a Semester and the average of the two shall be considered for the award of marks for internal tests.

Third test facility can be availed as mentioned above (8.3.1 (i) (a) and (b)

**8.6. Technical Seminar (100 marks)**

There shall be a technical seminar evaluated for 100 marks from I year to IV year\*. The evaluation is purely internal and will be conducted as follows:

|  |  |  |
| --- | --- | --- |
| Sl.No | Description | Marks |
| 1 | Literature survey, topic and content | 10 |
| 2 | Presentation including PPT | 15 |
| 3 | Seminar Notes | 10 |
| 4 | Interaction | 05 |
| 5 | Report | 10 |
| 6 | Attendance in the seminar class | 10 |
| 7 | Punctuality in giving seminar as per Scheduled time and date | 10 |
| 8 | Mid Semester Viva (on the seminar topics completed up to the end of 9th week | 10 |
| 9 | End Semester Viva | 20 |
|  | Total | 100 Marks |

Student must secure 40% i.e. 40 marks to be successful

\* According to the syllabus approved by the Academic Council as per Board of studies recommendations

**8.7 Comprehensive Viva-voce (II-II, III-II and IV-II\*)**

There shall be comprehensive viva voce as stated above which will be evaluated for 100 marks. Out of 100 marks, 25 marks are internal and 75 marks are external.

|  |  |  |
| --- | --- | --- |
| S.No. | Description | marks |
| 1 | First mid-sessional viva at the end of 5 weeks (Internal) | 12.5 marks |
| 2 | Second mid-sessional viva at the end of 10 weeks (Internal) | 12.5 marks |
| 3 | Final viva during practical examinations (External) | 75 marks |
| 4 | Total | 100 Marks |

--

\* According to the syllabus approved by the Academic Council as per Board of Studies recommendations

**8.7.2** The evaluation of comprehensive viva-voce has to be carried out by two teachers independently and average be taken.

The sessional marks awarded by the Department are not final.

They are subject to scrutiny by a committee constituted by the college and scaling is done wherever necessary.

The recommendations of the Committee are final and binding.

8.8 The laboratory records and internal test papers shall be preserved in the respective departments as per the college norms and shall be produced to the Committee of the college or any external agency like AICTE, NAAC, JNTUH, NBA etc., as and when the same are called for.

**9.0 Grading procedure**

9.1 Marks will be awarded to indicate the performance of student in each theory subject, laboratory / practicals, seminar, UG mini project and UG major project.

Based on the percentage of marks obtained (Continuous Internal Evaluation plus Semester End Examination, both taken together) as specified in item 8 above, a corresponding letter grade shall be given.

**9.2** As a measure of the performance of student, a 10-point absolute grading system using the following letter grades (as per UGC / AICTE guidelines) and corresponding percentage of marks shall be followed:

|  |  |  |
| --- | --- | --- |
| **% of Marks Secured in a Subject / Course**  **(Class Intervals)** | **Letter Grade**  **(UGC Guidelines)** | **Grade Points (GP)** |
| Greater than or equal to 90% | O  (Outstanding) | 10 |
| 80% and less than 90% | A+  (Excellent) | 9 |
| 70% and less than 80% | A  (Very Good) | 8 |
| 60% and less than 70% | B+  (Good) | 7 |
| 50% and less than 60% | B  (Average) | 6 |
| 40% and less than 50% | C  (Pass) | 5 |
| Below 40% | F (FAIL) | 0 |
| Absent | Ab | 0 |

**9.3** A student obtaining ‘**F’** grade in any subject shall be deemed to have ‘**failed’** and is required to reappear as a ‘supplementary student’ in the semester end examination, as and when offered. In such cases, internal marks in those subjects will remain the same as those obtained earlier.

**9.4** A student who has not appeared for examination in any subject, ‘**Ab’** grade will be allocated in that subject, and student shall be considered ‘**failed’**. Student will be required to reappear as a ‘supplementary student’ in the semester end examination, as and when offered.

**9.5** A letter grade does not indicate any specific percentage of marks secured by the student, but it indicates only the range of percentage of marks.

**9.6** A student earns grade point (GP) in each subject / course, on the basis of the letter grade secured in that subject / course. The corresponding ‘credit points’ (CP) are computed by multiplying the grade point with credits for that particular subject/ course.

**Credit points (CP) = grade point (GP) x credits …. For a course**

**9.7** The student passes the subject / course only when **GP is not less than 5 (i.e. ‘C’ grade or above)**

**9.8** The semester grade point average (SGPA) is calculated by dividing the sum of credit points (CP) secured from all subjects / courses registered in a semester, by the total number of credits registered during that semester. SGPA is rounded off to two decimal places. SGPA is thus computed as

SGPA = { Ci Gi } / {  Ci } …. For each semester

**(i.e., upto and inclusive of S semesters, S 2),**

where ‘**N’** is the **total** number of subjects (as specifically required and listed under the course structure of the parent department) the student has ‘**registered’** i.e., from the 1st semester onwards upto and inclusive of the 8th semester, ‘j’ is the subject indicator index (takes into account the subjects from 1 to 8 semesters), CJ is the number of credits allotted to the Jth subjects and Gj represents the grade points (GP) corresponding to the letter grade awarded for that Jth subject.

After registration and completion of the first year first semester, SGPA of that semester itself may be taken as the CGPA, as there are no cumulative effects.

**Illustration of calculation of SGPA**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Course / Subject** | **Credits** | **Letter**  **Grade** | **Grade**  **Points** | **Credit**  **Points** |
| 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 |
|  | 21 |  |  | 152 |

SGPA = 152/21 = 7.24

**Illustration of calculation of CGPA:**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Course / Subject** | | **Credits** | **Letter Grade** | **Grade Points** | | **Credit points Points** |
| **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 |
| **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 |
| Total Credits | | = 42 |  |  | | Total Credit Points =327 |

CGPA = 327/42 = 7.79

**9.9** For merit ranking or comparison purposes or any other listing, **only** the ‘**rounded off’** values of the CGPAs will be used.

**9.10** For calculations listed in regulations 9.6 to 9.9, performance in failed subjects/ courses (securing **F** grade) will also be taken into account, and the credits of such subjects/courses will also be included in the multiplications and summations.

After passing the failed subject(s) newly secured letter grades will be taken into account for calculation of SGPA and CGPA.

However, mandatory courses will not be taken into consideration.

**10.0 Passing standards**

**10.1** A student shall be declared successful or ‘passed’ in a semester, if student secures a GP ≥ 5 (‘C’ grade or above) in every subject/course in that semester (i.e. when student gets an SGPA 5.00 at the end of that particular semester); and a student shall be declared successful or ‘passed’ in the entire under graduate programme, only when gets a CGPA 5.00 for the award of the degree as required.

**10.2** After the completion of each semester, a grade card or grade sheet (or transcript) shall be issued to all the registered students of that semester, indicating the letter grades and credits earned. It will show the details of the courses registered (course code, title, no. of credits, and grade earned etc.), credits earned, SGPA, and CGPA.

**11.0 Declaration of results**

**11.1** Computation of SGPA and CGPA are done using the procedure listed in 9.6 to 9.9.

**11.2** For final percentage of formula may be used.

**12.0 Award of degree** marks equivalent to the computed final CGPA, the following

**% of Marks = (final CGPA – 0.5) x 10**

**12.1** A student who registers for all the specified subjects/ courses as listed in the course structure and secures the total number of credits (with CGPA >5.0), within 8 academic years from the date of commencement of the first academic year, shall be declared to have ‘**qualified’** for the award of the B.Tech. degree in the chosen branch of Engineering as selected at the time of admission.

**12.2** A student who qualifies for the award of the degree as listed in item 12.1 shall be placed in the following classes.

**12.3** Students with final CGPA (at the end of the under graduate programme) 8.00 and above, and fulfilling the following conditions -

(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 8.00, at the end of each of semesters, starting from first year first 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, shall be placed in **‘FIRST CLASS WITH DISTINCTION’**, otherwise **FIRST CLASS** only.

**12.4** Students with final CGPA (at the end of the under graduate programme) ≥ 7 but ≤ 8.00, shall be placed in ‘**FIRST CLASS’**.

**12.5** Students with final CGPA (at the end of the under graduate programme) ≥ 6 but ≤ 7, shall be placed in ‘**SECOND CLASS’**.

**12.6** All other students who qualify for the award of the degree (as per item 12.1), with final CGPA (at the end of the under graduate programme) ≥ 5 but ≤ 6, shall be placed in ‘**pass class**’.

**12.7** A student with final CGPA (at the end of the under graduate programme) < 5.00 will not be eligible for the award of the degree.

**12.8** Students fulfilling the conditions listed under item 12.3 alone will be eligible for award of ‘**university rank**’ and ‘**gold medal**’.

**13.0 Withholding of results**

**13.1** If the student has not paid the fees to the university / college at any stage, or has dues pending due to any reason whatsoever, or if any case of indiscipline is pending, the result of the student may be withheld, and student will not be allowed to go into the next higher semester. The award or issue of the degree may also be withheld in such cases.

**14.0 Transitory regulations**

**14.1** A student who has discontinued for any reason, or has been detained for want of attendance or lack of required credits as specified, or who has failed after having undergone the degree programme, may be considered eligible for readmission to the same subjects / courses (or equivalent subjects/ courses, as the case may be), and same professional electives / open electives (or from set/category of electives or equivalents suggested, as the case may be) as and when they are offered (within the time-frame of 8 years from the date of commencement of student's first year first semester).

A student admitted in one academic regulation and he is getting readmission in some other academic regulations , the college has to offer substitute / additional subjects based on the comparison of two academic regulations. The details of substitute / additional subjects offered with the recommendations of board of studies of the concerned branch has to be given from time to time.

**15.0 Student transfers**

15.1There shall be no branch transfers after the completion of admission process.

15.2 The students seeking transfer to Sreenidhi Institute of Science and Technology ( SNIST) from various other Universities / institutions have to pass the failed subjects which are equivalent to the subjects of SNIST, and also pass the subjects of SNIST which the students have not studied at the earlier institution.

Further, though the students have passed some of the subjects at the earlier semesters of SNIST, the students have to study substitute subjects in SNIST and get sessional marks by attending 3rd mid test and paying requisite fee as per the rules.

15.3 The transferred students from other Universities/ institutions to SNIST who are on rolls to be provide one chance to write the CBI (internal marks) in the failed subjects and /or subjects not studied as per the clearance letter issued by the Institution.

15.4 The autonomous affiliated colleges have to provide one chance to write the internal examinations in the failed subjects and /or subjects not studied, to the students transferred from other universities / institutions to SNIST who are on rolls, as per the clearance (equivalence) letter issued by the University.

16.0 **Scope**

16.1 The academic regulations should be read as a whole, for the purpose of any interpretation.

16.2 In case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Academic Council is final and binding.

16.3 The Institution 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 date notified by the Institution.

**Academic Regulations for B.Tech.**

**(LATERAL ENTRY SCHEME)**

**w.e.f the AY 2019-20**

**1. Eligibility for award of B. Tech. Degree (LES)**

The Lateral Entry Scheme (LES) students after securing admission shall pursue a course of study for not less than three academic years and not more than six academic years failing which he will forfeit the seat.

**2.** The student shall register and secure for all the credits with CGPA ≥ 5 from II year to IV year B.Tech. programme (LES) as per the regulations for the award of B.Tech. degree. **Out of the total credits secured, the student can avail exemption up to 6 credits**, that is, one open elective subject and one professional elective subject or two professional elective subjects resulting in 160 credits for B.Tech programme performance evaluation**.**

**3.** The students, who fail to fulfil the requirement for the award of the degree in six academic years from the year of admission, shall forfeit their seat in B.Tech.

**4.** The attendance requirements of B. Tech. (Regular) shall be applicable to B.Tech. (LES).

**5. Promotion rules based on credits**

|  |  |  |
| --- | --- | --- |
| **S. No** | **Promotion** | **Conditions to be fulfilled** |
| 1 | Second year first semester to second year second semester | Regular course of study of second year first semester. |
| 2 | 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 29 credits  out of 48 credits i.e., 60% of credits up to second year second semester from all the relevant regular and supplementary examinations, whether the student takes those examinations or not. |
| 3 | Third year first semester to third year second semester | Regular course of study of third year first semester. |
| 4 | 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 58 credits out of 96 credits i.e., 60% of credits up to third year second semester from all the relevant regular and supplementary examinations, whether the student takes those examinations or not. |
| 5 | Fourth year first semester to fourth year second semester | Regular course of study of fourth year first semester. |

**6.** All the other regulations as applicable to B. Tech. 4-year degree course (Regular) will hold good for B. Tech. (Lateral Entry Scheme).

**MALPRACTICES RULES**

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

|  |  |  |
| --- | --- | --- |
|  | **Nature of Malpractice/Improper conduct** | **Punishment** |
|  | If the student: |  |
| 1. (a) | Possesses or keeps accessible in  examination hall, any paper, note book, programmable calculators, cell phones, pager, palm computers or any other form of material concerned with or related to the subject of the examination (theory or practical) in which student 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 UG major project 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 UG major project) 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 UG major project 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, 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. | 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 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 UG major project 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 UG major project 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 UG major project 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 UG major project 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 UG major project 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 punishment. award suitable

**Malpractices identified by squad or special invigilators**

1. Punishments to the students as per the above guidelines.

2. Punishment for institutions: (if the squad reports that the college is encouraging malpractices)

a. A show cause notice shall be issued to the college. b. Impose a suitable fine on the college.

c. Shifting the examination centre from the college to another college for a specific period of not less than one year.

\* \* \* \* \*

**SREENIDHI INSTITUTE OF SCIENCE AND TECHNOLOGY**

**DEPARTMENT OF CIVIL ENGINEERING**

**B.Tech Course Structure – Autonomous Regulation: 2018-19 (166 Credits)**

**[6 theory + 3 Lab structure & Professional Electives – 5 & Open Electives – 3]**

**I Year I Semester**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Sr. No** | **Subject Code** | **Subject** | **L** | **T** | **P/D** | **C** | **Max Marks** | |
| **CIE** | **SEE** |
| 1 | 7HC03 | Chemistry | 3 | 1 | 0 | 4 | 25 | 75 |
| 2 | 7FC01 | Problem solving using C | 3 | 0 | 0 | 3 | 25 | 75 |
| 3 | 7HC06 | Engineering Mathematics – I | 3 | 1 | 0 | 4 | 25 | 75 |
| 4 | 7BC01 | Workshop / Manufacturing practices | 1 | 0 | 0 | 1 | 25 | 75 |
| 5 | 7HC01 | English (reading, listening, and writing) | 1 | 0 | 0 | 1 | 25 | 75 |
| 6 | 7HC63 | Chemistry lab | 0 | 0 | 3 | 1.5 | 25 | 75 |
| 7 | 7FC71 | Problem solving using C lab | 0 | 0 | 3 | 1.5 | 25 | 75 |
| 8 | 7HC61 | English (reading, listening, and writing) lab | 0 | 0 | 2 | 1.0 | 25 | 75 |
| 9 | 7BC61 | Workshop / Manufacturing practices Lab | 0 | 0 | 3 | 1.5 | 25 | 75 |
| 10 | 7K261 | Technical Seminar – I | 0 | 0 | 2 | 1.0 | 25 | 75 |
|  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
|  |  | **Total :** | **11** | **2** | **13** | **19.5** | **250** | **750** |

**I Year II Semester**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Sr. No** | **Subject Code** | **Subject** | **L** | **T** | **P/D** | **C** | **Max Marks** | |
| **CIE** | **SEE** |
| 1 | 7HC04 | Applied Physics | 3 | 1 | 0 | 4 | 25 | 75 |
| 2 | 7K201 | Engineering Mechanics (civil engineering) | 3 | 1 | 0 | 4 | 25 | 75 |
| 3 | 7HC08 | Engineering Mathematics – II | 3 | 1 | 0 | 4 | 25 | 75 |
| 4 | 7BC02 | Engineering Graphics & Design | 1 | 0 | 4 | 3 | 25 | 75 |
| 5 | 7HC02 | English (Oral communication skills) | 1 | 0 | 0 | 1 | 25 | 75 |
| 6 | 7HC64 | Applied Physics lab | 0 | 0 | 3 | 1.5 | 25 | 75 |
| 7 | 7HC62 | English (Oral communication skills) Lab | 0 | 0 | 2 | 1 | 25 | 75 |
| 8 | 7K291 | Technical Seminar – II | 0 | 0 | 2 | 1 | 25 | 75 |
|  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
|  |  | **Total:** | **11** | **3** | **11** | **19.5** | **200** | **600** |

**II Year I Semester**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Sr. No** | **Subject Code** | **Subject** | **L** | **T** | **P/D** | **C** | **Max Marks** | |
| **CIE** | **SEE** |
| 1 | 7BC04 | Elements of Mechanical Engineering | 2 | 0 | 0 | 2 | 25 | 75 |
| 2 | 7HC12 | Engineering Mathematics- III | 3 | 1 | 0 | 3 | 25 | 75 |
| 3 | 7K301 | Introduction to Solid Mechanics | 3 | 1 | 0 | 3 | 25 | 75 |
| 4 | 7K302 | Surveying and Geomatics | 3 | 1 | 0 | 3 | 25 | 75 |
| 5 | 7K303 | Building Materials and Planning | 3 | 0 | 0 | 2 | 25 | 75 |
| 6 | 7ZC01 | Management Science & Financial Accounting | 2 | 0 | 0 | 2 | 25 | 75 |
| 7 | 7K371 | Mechanics of Solids LAB | 0 | 0 | 3 | 1.5 | 25 | 75 |
| 8 | 7K372 | Survey LAB | 0 | 0 | 3 | 1.5 | 25 | 75 |
| 9 | 7K373 | Computer Aided Drafting of Building LAB | 0 | 0 | 3 | 1.5 | 25 | 75 |
| 10 | 7K391 | Technical Seminar –III | 0 | 0 | 2 | 1 | 100 | - |
|  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
|  |  | **Total :** | **16** | **3** | **11** | **20.5** | **325** | **675** |

**II Year II Semester**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Sr. No** | **Subject Code** | **Subject** | **L** | **T** | **P/D** | **C** | **Max Marks** | |
| **CIE** | **SEE** |
| 1 | 7AC48 | Electrical & Electronics Engineering | 3 | 0 | 0 | 3 | 25 | 75 |
| 2 | 7K404 | Mechanics of Materials | 3 | 1 | 0 | 3 | 25 | 75 |
| 3 | 7K405 | Fluid Mechanics | 3 | 1 | 0 | 3 | 25 | 75 |
| 4 | 7K406 | Construction Engineering and Management | 3 | 1 | 0 | 3 | 25 | 75 |
| 5 | 7K407 | Hydrology and Water resources engineering | 3 | 0 | 0 | **2** | 25 | 75 |
| 6 | 7K408 | Engineering Geology | 3 | 0 | 0 | 2 | 25 | 75 |
| 7 | 7AC95 | Electrical & Electronics Engineering Lab | 0 | 0 | 2 | 1 | 25 | 75 |
| 8 | 7K471 | Fluid mechanics Lab | 0 | 0 | 4 | 2 | 25 | 75 |
| 9 | 7K472 | Engineering Geology Lab | 0 | 0 | 3 | 1.5 | 25 | 75 |
| 10 | 7K491 | Technical Seminar –IV | 0 | 0 | 2 | 1 | 100 | - |
| 11 | 7K488 | Comprehensive Viva voce –I | - | - | - | 1 | 50 | 50 |
|  |  |  |  |  |  |  |  |  |
|  |  | **Total** | **18** | **3** | **11** | **22.5** | **375** | **725** |

**III Year I Semester**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Sr. No** | **Subject Code** | **Subject** | **L** | **T** | **P/D** | **C** | **Max Marks** | |
| **CIE** | **SEE** |
| 1 |  | Structural Engineering | **3** | 1 | 0 | 3 | 25 | 75 |
| 2 |  | Reinforced Concrete Design | **3** | 1 | 0 | 3 | 25 | 75 |
| 3 |  | Hydraulic Engineering | **3** | 1 | 0 | 3 | 25 | 75 |
| 4 |  | Geotechnical Engineering | **3** | 1 | 0 | 3 | 25 | 75 |
| 5 |  | Environmental Engineering | **3** | 0 | 0 | 2 | 25 | 75 |
| 6 |  | Professional Elective – I | **3** | 1 | 0 | 3 | 25 | 75 |
| 7 |  | Hydraulics Engineering Lab | 0 | 0 | 3 | 1.5 | 25 | 75 |
| 8 |  | Geotechnical Engineering lab | 0 | 0 | 3 | 1.5 | 25 | 75 |
| 9 |  | Environmental Engineering Lab | 0 | 0 | 3 | 1.5 | 25 | 75 |
| 10 |  | Quantitative Aptitude | 1 | 1 | - | 1 | 25 | 75 |
| 11 |  | Technical Seminar –V |  |  |  | 1 | 100 | - |
| 12 |  | Summer Internship –I (Done after II\_II) |  |  |  | 1 | 100 | - |
|  |  |  |  |  |  |  |  |  |
|  |  |  | **19** | **6** | **9** | **24.5** | **450** | **750** |

**Professional Elective** – I**: List of Subjects (III-II)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Sr. No** | **Name of Stream** | **Subject Code** | **Subject Name** |
| 1 | Structural Engineering |  | Repairs and Rehabilitation of Structures |
| 2 | Water Resources and Environmental Engineering Stream |  | Pipe Line Engineering |
| 3 | Transportation Engineering Stream |  | Railway Engineering |
| 4 | Geotechnical Engineering Stream |  | Soil Mechanics - I |

**III Year II Semester**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Sr. No** | **Subject Code** | **Subject** | **L** | **T** | **P/D** | **C** | **Max Marks** | |
| **CIE** | **SEE** |
| 1 |  | Geographical Information Systems and Science | **3** | 0 | 0 | **2** | 25 | 75 |
| 2 |  | Transportation Engineering | **3** | 1 | 0 | **3** | 25 | 75 |
| 3 |  | Professional Elective –II | **3** | 0 | 0 | **3** | 25 | 75 |
| 4 |  | Professional Elective –III | **3** | 0 | 0 | **3** | 25 | 75 |
| 5 |  | Open Elective – I | **3** | 0 | 0 | **3** | 25 | 75 |
| 6 |  | Ecology, Indian Culture, and History | **3** | 0 | 0 | **2** | 25 | 75 |
| 7 |  | Transportation engineering Lab | 0 | 0 | 3 | 1.5 | 25 | 75 |
| 8 |  | Geographical Information Systems Lab | 0 | 0 | 3 | 1.5 | 25 | 75 |
| 9 |  | MATLAB Programming Lab | 0 | 0 | 3 | 1.5 | 25 | 75 |
| 10 |  | Soft Skills (English-3) | **2** | 0 | 0 | 1 | 25 | 75 |
| 11 |  | Logical Reasoning | **2** | 0 | **0** | **1** | 25 | 75 |
| 12 |  | Group Project | **0** | **0** | 4 | **2** | **25** | **75** |
| 13 |  | Comprehensive Viva voce –II | **-** | **-** | **-** | **1** | **50** | **50** |
|  |  |  | **22** | **1** | **13** | **25.5** | **350** | **950** |

**Professional Elective** – II**: List of Subjects (III-II)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Sr. No** | **Name of Stream** | **Subject Code** | **Subject Name** |
| 1 | Structural Engineering |  | Design of Steel Structures |
| 2 | Water Resources and Environmental Engineering Stream |  | Open Channel Flow |
| 3 | Transportation Engineering Stream |  | Airport Planning & Design |
| 4 | Geotechnical Engineering Stream |  | Soil Mechanics - II |

**Professional Elective** – III **: List of Subjects (IV-I)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Sr. No** | **Name of Stream** | **Subject Code** | **Subject Name** |
| 1 | Structural Engineering |  | Foundation Engineering |
| 2 | Water Resources and Environmental Engineering Stream |  | Surface Water Hydrology |
| 3 | Transportation Engineering Stream |  | Pavement Design |
| 4 | Geotechnical Engineering Stream |  | Geotechnical Design |

**Open Elective** – I**: List of Subjects (III-II)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Sr. No** | **Name of Stream** | **Subject Code** | **Subject Name** |
| 1 | Emerging Technologies |  | Metro systems and Engineering |
| 2 | Humanities stream |  | Civil Engineering – Societal and Global Impact |
| 3 | Interdisciplinary |  | Biology for Engineers |
|  |  |  |  |

**IV Year I Semester**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Sr. No** | **Subject Code** | **Subject** | **L** | **T** | **P/D** | **C** | **Max Marks** | |
| **CIE** | **SEE** |
| 1 |  | Concrete Technology | **3** | 1 | 0 | **3** | 25 | 75 |
| 2 |  | Design and Detailing of Hydraulics Structures | **3** | 1 | 0 | **3** | 25 | 75 |
| 3 |  | Indian Polity & Economy | **3** | 0 | 0 | **2** | 25 | 75 |
| 4 |  | Estimation, costing and valuation | **3** | 1 | 0 | **3** | 25 | 75 |
| 5 |  | Professional Elective – IV | **3** | 1 | 0 | **3** | 25 | 75 |
| 6 |  | Open Elective – II | **3** | 0 | 0 | **3** | 25 | 75 |
| 7 |  | Concrete Technology Lab | **0** | 0 | 3 | **1.5** | 25 | 75 |
| 8 |  | Computer applications in CE Lab | **0** | 0 | 3 | **1.5** | 25 | 75 |
| 9 |  | Project – I | **-** | 1 | 3 | **2** | 100 | - |
| 10 |  | Summer Internship – II (Done after III\_II) |  |  |  | **1** |  |  |
|  |  |  |  |  |  |  |  |  |
|  |  |  | **18** | **5** | **9** | **23** | **300** | **600** |

**Professional Elective** – IV**: List of Subjects (IV-I)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Sr. No** | **Name of Stream** | **Subject Code** | **Subject Name** |
| 1 | Structural Engineering |  | Prestressed Concrete |
| 2 | Water Resources and Environmental Engineering Stream |  | Ground water |
| 3 | Transportation Engineering Stream |  | Urban Transportation Planning |
| 4 | Geotechnical Engineering Stream |  | Off shore Engineering |

**Open Elective** – II**: List of Subjects (IV-I)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Sr. No** | **Name of Stream** | **Subject Code** | **Subject Name** |
| 1 | Emerging Technologies |  | High Speed Rail Engineering |
| 2 | Humanities stream |  | Professional practices, Law and Ethics |
| 3 | Interdisciplinary |  | Instrumentation & Sensor Technologies for Civil Engineering Applications |
|  |  |  |  |

**IV Year II Semester**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Sr. No** | **Subject Code** | **Subject** | **L** | **T** | **P/D** | **C** | **Max Marks** | |
| **CIE** | **SEE** |
| 1 |  | Project – II | **-** | - | 20 | **5** | 50 | 150 |
| 2 |  | Professional Elective – V | **3** | 1 | 0 | **3** | 25 | 75 |
| 3 |  | Open Elective – II | **3** | 0 | 0 | **3** | 25 | 75 |
| 4 |  |  |  |  |  |  |  |  |
|  |  | **Total** | **6** | **1** | **20** | **11** | **100** | **300** |

**Professional Elective** – V **: List of Subjects (IV-I)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Sr. No** | **Name of Stream** | **Subject Code** | **Subject Name** |
| 1 | Structural Engineering |  | Engineering Materials for Sustainability |
| 2 | Water Resources and Environmental Engineering Stream |  | Water Quality Engineering |
| 3 | Transportation Engineering Stream |  | Intelligent Transportation Systems |
| 4 | Geotechnical Engineering Stream |  | Environmental Geo technology |

**Open Elective** – III**: List of Subjects (IV-II)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Sr. No** | **Name of Stream** | **Subject Code** | **Subject Name** |
| 1 | Emerging Technologies |  | Off shore Engineering |
| 2 | Humanities stream |  | History of Science and Engineering |
| 3 | Interdisciplinary |  | Disaster Preparedness and Planning |
|  |  |  |  |

**L: Lecture T: Tutorial P/D: Practical / Drawing C: Credits**

**CIE: Continuous Internal Evaluation SEE: Semester End Examination**

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| **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| X |  |  |  |  | x | x |  |  |  |  |  |

**7HC03: CHEMISTRY**

|  |  |  |  |
| --- | --- | --- | --- |
| **L** | **T** | **P** | **C** |
| **3** | **1** | **0** | **4** |

**(Common to CSE, IT , ECM , CE & BT)**

**B. Tech I Year I Semester**

**Course Objectives**:

1. To understand microscopic chemistry in terms of atomic and molecular orbitals
2. To learn the preparation and applications of commercial and conducting polymers and lubricant materials
3. To learn the industrial problems caused by water and municipal water treatment
4. To acquire knowledge about different types of batteries and their working mechanism
5. To develop the concepts and types of corrosion and the factors influence corrosion and to understand the control methods and protective coatings for metals
6. To learn the chemical reactions of drugs that are used in the synthesis of drug molecules

|  |  |  |  |
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**UNIT - I**

**Atomic and molecular structure (6L)**

Molecular orbitals of diatomic molecules and plots of the multicentre orbitals. Equations for atomic and molecular orbitals. Energy level diagrams of diatomics. Pi-molecular orbitals of butadiene and benzene and aromaticity. Crystal field theory and the energy level diagrams for transition metal ions and their magnetic properties. Band structure of solids and the role of doping on band structures.

**UNIT - II**

**Engineering materials (8L)**

**Plastics** – Thermosetting and Thermoplastics, preparation, properties and engineering applications of plastics: PVC, Teflon, Bakelite. **Fibers:** Nylon 6,6 and Dacron.

**Rubbers** – natural and artificial rubber, vulcanization of natural rubber, Buna-S, Buna-N and their **engineering applications.**

**Lubricants**

Definition, classification and function of lubricants, Types of lubrication and mechanisms – Thick Film or Hydrodynamic Lubrication, Thin Film or Boundary Lubrication, Extreme Pressure Lubrication. Classification and properties of lubricants – Viscosity, flash and fire point, cloud and pour point and acid value. **Engineering applications.**

**UNIT - III**

**Water Technology (8L)**

1. **Introduction**:- Hardness of water – types of hardness (temporary and permanent), calculation of hardness- Numerical problems. Estimation of hardness of water by EDTA Method.
2. **Water for Industrial purpose**: Food, sugar, textile, paper and pharma industries, water for steam making characteristics of boiler feed water, boiler troubles- scale and sludge & Carry over (priming &foaming),boiler corrosion, caustic embrittlement.
3. **Water Treatment**: Internal conditioning- phosphate, carbonate & calgon conditioning. External Treatment: Ion-exchange process. Desalination-reverse osmosis. Municipal water treatment-sedimentation, coagulation, filtration, disinfection-chlorination, ozonization. **Engineering applications: Methodology and working of mineral water plant for drinking purpose.**

**UNIT - IV**

**Electrochemistry (8L)**

Conductance – conductors (metallic and electrolytic), types of conductance – specific, equivalent and molar conductance – effect of dilution on conductance.

Free energy and emf, cell potentials, electrode potential (oxidation and reduction). Types of electrodes - redox electrode (quinhydrode electrode), metal – metal insoluble salt electrode and Ion selective electrode. Cell notation and cell reaction –Nernst equation and applications. **Engineering Applications.**

**Batteries** : Types of batteries

1. Primary batteries – Lechalanche cell (dry cell), Lithium cell
2. Secondary batteries(Accumulators) – Lead acid battery, Lithium-ion battery
3. Fuel cells- H2 – O2 fuel cell and MeOH-O2 fuel cell-advantages and applications.

**Engineering applications – future water powered car, Hydrogen production and storage**.

**UNIT - V**

**Corrosion and its prevention (7L)**

Corrosion – basic concepts –types of corrosion, chemical, electrochemical corrosion (absorption of O2 and evolution of H2). Types of electrochemical corrosion – galvanic corrosion, pitting corrosion- factors affecting the rate of corrosion.

**Cathodic protection** – sacrificial anodic protection and impressed current cathodic protection method. Methods of metallic coatings-hot dipping (**tinning and galvanizing**), metal cladding (**Al cladding**), electroplating (**copper plating**) and electroless plating (**nickel plating**).

**UNIT-VI**

**Organic reactions and drug molecules (5L)**

Introduction : reactions involving substitution(SN1, SN2) addition to double bond(C=C), elimination(E1 and E2), oxidation (using KMnO4, CrO3), reduction (Hydrogenation by Ni/H2, Pd/C)

**Drugs :** Definition, classification structure and applications of commonly used drug molecules- paracetamol, aspirin, ibuprofen and diphenhydramine (Benadryl)

Principles of spectroscopy and selection rules: Electronic spectroscopy. Fluorescence and its applications in medicine. Vibrational and rotational spectroscopy of diatomic molecules-**Applications**.

**TEXT BOOKS:**

1. Engineering Chemistry: by Jain & Jain ,Dhanapathrai Publications (2015)
2. Engineering Chemistry: by Thirumala Chary & Laxminarayana, Scitech Publications (2016)
3. Engineering Chemistry: by & B.Rama Devi, Prsanta Rath & Ch. Venkata Ramana Reddy, Cengage Publications (2016)

**REFERENCE BOOKS:**

1. Fundamentals of Molecular Spectroscopy by C. N. Banwell
2. Drugs by David Krupadanam- Universities Press
3. University chemistry by B. H. Mahan
4. Chemistry: Principles and Applications, by M. J. Sienko and R. A. Plane
5. Organic Chemistry: Structure and Function by K. P. C. Volhardt and N. E. Schore, 5th Edition http://bcs.whfreeman.com/vollhardtschore5e/default.asp

**Course Outcomes**

After completion of the course, the student will be able to:

1. Understand and analyse microscopic chemistry in terms of atomic orbitals, molecular orbitals and intermolecular forces.
2. Identify and differentiate conductivity of polymers, thermoplastic, thermosetting plastics and various lubricants.
3. Recognize and select the domestic and industrial problems caused by hard water and also learn about the municipal water treatment using various methods.
4. Understand and interpret the important fundamental concepts of electrochemistry and solve the problems related to batteries.
5. Differentiate the types of corrosion and methods used to prevent the corrosion.
6. Learn and implement synthesis of drug molecules and learn fundamentals of analytical techniques like electronic, vibrational and rotational spectroscopy.

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| X |  |  |  |  | x | x |  |  |  |  |  |

**B. Tech I Year I semester**

**Problem Solving using C**

**(Common to All Branches)**

**Code: 7FC01 L T P C**

**3 0 0 3**

**Course Outcomes:**

**After completion of this course student will learn**

1. To formulate simple algorithms for arithmetic, logical problems and to translate the algorithms to programs(in C language)
2. To test and execute the programs and correct syntax and logical errors, to implement conditional branching, iteration and recursion
3. To decompose a problem into functions and synthesize a complete program using divide and conquer approach.
4. To use arrays, pointers and structures to formulate algorithms and programs.
5. To apply programming to solve matrix addition and multiplication problems and searching and sorting problems.
6. To apply programming to solve simple numerical method problems, namely rot finding of function, differentiation of function and simple integration.

**UNIT I**

**Introduction to Programming:** Introduction to components of a computer system (disks, memory, processor, where a program is stored and executed, operating system, compilers etc.)

**Idea of Algorithm:** steps to solve logical and numerical problems. Representation of Algorithm: Flowchart/Pseudocode with examples.

From algorithms to programs; source code, variables (with data types) variables and memory locations, Syntax and Logical Errors in compilation, object and executable code

**UNIT II**

**History of C language, Characteristics of C language, Structure of C Language, C Tokens**

Arithmetic expressions, Operator Precedence & **Associativity**

Conditional Branching and Loops

Writing and evaluation of conditionals and consequent branching and **Jumping Constructs**

**Pretest and Post test**, Iteration and loops (3 lectures)

**UNIT III**

**Function:** Functions (including using built in libraries), Parameter passing in functions, call by value, passing arrays to functions: idea of call by reference, **Storage Classes**

**Recursion:** Recursion, as a different way of solving problems. Example programs, such as Finding Factorial, Fibonacci series, Ackerman function etc.

**UNIT IV**

**Arrays:** Arrays (1-D, 2-D), Character arrays **Ragged Arrays and Dynamic Arrays**

Basic Algorithms Searching, Basic Sorting Algorithms (Bubble, Insertion and Selection), Finding roots of equations, notion of order of complexity through example programs (no formal definition required) Quick sort or Merge sort.

**UNIT V**

Pointers Idea of pointers, Defining pointers, Use of Pointers in self-referential structures, notation of linked list (no implementation) **Dynamic Memory allocation Functions**.

**Strings:** **String Handling Functions.**

**UNIT IV**

Structure: Structures, Defining structures and Array of Structures,

**Nested Structures enum, typedef**

File handling (only if time is available, otherwise should be done as part of the lab)

**File Handling Functions, File Modes, File Operations**

**Suggested Text Books**

1. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill
2. E. Balaguruswamy, Programming in ANSI C, Tata McGraw-Hill Suggested

**Reference Books**

1. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| x | x | x |  |  |  |  |  |  |  | x |  |

**I Year B.Tech, Semester-I Engineering Mathematics –I**

**(Calculus and Matrix Theory)**

**(Common to EEE, ECE, ME, CE)**

**L T P/D C**

**Code: 7**HC06 **3**  **1 0 4**

**Pre Requisites**: Mathematics Knowledge at Pre-University Level

***Course Objectives:*** *To make the students to understand and expected to learn*

1. *Mean value theorems and their applications to the given functions, series expansions of a function.*
2. *Special functions such as Beta & Gamma functions and their properties, evaluation of improper integrals and the applications of definite integrals.*
3. *To test the convergence of a series and expansion of a function in sine and cosine terms.*
4. *Basic concepts of multivariable differential calculus.*
5. *About the linear system and some analytical methods for solution.p*
6. *Concept of Eigen values and Eigen vectors their properties and applications.*

***Syllabus***

***UNIT*-I: *Calculus-1***

Rolle’s Theorem and Mean value theorems (Statements and Geometrical Interpretations if any); Taylor’s and Maclaurin’s theorems with remainders (without proof); Taylor’s and Maclaurin series expansion.

***UNIT-II: Calculus-2***

Evolutes and involutes; Beta and Gamma functions and their properties; Evaluation of improper integrals, Applications of definite integrals to evaluate surface areas and volumes of revolutions.

***UNIT-III: Sequences and series***

Convergence of sequence and series, tests for convergence of a series. Fourier series, half range sine and cosine series, Parseval’s theorem (without proof).

***UNIT-IV: Multivariable Calculus (Differentiation)***

Limit, continuity and partial derivatives, total derivative; Maxima, minima and saddle points; Method of Lagrange multipliers; Gradient, directional derivatives, Tangent plane; Concepts of divergence and curl with physical significance.

**(PTO)**

***UNIT-V: Matrices-1***

Inverse of a matrix by Gauss Jordan method, rank of a matrix; System of linear equations- Rank method/Gauss Elimination method. Symmetric, skew-symmetric and orthogonal matrices;

***UNIT-VI: Matrices-2***

Eigenvalues and Eigenvectors; Cayley - Hamilton Theorem, Hermitian, Skew-Hermitian and Unitary matrices, Diagonalization of matrices and Orthogonal transformation.

**Text Books:**

1. R K Jain and S R K Iyengar Advanced Engineering Mathematics, Narosa Publications.
2. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.
3. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.

**Reference Books:**

(i) N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications,

Reprint, 2008.

(ii) B.S. Grewal, Elementary Engineering Mathematics, Khanna Publishers

(iii) C Sankaraiah, A Text book of Engineering Mathematics – I, VGS Book Links

(iv) G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.

***Course Outcomes:*** *After the course completion the students will be able to*

1. *Verify the mean value theorems and also express the given function in series form using Taylor’s theorem.*
2. *Solve the problems using special functions; evaluate surface areas and volumes of revolutions.*
3. *Determine the convergence, divergence or oscillating nature of a series and express the function as trigonometric series.*
4. *Compute the extreme values of a function defined with and without constraints.*
5. *Check the consistency or inconsistency of a linear system and ability to solve real time problems.*
6. *Calculate the Eigen values and Eigen vectors of a matrix and their application for orthogonal transformation.*

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| x |  | x |  | x |  |  |  |  |  |  |  |

**WORKSHOP/MANUFACTURING PRACTICES (THEORY)**

|  |  |  |  |
| --- | --- | --- | --- |
| **L** | **T** | **P** | **C** |
| 1 | 0 | 0 | 1 |

**B.Tech I year I sem (CSE, ECE, IT & CE) II sem (EEE, ECE & ME)**

**Code: 7BC01**

**Course Objectives:**

Upon completion of this course, the students will gain knowledge of the different manufacturing processes which are commonly employed in the industry, to fabricate components using different materials.

**COURSE OUTCOMES:**

1. To understand various basic tools to perform simple joints using metal and wood.
2. To understand the principle of various electrical and electronic appliances and their applications.
3. To understand the manufacturing process of welding, casting and tin smithy and their applications.
4. To understand the operation of basic as well as advanced machines used for fabrication of Metals, Plastics and Glass.

**Theory:** In theory classes the following syllabus is to be covered in 10hrsusing PPTS and Videos (Elementary treatment only)

* 1. Fitting & Power Tools
  2. Electrical & Electronics Appliances
  3. Carpentry
  4. Plastic molding & Glass Cutting
  5. Metal Casting
  6. Metal Joining: Arc & gas welding and brazing
  7. Metal forming
  8. Machining
  9. Advanced manufacturing methods: (Micro machining, USM,ECM,EDM )
  10. CNC machining & Additive Manufacturing

**Suggested Text/Reference Books:**

1 Hajra Choudhury S.K., Hajra Choudhury A.K. and Nirjhar Roy S.K., “Elements of Workshop Technology”, Vol. I 2008 and Vol. II 2010, Media promoters and publishers private limited, Mumbai.

2.Rao P.N., “Manufacturing Technology”, Vol. I and Vol. II, Tata McGrawHill House, 2017.

**ENGLISH (Reading, Listening and Writing)**

**Course code: 7HC01**

**Branches: ECM, CSE, IT and Civil (I Year I Semester) L T P Credits**

**ECE, EEE and Mech (I Year Sem-II) 1 0 0 1**

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|  |  |  |  |  |  |  | X | X | X |  | X |

**Course Objectives:** The students

* acquire knowledge on various types of listening techniques, barriers and benefits of listening
* recognize the speech sounds and learn the intonation patterns
* learn various vocabulary patterns
* develop the ability to structure and punctuate the sentences
* learn different reading techniques
* learn different writing skills

**Unit-I : Listening & Phonology**

1.1 Importance of Listening;

1.2 Introduction to Speech Sounds

1.3 Vowels, Diphthongs, Consonant Sounds

**Unit-II: Stress & Intonation**

2.1 Significance of word accent

2.2 Intonation Patterns

**Unit-III: Vocabulary**

3.1 Word Roots - Affixes: Prefixes and Suffixes

3.2 Homophones, Homonyms, Homographs

3.3 Synonyms – Antonyms

3.4 One word substitutes

3.5 Idioms and Phrases

**Unit-IV: Basic Writing Skills**

4.1 Sentence Structure

4.2 Kinds of Sentences

4.3 Punctuation in Writing

**Unit-V : Reading Comprehension**

5.1 Skimming and Scanning

5.2 Prediction Techniques and Inferring

5.3 Note Making

**Unit-VI: Writing Skills**

6.1 Paragraph Writing

6.2 Letter Writing

**Course Outcomes:** At the end of the course the students will be able to

* understand and differentiate different types of listening techniques used to interact with real world problems
* differentiate the speech sounds and improve their accent and modulation while speaking
* understand and illustrate different word roots, word derivatives – synonyms, antonyms and word inflections
* discriminate a variety of sentence types, their structure and use punctuations
* get acclimatized to reading strategies and note making.
* develop proficiency in writing and preparing resume

**Suggested Readings:**

(i)*English grammar just for you*Rajeevan Karal, Oxford publications

(ii) *Practical English Usage.* Michael Swan. OUP. 1995.

(iii) *Remedial English Grammar.* F.T. Wood. Macmillan.2007

(iv) *On Writing Well.* William Zinsser. Harper Resource Book. 2001

(v) *Study Writing.* Liz Hamp-Lyons and Ben Heasly. Cambridge University Press. 2006.

(vi) *Communication Skills*. Sanjay Kumar and Pushp Lata. Oxford University Press. 2011.

(vii) *Learn to Write* by Dr. G. Varalakshmi, Kindle Edition 2016

(viii) *A practical course for developing writing skills in English* by J.K. Gangal, PHI Learning Pvt Ltd.

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
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| x |  |  |  |  | x |  |  |  |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **L** | **T** | **P** | **C** |
| **0** | **0** | **3** | **1.5** |

**7HC63: CHEMISTRY LABORATORY**

**B. Tech I Year I Semester**

**(Common to CSE, IT , ECM , CE & BT)**

**Course Objectives**:

The student will be able to learn:

1. Preparation of coordination complex NiDMG Complex
2. Determination of surface tension
3. Determination of viscosity
4. Saponification /acid value of an oil
5. Ion exchange column for removal of hardness of water / Estimation of Hardness of water by EDTA Method
6. Determination of chloride content of water
7. Determination of cell constant and conductance of solutions (HCl Vs NaOH / Mixture of acid Vs Strong base)
8. Potentiometry - determination of redox potential and emf (FeSO­4 Vs KMNO4 / HCl Vs NaOH)
9. Determination of the rate constant of acid catalyzed hydrolysis of methylacetete
10. Synthesis of a polymer- Thiakol rubber / Urea-Farmaldehyde resin
11. Synthesis of a drug- Aspirin
12. Thin layer chromatography

**List of Experiments**

1. Preparation of coordination complex NiDMG Complex
2. Determination of surface tension
3. Determination of viscosity
4. Saponification/acid value of an oil
5. Ion exchange column for removal of hardness of water / Estimation of Hardness of water by EDTA Method
6. Determination of chloride content of water
7. Determination of cell constant and conductance of solutions (HCl Vs NaOH / Mixture of acid Vs Strong base)
8. Potentiometry - determination of redox potential and emf (FeSO­4 Vs KMNO4 / HCl Vs NaOH)
9. Determination of the rate constant of acid catalyzed hydrolysis of methylacetete
10. Synthesis of a polymer- Thiakol rubber / Urea-Farmaldehyde resin
11. Synthesis of a drug- Aspirin
12. Thin layer chromatography

**Course Outcomes**

After completion of the course, the student will be able to learn:

1. Methods to prepare inorganic complexes.
2. The process to determine surface tension of different liquids using stagnometer
3. The process to determine viscosity of lubricants by using redwood viscometer.
4. How to find acid value of an oil.
5. The principle and determination of Hardness of a water sample.
6. The methods to estimate amount of chlorine in water.
7. To determine unknown concentration of acid by using conductometric method.
8. To determine unknown concentration of acid by using potentiometric method.
9. Estimate rate constants of reactions from concentration of reactants/products as a function of time.
10. Methods to prepare industrially important polymers.
11. The method of preparation for organic compounds.
12. To separate the organic compounds from their mixture by using Thin layer chromatography.

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**B. Tech I Year I semester**

**Problem Solving using C LAB**

**(Common to All Branches)**

**Code: 7FC71 L T P C**

**0 0 3 1.5**

**Course Outcomes:**

**After completion of this course student will learn**

1. To formulate the algorithms for simple problems
2. To translate given algorithms to a working and correct program
3. To be able to correct syntax errors as reported by the compilers
4. To be able to identify and correct logical errors encountered at run time
5. To be able to write iterative as well as recursive programs
6. To be able to represent data in arrays, strings and structures and manipulate them through a program
7. To be able to declare pointers of different types and use them in defining self referential structures.
8. To be able to create, read and write to and from simple text files.

**[The laboratory should be preceded or followed by a tutorial to explain the approach or algorithm to be implemented for the problem given.]**

1. **Unit I (Cycle 1)**
2. Write an algorithm for converting a given Celsius temperature to its equivalent Fahrenheit temperature and draw a flowchart.
3. Write an algorithm to find the largest of three given numbers and draw a flowchart.
4. Write an algorithm and draw a flowchart for finding the roots and nature of roots of a quadratic equation, given its coefficients.
5. Write an algorithm and flowchart for finding the first n Fibonacci numbers, give n.
6. **Unit II (Cycle 2)**
7. Write an algorithm, flowchart, and C program for:
8. Finding the area and circumference of a circle of given radius.
9. Finding the volume of a sphere of given radius.
10. Finding the lateral surface area of a right circular cone of given base radius and height.
11. Finding selling price of an item, given its cost price and profit percent.
12. Finding the interest on a given principal for a given period of time at a given rate of per year.
13. Write a C program to display all the sizes of data types in C.
14. Write a C program to display a given decimal integer into an equivalent octal number and hexadecimal number using %o and %x in printf function.
15. **Unit II (Cycle 3)**
    1. Write a C program to find the roots and nature of the roots of a quadratic equation, given its coefficients.
    2. Write a C program for finding the largest of three given numbers.
    3. A salesman gets a commission of 5% on the sales he makes if his sales is below Rs.5000/- and a commission of 8% on the sales that exceeds Rs.5000/- together with Rs.250/-. Write an algorithm or a flowchart and develop C program for computing the commission of the salesman, given his sales.
16. **Unit III (Cycle 4)**
17. Write three C programs to print a multiplication table for a given number using while, do-while, and for loops.
18. Write a C program to compute the sum of:
19. 1+x+x2+x3+………….+xn, given x and n.
20. 1! + 2! + 3! + . . . + n!, given n.
21. 1 – x2/2! + x4/4! – x6/6! + x8/8! – x10/10! + … to n terms where the nth term becomes less than 0.0001.
22. **Unit III (Cycle 5)**
    1. Write a C program in the menu driven style to perform the operations +, -, \*, /, % between two given integers.
    2. Write a C program to find the largest and the least of some numbers given by the user.
    3. Write a C program to find the sum of the digits of a positive integer.
23. **Unit III (Cycle 6)**
    1. Write C functions for the following:
       1. A function that takes an integer n as argument and returns 1 if it is a prime number and 0 otherwise.
       2. A function that takes a real number x and a positive integer n as arguments and returns xn.
       3. A function that takes a positive integer n as an argument and returns the nth Fibonacci number.
    2. Using recursion write C functions for the following:
       1. Factorial of a non-negative integer n.
       2. Number of combinations of n things taken r at a time.
       3. Greatest Common Divisor of two integers.
       4. Least Common Multiple of two integers.
24. **Unit III (Cycle 7)**
    * 1. Write a menu driven style program to compute the above functions (cycle 6) on the choice of the function given by the user.
      2. Define macros for the following and use them to find sum of the squares of the minimum and maximum of two given numbers.
         1. Larger of two numbers.
         2. Smaller of two numbers.
         3. Sum of the squares of two numbers.
      3. Write a program to generate Pascal’s triangle.
      4. Write a program to count the number of letters, words, and lines in a given text.
25. **Unit IV (Cycle 8)**
    1. Write a program to store the numbers given by the user in an array, and then to find the mean, deviations of the given values from the mean, and variance.
    2. Write a C program to initially store user given numbers in an array, display them and then to insert a given number at a given location and to delete a number at a given location.
    3. Write a program to store user given numbers in an array and find the locations of minimum and maximum values in the array and swap them and display the resulting array.
26. **Unit IV (Cycle 9)**
    1. Write a C program to implement the operations of matrices – addition, subtraction, multiplication.
    2. Write a program to find whether a given matrix is symmetric, lower triangular, upper triangular, diagonal, scalar, or unit matrix.
27. **Unit V (Cycle 10)**
    1. Write a function to swap two numbers.
    2. Write a function to compute area and circumference of a circle, having area and circumference as pointer arguments and radius as an ordinary argument.
28. **Unit VI (Cycle 11)**
29. Define a structure for complex number. Write functions on complex numbers (addition, subtraction, absolute value, multiplication, division, complex conjugate) and implement them in a menu driven style.
30. Define a structure point. Write a program to find the distance between two points.
31. Define a structure student having members roll no., name, class, section, marks. Create an array of 10 students give the data and find the average marks, section-wise.
32. **Unit VI (Cycle 12)**
    1. Write a program to:
       1. Create a file by the name given by the user or by command line argument and add the text given by the user to that file.
       2. Open the file created above and display the contents of the file.
       3. Copy a file into some other file, file names given by the user or by command line arguments.
       4. Append a user mentioned file to another file.
       5. Reverse the first n characters of a file.

**ENGLISH (Reading, Listening and Writing) Lab**

**Course code: 7HC61**

**Branches: ECM, CSE, IT and Civil (I Yr Sem-I) L T P Credits**

**ECE, EEE and Mech (I Yr Sem-II) 0 0 2 1**

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**Course Objectives:** The students

* acquire knowledge on various types of listening techniques, barriers and benefits of listening
* recognize the speech sounds and learn the intonation patterns
* learn various vocabulary patterns
* develop the ability to structure and punctuate the sentences
* learn different reading techniques
* learn different writing skills

**Unit-I :** Practice sessions on

Listening to Sounds of English, Vowels, Diphthongs, Consonant

Listening to differentiate minimal pairs, pronunciation patterns

**Unit-II:** Practice sessions on

word and sentence stress ,stress shift, strong and weak verbs

Intonation Patterns

**Unit-III:** Exercises on Word Roots

Affixes : Prefixes and Suffixes

Identifying Homophones,

Homonyms, Homographs

Synonyms - Antonyms

One word substitutes

Idioms and Phrases

**Unit-IV:** Exercises on

Punctuation and Spelling

Error Identification in Sentences

Conversion of Sentences

**Unit-V :** Practice sessions on

Using passages for skimming and scanning

Note Making using Texts

Reading Comprehension using different techniques

**Unit-VI:** Exercises on

Paragraph Writing using hints/guided Paragraphs

Writing Letters

**Course Outcomes:** At the end of the course the students will be able to

* understand and differentiate different types of listening techniques used to interact with real world problems
* differentiate the speech sounds and improve their accent and modulation while speaking
* understand and illustrate different word roots, word derivatives – synonyms, antonyms and word inflections
* discriminate a variety of sentence types, their structure and use punctuations
* get acclimatized to reading strategies and note making.
* develop proficiency in writing and preparing resume

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**WORKSHOP/MANUFACTURING PRACTICES (LAB)**

**Code: 7BC61**

Course Objectives:

1. To identify various basic tools to perform simple joints using metal and wood.
2. To recognize various electrical and electronic and their applications.
3. To understand the manufacturing process of welding , casting and tinsmithy and apply the processes in making simple products.
4. To understand and operate basic machines for fabrication of Metals, Plastics and Glass.
5. To understand the functions and parts of commonly used domestic appliances.

**COURSE OUTCOMES:**

1. After completion of the course , the student will be able tofabricate components with their own hands.
2. Assemble different components and produce small devices of their interest.

**Work shop and Manufacturing Practices**: Minimum of 10 experiments out of twelve given here under are to be completed

**LIST OF EXPERIMENTS**

|  |  |  |
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| **S.No** | **Trades** | **List of Experiments** |
| 1 | Fitting Shop | **1**. Preparation of T-Shape Work piece  **2.** Preparation of U-Shape Work piece which contains: Filing, Sawing, Drilling, Grinding. |
| 2 | Carpentry | 3.Practice of Cross Half lap joint  4. Practice of Half lap Dovetail joint |
| 3 | Electrical & Electronics | 5. One lamp one switch Practice  6. Stair case wiring: Practice |
| 4 | Welding shop  ( Arc & Gas) | Demonstration of Gas and Resistance welding  7. Practice of Lap and Butt joint using Arc welding |
| 5 | Casting | 8.Preparation of mould by using split pattern  9. Mould preparation and pouring of molten metal. |
| 6 | Tin Smithy | 10. Preparation of Rectangular Tray & Square box |
| 7 | Machine Shop | 11. Demonstration of turning , Drilling and Reaming operations |
| 8 | Plastic molding & Glass Cutting | 12 a) Demonstration of Injection Moulding  b) Demonstration of Glass Cutting with hand tools |
| 9 | Domestic Appliances | 13.Demonstration of Fans, Mixers, Air blower, Iron box, Rice cooker, Emergency light etc |
| 10 | Lab project | 14. Making various components and / or assembling the components which can be useful in domestic / engineering applications |

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**Syllabus for B. Tech I Year I Semester**

**Civil Engineering**

**TECHNICAL SEMINAR –I**

**Code: 7K261 L T P C**

**- - 2 1**

**Course Objective :**

1. Develop ability to be a public speaker with the aid of Power Point Presentations.
2. Learn delivering technical seminars demonstrating clarity in thinking and enunciating complex technical concepts.
3. Practice and develop communication skills and interview performance skills.

**Course Outcomes:**

1. Demonstrate public speaking with the aid of Power Point Presentations
2. Identify current general and specific technological topics of interest and prepare and present the content cogently.
3. Demonstrate communication skills and interview performance skills

**Procedure**

1. Seminar in-charges shall highlight the significance of technical seminar in the first two sessions and enlighten the students on the utility of these seminars.
2. The slots, titles shall be decided upfront and seminar in charge shall take signatures.
3. The same sheet shall be affixed in the respective classrooms and seminar register.
4. Progress of the seminars is reviewed by the concerned HOD once in 15 days.
5. The evaluation for technical seminars is informed to students and displayed in the classrooms.
6. The presentation (PPT) must contain topic, introduction, explanation, diagrams, tables, applications and conclusions.

**Distribution of marks**

There shall be a Technical Paper writing and seminar evaluated for 100 marks in First Year Second Semester. The evaluation is purely internal and will be conducted as follows:

Content : 20 marks

Presentation including PPT : 20 marks

Seminar Notes : 10 marks

Interaction : 10 marks

Report : 25 marks

Attendance : 10 marks

Punctuality : 5 marks

**Total 100 marks**

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**B.TECH. I YEAR I SEM (Mechanical) & II SEM (Civil)**

**L T P C**

**Code: 7HC04 APPLIED PHYSICS 3 1 0 4**

**Course Objectives**

* To understand basic fundamentals of crystallography, crystal structures, their properties
* To understand the various defects of a crystal and X-ray diffraction techniques to analyze a crystal structure.
* To make the students to widen the conceptual understanding of the fundamental principles of interference and diffraction (wave optics)
* To understand the basic concepts of normal light, Laser and its applications and to know about the fundamentals of radioactivity and its applications.
* To know the various types of vibrations like periodic, vibrating strings, ultrasonics, magnetostriction, piezo-electricity, NDT.
* To discuss about the nano-technology, preparation techniques and characterization (XRD, SEM & TEM), CNTs

**Unit:1**

**Crystallography and Crystal structures and their relative properties**

Space Lattice, Unit Cell, Lattice Parameters, Crystal Systems, Bravais Lattices, Atomic Radius, Co-ordination Number and Packing Factor of SC, BCC, FCC

and HCP Structures. Crystal Planes, directions and Miller Indices, Inter Planar Spacing of Orthogonal Crystal Systems.

**Unit:2**

**Crystal Defects and X-ray diffraction**

Point Defects - Vacancies, Substitutional, Interstitial, Frenkel and Schottky Defects-Calculation of concentrations, Qualitative treatment of line (Edge and Screw Dislocations) Defects, Burger’s Vector.

X-ray Diffraction: Bragg’s Law, Laue method and Powder Method.

**Unit:3**

**Wave optics and applications**

**Interference**: Introduction, Superposition of waves, Young’s double slit experiment, Intensity calculation, fringe width, Interference in thin films due to reflection of light, Newton’s rings. Applications: Calculation of Refractive Index of liquid, Thickness of glass plate.

**Diffraction:** Introduction, Plane diffraction grating (Qualitative), Theory of plane transmission grating, Resolving power of a grating - Application; calculation of wavelength of spectral light by using grating.

**Unit:4**

**Lasers**

Characteristics of LASER, Spontaneous and Stimulated Emission of Radiation, Meta-stable State, pumping, Population Inversion, Lasing Action, Einstein’s Coefficients and Relation between them and significance, Ruby Laser, Helium-Neon Laser, Semiconductor Diode Laser, Applications of Lasers in medicine and engineering.

**Nuclear Energy:** Radioactivity, Nuclear binding energy, Nuclear fission, Nuclear fusion, , β, γ rays decay, Geiger-Muller counter and practical applications of nuclear physics.

**Unit:5**

**Vibrations and ultrasonics**

Undamped vibrations and its solutions (quantitative), Damped, Forced vibrations (qualitative) and Resonance. Applications: Physical Pendulum, Torsional Pendulum and Compound Pendulum, Vibrating strings. Production and properties of ultrasonics by magnetostriction effect and piezoelectric effect. Applications of ultrasonics, special reference to NDT.

**Unit:6**

**Nanotechnology**

Origin of Nanotechnology, Nano Scale, Surface to Volume Ratio, Quantum Confinement, Bottom-up Fabrication, Sol-gel, Precipitation, Chemical vapor Deposition(CVD); Top-down Fabrication; Thermal evaporation, Ball Milling, Characterization of Nano materials (XRD&TEM), carbon nano tubes(CNTs), Applications of Nano Materials.

**Text Books:**

1.B.K. Pandey & S. Chaturvedi Engineering Physics, Cengage Learning

2.D.K. Bhattacharya and Poonam Tandon, OXFORD university press.

**Reference Books:**

1. Charles Kittel, Introduction to Solid State Physics, John Wiley Publisher

2. Dekker, Solid State Physics

3. Halliday and Resnick, Physics

4. Engineering Mechanics, 2nd ed. – MK Harbola

5. Theory of Vibrations with Applications – WT Thomson

6. S.O. Pillai, Solid State Physics

7. P K Palanisamy, Engineering Physics, Sitech Publications

8. A. Ghatak – Optics

9. Physical Metallurgy principles 4th edition-Reza Abbaschian Lara Abbaschian

Robert E. Reed-Hill

**Course Outcomes**

After completing the course, students will be able to

* Get the knowledge to classify the crystal structures, their parameters and draw the various crystal planes using Miller indices.
* Understand and analyze the defect type, describe the crystal structure using the various X-ray diffraction techniques.
* Analyze the wave nature and its types, superposition principle, differentiation between interference, diffraction and their applications
* Explain about emission, its types, laser principle, types, working and its applications and also to understand the radioactivity, fusion & fission, alpha, beta and gamma rays decay and its applications.
* Understand about the vibrations, periodic motion and apply the knowledge of ultrasonic, non destruction testing, magnetostriction, piezo-electricity.
* Summarize nano & bulk concepts, surface to volume ratio, quantum confinement, CNTs and preparation methods (physical & chemical), analysis the techniques like XRD, SEM, TEM

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**Syllabus for B. Tech I Year II Semester**

**Civil Engineering**

**Engineering Mechanics (For Civil Engineering)**

**Code: 7K201 L T P C**

**3 1 0 4**

**Course Objective :**

1. To make the students understand the concepts of Force system, Resultant of Force systems, Components of Force, Moments, and Couples in plane and in space and Free body diagrams
2. To introduce the students the concepts of friction, including types of friction, and analysis of simple trusses and frames and give them a foundation on these topics.
3. To make the students understand the concepts of Centroid and Area and Mass Moments of Inertia and make them learn how to calculate the centroid of various geometrical shapes and Area and Mass Moments of Inertia of different shapes and objects.
4. To make the students learn the principles of virtual work and energy method in analyzing and solving equilibrium problems involving rigid bodies acted upon by various forces
5. To make the students learn particle kinematics and kinetics concepts involving rectilinear and curvilinear motions in different coordinate systems
6. To make the students learn rigid body dynamics involving plane motion including rotation and application of work energy principle in plane motion of connected bodies.

**Course Outcomes:**

After completing the course, students will be able:

1. to analyze a system of forces in plane or in space, sketch free body diagrams and use equations of equilibrium to solve problems dealing with coplanar or spatial forces.
2. to analyze and solve problems involving basic frictional forces.
3. to analyze and solve simple trusses and frames using method of sections and method of joints
4. to determine the centroid, area and mass Moments of Inertia for various geometrical shapes and objects
5. to able use principle of virtual work and energy equation in solving problems involving rigid bodies acted by various forces including friction forces.
6. to apply the equations of rectilinear and curvilinear motions to predict the geometry of motion for a given system of forces
7. to apply the equations of plane motion and rotation involving rigid bodies to problems involving applied forces and ensuing motion of the bodies.

**UNIT-I**

**Introduction to Engineering Mechanics:** Force Systems, Basic concepts and axioms, Rigid Body equilibrium, System of Forces, Coplanar Concurrent Forces, Lami’s theorem, Components in Space – Resultant of Force System; Moment of Forces and its Application; Varignon’s principle; Couples; Equilibrium of System of Forces, Free body diagrams, Equations of Equilibrium of Coplanar Systems and Spatial Systems; Static Indeterminacy.

**UNIT-II**

**Friction:** Types of friction, Limiting friction, Laws of Friction, Static and Dynamic Friction; Motion of Bodies, wedge friction, Belt Friction, screw jack & differential screw jack.

**Basic Structural Analysis:** Equilibrium in three dimensions; Method of Sections; Method of Joints; Simple Trusses; Frames.

**UNIT-III**

**Centroid and Centre of Gravity:**Centroid of simple figures from first principle, centroid of composite sections; Centre of Gravity and its implications;

**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, Hook.

**UNIT-IV**

**Virtual Work and Energy Method:** Virtual displacements, principle of virtual work for particle and ideal system of rigid bodies, degrees of freedom. Active force diagram, systems with friction, mechanical efficiency. Conservative forces and potential energy (elastic and gravitational), energy equation for equilibrium. Applications of energy method for equilibrium. Stability of equilibrium.

**UNIT-V**

**Particle Dynamics:** Rectilinear motion; Plane curvilinear motion (rectangular, path, and polar coordinates). 3-D curvilinear motion; Relative and constrained motion; Newton’s Second law (rectangular, path, and polar coordinates). Work-kinetic energy, power, potential energy. Impulse-momentum (linear, angular); Impact (Direct and oblique).

**UNIT-VI**

**Introduction to Dynamics of Rigid Bodies:**Basic terms, general principles in dynamics; Types of motion, Instantaneous centre of rotation in plane motion and simple problems; D’Alembert’s principle and its applications in plane motion and connected bodies; Work energy principle and its application in plane motion of connected bodies; Kinetics of rigid body rotation;

**TEXT BOOK**

1. K. Vijay Kumar Reddy and J. Suresh Kumar, Singer’s Engineering Mechanics, BS Publications, Hyderabad, 2011

**REFERENCES**

1. Engineering Mechanics by S.P. Timoshenko, D.H.Young & J.V.Rao, Tata McGraw Hill Publishers,4th Edition,2010
2. Engineering Mechanics by S.S. Bhavikatti, Newage International Publishers,2012
3. Engineering Mechanics (Statics) by J.L.Meriam & L.G.Kraige, Wiley Publishers, 6th Edition,2006
4. Engineering Mechanics by A.K.Tayal, Umesh Publications,13th Edition,2010
5. Engineering Mechanics by R.K. Rajput, laxmi Publications,1998

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**I Year B.Tech, Semester-II Engineering Mathematics – II**

**(Advanced Calculus and Complex Analysis)**

**(Common to EEE, ECE, ME & CE)**

**L T P/D C**

**Code: 7HC08 3**  1 **0 4**

**Pre Requisites**: Engineering Mathematics-II

***Course Objectives:*** *To make the students to understand and expected to learn*

1. *Multiple integration and its applications also acquire knowledge on curvilinear coordinate system.*
2. *Various analytical methods to solve first order first degree and also the equations not of first degree ordinary differential equations.*
3. *Methods to solve higher order ordinary differential equations.*
4. *Series solution of second order ordinary differential equations with variable coefficients.*
5. *Basic concepts of Complex Analysis and conformal mapping and their properties.*
6. *Series expansion of a function using Taylor’s and Laurent’s series. Evaluation of definite integrals and improper integrals.*

***Syllabus***

***UNIT - I: Multivariable Calculus (Integration (12 L)***

Multiple Integration: Double integrals (Cartesian), change of order of integration in double integrals, Change of variables (Cartesian to polar), Triple integrals (Cartesian), Applications: areas and volumes. Line integrals, Surface integrals, Volume Integrals, Green, Gauss divergence and Stokes theorems (without proofs).

***UNIT - II: First order ordinary differential equations: (10 L)***

Exact, equations reduced to exact; linear and Bernoulli’s equations; Orthogonal Trajectories, Newton’s Law of Cooling, Law of natural Growth/Decay.

***UNIT - III: Ordinary differential equations of higher order: (10 L)***

Higher order linear differential equations with constant coefficients-Standard types of finding P.I, method of variation of parameters, Cauchy-Euler equation.

**(PTO)**

***UNIT - IV: Series Solutions to Second Order Ordinary Differential Equations: (8 L )***

Legendre polynomials, Bessel functions of the first kind and their properties, Recurrence relations (without proof), generating function (without proof), related problems.

***UNIT - V: Complex Variable – Differentiation: (8 L)***

Differentiation, analytic functions, Cauchy-Riemann equations, harmonic functions, finding harmonic conjugate. Conformal mapping:Translation, Inversion, Rotation and Magnification, Invariance of circles and cross ratio-Determination of bilinear transformation – mapping three given points.

***UNIT - VI: Complex Variable – Integration: (12 L)***

Cauchy - Integral theorem (without proof), Cauchy Integral formula (without proof), singularities, zeros of analytic functions, Taylor’s series, Laurent’s series; Residues, Cauchy Residue theorem (without proof), Evaluation of definite integral involving sine and cosine.

**Text Books:**

1. R K Jain and S R K Iyengar Advanced Engineering Mathematics, Narosa Publications.
2. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition, 2000.
3. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.

**Reference Books:**

(i) N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.

(ii) Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.

(iii) Engineering Mathematics, Srimanta Pal, OXFORD university press.

(iv) G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.

***Course Outcomes:*** *After the course completion the students will be able to*

1. *Solve the problems of multiple integration and apply these concepts for finding the parameters like surface area, volume, center of mass and centre of gravity.*
2. *Find the solutions of first order first degree and not of first degree differential equations and their applications such as Newton’s law of cooling, Natural growth and decay.*
3. *Identify and solve higher order ordinary differential equations with constant coefficients using some standard methods and also their applications in LCR circuits.*
4. *Write the solutions of Legendre and Bessel’s equations s series.*
5. *Understand the concept of analyticity of a function; solve the problems on conformal mapping.*
6. *Express the functions of a complex variable in series form also able to evaluate definite and improper integrals using complex integration*.

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**ENGINEERING GRAPHICS & DESIGN**

**B.Tech I year I sem (EEE, ECE & ME) II sem (CSE, ECE, IT & CE)**

**Code : 7BC02**

**L T P/D C**

**1**  0 **4 3**

**Course objectives:**

1: To teach students the basic principles of Engineering graphics and instruments used

2: To introduce the concept of projections in drawing and its applications for simple drawing entities

3: To impart the knowledge of various types of solids and their projections in different position wrt principle planes

4: To teach the concept of sections of solids and their applications

5: To develop a clear understanding of the basic principles involved in three dimensional Engineering drawings.

6: To train the students for the extraction of multiple views from a solid model using AutoCAD

**Course outcomes**

After completing this course, the student will able to:

1. Get familiar to use the instruments to solve the engineering problem and draw various type of curves used in engineering
2. Understand and Implement Orthographic projections and draw projections of simple drawing entities such as points Lines, and Planes
3. Draw projections of different types of regular solids in various positions wrt principal planes of projection
4. Draw Sections of various Solids including Cylinders, cones, prisms and pyramids and draw the developments of these solids and their sections.
5. Construct Isometric Scale, Isometric Projections and Views and convert 3D views to 2D orthographic views
6. Understand from basic sketching through 2D and 3-D solid modeling using computer aided design (CAD) software

**UNIT – I**

**Introduction to Engineering Drawing:** Drawing Instruments and their uses, types of lines, Types and uses of pencils, Lettering, Rules of dimensioning.

**Curves used in Engineering Practice and their Constructions**:

Conic Sections including Rectangular Hyperbola - General method, Cycloid, Epicyloid, and Involutes of circles.

**UNIT – II**

**Orthographic Projection:** Principles of Orthographic Projections – Conventions – First angle and third angle projections (however all drawing exercises must be in first angle only) - Projection of Points, Lines - Inclined to both planes, Projections of regular Plane, inclined planes - Auxiliary views.

**UNIT –III**

**Projections of Regular Solids:** Projections of Regular Solids: Prisms, Cylinders, Pyramids, Cones – Axis inclined to both planes, Auxiliary views.

**UNIT –IV**

**Sections and sectional views of Solids:** Sections and Sectional views of Right Regular Solids – Prism, Cylinder, Pyramid, Cone – Auxiliary views.

**Development of Surfaces:** Development of Surfaces of Right Regular Solids – Prisms, Cylinders, Pyramids, Cones and their sections.

**UNIT – V**

**Isometric Projections/views:** Principles of Isometric Projection – Isometric Scale – Isometric Views – Conventions – Isometric Views of Lines, Plane, Simple Solids. Conversion of isometric views to orthographic views.

**UNIT –VI**

**Overview of Computer Graphics :** Demonstrating features of the CAD software - The Menu System, Toolbars, , Dialog boxes and windows, Drawing entities - lines, circles, arcs etc and editing commands, Dimensioning of objects,2D drawings-simple exercises , 3D wire-frame and shaded solids- Commands, Boolean operations.

**Text/Reference Books:**

(i) Bhatt N.D., Panchal V.M. & Ingle P.R., (2014), Engineering Drawing, Charotar Publishing House

(ii) Shah, M.B. & Rana B.C. (2008), Engineering Drawing and Computer Graphics, Pearson Education

(iii) Agrawal B. & Agrawal C. M. (2012), Engineering Graphics, TMH Publication

(iv) Narayana, K.L. & P Kannaiah (2008), Text book on Engineering Drawing, Scitech Publishers

(v) AUTOCAD Software Theory and User Manuals

**ENGLISH (Oral Communication Skills)**

**Course code: 7HC02**

**Branches: ECE, EEE and Mech (Sem-I) L T P Credits**

**ECM, CSE, IT and Civil (Sem-II) 1 0 0 1**

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Course Objectives: The course will develop the students’ ability to

* integrate listening and speaking skills
* communicate effectively
* speak effectively on a given topic
* master the art of presentation
* interact with peers in a group discussion

**Unit-I : Listening Skills**

1.1 Importance of Listening;

1.2Types of listening

1.3 Barriers to Listening

1.4 Benefits of Listening

**Unit-II: Oral Communication Skills -I**

2.1 Types of Sentences – Assertive, Interrogative, Imperative and Exclamatory

2.2 Difference between Pauses, Gaps

2.3 Question Tags

**Unit-III: Inter personal Communication**

3.1. Self introduction , introducing others and Greetings

3.2 Asking and Giving Directions

3.3 Role Plays & Situational Dialogues

**Unit-IV: Oral Communication Skills -II**

4.1 Speaking on a particular topic - JAM

4.2 Use of cohesive devices in speaking

4.3 Common Errors in Spoken English

**Unit-V: Presentation skills**

5.1 Presentation Skills

5.2 Information Transfer

**Unit-VI: Group Discussion**

6.1 Importance of Group Discussion

6.2 Do’s and Don’ts of Group Discussion

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

* understand, analyze and respond to the audience by listening effectively
* acquire the articulation of different types of sentences by practicing pause patterns and question tags.
* translate and demonstrate self, participate effectively in activities like JAM, extempore
* express and deliver a presentation on the given topic through role plays and situational dialogues
* implement English language to meet the standards of corporate and real world in a group.

**Suggested Readings:**

1. *Step by step learning language and life skills* by Niruparani, Jayasree Mohanraj, Indira, Sailakshmi Pearson Publishers
2. *Communication skills for technical students* by TM Farhathullah, Orient Black swan Publications
3. *English for technical Communication* by K.R. Lakshmi Narayan , Scitech Publications
4. *Practical English Usage.* Michael Swan. OUP. 1995.
5. *Communication Skills*. Sanjay Kumar and Pushp Lata. Oxford University Press. 2011.

*Exercises in Spoken English.* Parts. I-III. CIEFL, Hyderabad. Oxford University Press

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**B.TECH. I YEAR I SEM (Mechanical) & II SEM (Civil)**

**L T P C**

**Code: 7HC64 APPLIED PHYSICS LAB - - 3 1.5**

**Course Objectives**

* To explain about magnetic induction, Biot-Savart principle - Magnetism
* Explain about the acceleration due to gravity and radius of gyration and periodic vibrations-Compound Pendulum - Vibrations
* To understand the rigidity modulus-Torsional pendulum - Vibrations
* To understand about the [ionizing radiation](https://en.wikipedia.org/wiki/Ionizing_radiation) by using the Geiger–Muller counter – Nuclear energy.
* To understand the transverse laws of vibrations-Sonometer - Resonance
* To explain the electrically vibrating the tuning fork by using Melde’s experiments – Electromagnetism.
* Discuss the dispersive power of prism-minimum deviation method - Light
* Explain the formation of Newton’s rings-interference - Light
* Discussion of diffraction pattern using the grating - LASER
* To study the LED characteristics and forward resistance – Semiconductor devices.
* Explaining about the electrical resonance by using the LCR circuit – Electrical / Semiconductor devices.
* To know the time constant of RC circuit - Electrical / Semiconductor devices.

**List of Experiments**

1. Determination of magnetic induction flux density along the axis of a current carrying circular coil using Stewart and Gee’s experiment.
2. Determination of acceleration due to gravity and radius of gyration using compound pendulum.
3. Determination of rigidity modulus of a given wire material using the Torsional pendulum.
4. Studying the characteristics of Geiger–Muller counter and verifying the inverse square law.
5. Verification the transverse laws of stretched strings by using the Sonometer.
6. Determination of frequency of an electrically vibrating tuning fork using the Melde’s experiment
7. Calculation of dispersive power of a given material of prism by using

Spectrometer in minimum deviation method.

1. Determination of wavelength of a monochromatic light source by using

Newton’s rings experiment.

1. Determination of wavelength of a given laser source of light by using diffraction grating in normal incidence method.
2. Studying the characteristics and calculating the forward resistance of a LED.
3. Study of series and parallel resonance of an LCR circuit
4. Determination of time constant of an RC-circuit

**NOTE**: Any **TEN** of the above experiments are to be conducted.

**Course Outcomes**

After completing the experiment, students will be able to

* Understand and search to apply the fundamentals of magnetic induction, Ampere’s law, Oersted’s law and the Biot-Savart law.
* Analyze the concept and application parts of radius of gyration and periodic vibrations.
* Summarize the fundamentals of modulus-types, stress, strain, elasticity, plasticity and Hook’s law.
* Understand the concept of radiation, ionizing radiation, [radiological protection](https://en.wikipedia.org/wiki/Radiological_protection) and inverse square law.
* Demonstrate the resonance phenomenon and verify the transverse laws of stretched strings by using Sonometer.
* Describe the types of waves like longitudinal, transverse, stationary and progressive waves. Electromagnetic induction and its applications.
* Know about the light properties-dispersion, prism, spectrometer and minimum deviation arrangement.
* Understand the concepts of interference, conditions, formation of Newton’s rings-reason.
* Recognize the difference between the interference and diffraction, grating, laser characteristics.
* Analyze the difference between normal diode, LED, forward bias, reverse bias, I-V characteristics, direct and indirect band gap semiconductors.
* Analyze the LCR circuit combination, parallel, series electrical resonance, inductance, reactance, capacitance and electrical and electronic fundamentals.
* Characterize the RC network, time constant, capacitor functioning and its application.

**ENGLISH (Oral Communication Skills) Lab**

**Course code: 7HC62**

**Branches: ECE, EEE and Mech (Sem-I) L T P Credits**

**ECM, CSE, IT and Civil (Sem-II) 0 0 2 1**

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**Course Objectives:** The course will develop the students’ ability to

* integrate listening and speaking skills
* communicate effectively
* speak effectively on a given topic
* master the art of presentation
* interact with peers in a group discussion

**Unit-I :** Practice sessions on

Listening for General Information

Listen for specific information

Listening Comprehension

**Unit-II:** Practice sessions on

Types of Sentences

Question Tags

**Unit-III:** Practice sessions on

Self introduction, introducing others and greetings

Asking for and Giving Directions

Role Plays & Situational Dialogues

**Unit-IV:** Practice sessions on

JAM/Extempore/ Impromptu

Prepared talk on given topics

**Unit-V :** Practice sessions on

Formal Presentation

Information Transfer

**Unit-VI:** Practice sessions on

Group Discussion

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

* understand, analyze and respond to the audience by listening effectively
* acquire the articulation of different types of sentences by practicing pause patterns and question tags.
* translate and demonstrate self, participate effectively in activities like JAM, extempore
* express and deliver a presentation on the given topic through role plays and situational dialogues
* implement English language to meet the standards of corporate and real world in a group.

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**Syllabus for B. Tech I Year II Semester**

**TECHNICAL SEMINAR –II**

**Code: 7K291 L T P C**

**- - 2 1**

**Course Objective :**

1. Develop ability to be a public speaker with the aid of Power Point Presentations.
2. Learn delivering technical seminars demonstrating clarity in thinking and enunciating complex technical concepts.
3. Practice and develop communication skills and interview performance skills.

**Course Outcomes:**

1. Demonstrate public speaking with the aid of Power Point Presentations
2. Identify current general and specific technological topics of interest and prepare and present the content cogently.
3. Demonstrate communication skills and interview performance skills

**Procedure**

1. Seminar in-charges shall highlight the significance of technical seminar in the first two sessions and enlighten the students on the utility of these seminars.
2. The slots, titles shall be decided upfront and seminar in charge shall take signatures.
3. The same sheet shall be affixed in the respective classrooms and seminar register.
4. Progress of the seminars is reviewed by the concerned HOD once in 15 days.
5. The evaluation for technical seminars is informed to students and displayed in the classrooms.
6. The presentation (PPT) must contain topic, introduction, explanation, diagrams, tables, applications and conclusions.

**Distribution of marks**

There shall be a Technical Paper writing and seminar evaluated for 100 marks in First Year Second Semester. The evaluation is purely internal and will be conducted as follows:

Content : 20 marks

Presentation including PPT : 20 marks

Seminar Notes : 10 marks

Interaction : 10 marks

Report : 25 marks

Attendance : 10 marks

Punctuality : 5 marks

**Total 100 marks**

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**ELEMENTS OF MECHANICAL ENGINEERING**

(Common to All Branches Except Mechanical Engineering)

**Code : 7BC04**

**L T P/D C**

2 **- -- 2**

**Course Objectives:**

*The main objective of the course is to offer the students fundamental knowledge of* First Law of Thermodynamics*. Working of SI and CI engines, working principle of different types of Turbines&pumps.*

*properties of material and engineering application. Working principles of various types of power transmission systems*

**COURSE OUTCOMES:**

At the end of basic mechanical engineering a student should be able to

1. To acquire the knowledge of basic concepts of thermodynamics and analyze the p-v & t-s diagrams of the different cycles.
2. To acquire the knowledge two and four stroke engines,the function of components used in the steam power plant
3. To identify & understand the function of components used in VCR & VAR system, & about the working of hydraulic pumps & hydraulic turbines.
4. To identify & understand *properties of material and engineering application*
5. To acquire the knowledge *of various types of power transmission systems*
6. To acquire the knowledge the different NC and CNC machine.

**UNIT - I**

Energy Resources and Conversion,Basic concepts of Thermodynamics – general classification of heat engines, Property and state, System, Boundary and surroundings , Zeroth Law, First Law of Thermodynamics and its applications- Joule’s experiment, reversible non-flow processes-Constant volume, constant pressure, constant temperature process, polytropic process, Second Law of Thermodynamics – Statements, Heat engines, Carnot cycle, Air standard cycles – Otto, Diesel Cycles.

**UNIT-II**

**Internal combustion engines:** Internal combustion engines, definition, classification, components, working of four stroke cycle engines, SI and CI Engines, Performance parameters, Need for cooling, and lubrication of IC engines.

**Steam Power plant, Boiler, Steam Turbines:** Layout of steam power plant, Water tube and Fire tube Boilers :- Simple cross-tube boiler, Cochran, Babcock and Wilcox Boiler and High Pressure Boilers. (Benson & La-mount only).

**UNIT- III**

1. **Hydraulic pumps & turbines:-** Centrifugal Pumps, Pelton wheel, Francis turbine and Kaplan Turbine -- Layout of Hydro electric power plant

b) **Refrigeration & Air conditioning systems:-** Description of Vapour Compression and Vapour Absorption systems

**UNIT-IV**

**Engineering Materials –** Classification, mechanical properties, Ferrous Materials – Constituents of Cast Iron & types of Cast Iron, Steels – manufacture by Bessemer converter, Arc furnace, types of steel, effect of alloying elements on steel, Stainless steel, Non- Ferrous Materials: Properties and applications of Aluminum & alloys, Copper and alloys, composite materials – types, fabrication methods, Ceramics – Properties and applications

.

**UNIT-V**

**Transmission of Motion and Power –** Shafting, Belt drive, types of belt drive, types of belts, chain drives, types of chain drive, Pulleys, parts, types of pulleys, gear drive- classification, Terminology of spur gear, Gear trains – simple and compound, Clutches – purpose and basic principle of contact clutch, brakes - purpose and basic principle of block brake

**UNIT-VI**

**Robot and sensors –** Introduction, definition, Robot component, **CNC Machine tools** – Introduction, Machine control, Vertical and Horizontal spindles, CNC drill, mill, boring and tapping, Adaptive control, NC and CNC turning centers

**TEXT BOOKS :**

Mathur, M.L., Mehta, F.S. and Tiwari, R.P., Elements of Mechanical Engineering, Jain Brothers, New Delhi, 2005.

R.K. Rajput, “Elements of Mechanical Engineering”, Laxmi Publications, 1994.

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**II Year B. Tech, Semester-I**

**Engineering Mathematics–III**

**(Partial differential equations, Probability and Statistics)**

**L T P/D C**

**Code: 7HC12 (Common to ME & CE) 3**   **1 0 3**

**Pre Requisites**: Engineering Mathematics-II

***Course Objectives:*** *To make the students to understand and expected to learn*

1. *Form partial differential equations and find the solution to first order linear and nonlinear partial differential equations.*
2. *Applications of PDE.*
3. *Concepts of the probability, types of random variables and probability distributions.*
4. *Sampling distributions and their properties, concepts on estimation.*
5. *Concepts on testing the hypothesis concerning to large samples.*
6. *Different kinds of tests related to small samples and tests concerned to small size samples and goodness of fit and independence of attributes using chi-square distribution.*

***Syllabus***

***UNIT– I: First Order Partial Differential Equations:******(10L)***

Formation of Partial Differential Equations by Elimination of Arbitrary Constants and Arbitrary Functions. Solutions to First order Linear and Non-linear Equations-Standard Forms, Equations Reducible to Standard Forms.

***Unit-II: Higher Order Partial Differential Equations: (10L)***

Classification of partial differential equations. Method of Separation of Variables. Initial and Boundary conditions, Solutions of One dimensional wave, Heat equations and Laplacian equation in Cartesian form.

***UNIT-III: Random Variables and Probability Distributions: (12L)***

Conditional probability, Multiplication theorem, Baye’s theorem (without Proof). Random variables – Discrete and Continuous, Probability Mass and Density Functions, Expectation and Variance. Probability Distributions: Binomial, Poisson and Normal Distributions.

***UNIT-IV: Sampling Distributions and Estimation: (8L)***

## Populations and Samples, Sampling distribution of the Mean (σ - known and Unknown), Sums and Differences, Central limit theorem.Estimation: Point Estimation and Interval Estimation concerning Means for Large Samples.

***UNIT-V:*** ***Tests of Hypothesis for Large Samples: (10 L)***

Tests of Hypothesis, Type–I and Type-II Errors, Hypothesis testing concerning one mean and two means and Test of Hypothesis concerning one Proportion and difference of proportions.

***UNIT-VI:* Tests of Hypothesis for Small Samples**: **(10 L)**

Student t-test, Hypothesis testing concerning one mean and two means, F-test and χ2 test-Goodness of fit, Independence of Attributes.

**TEXT BOOKS**:

1. Higher Engineering Mathematics, B.S. Grewal, Khanna Publications, New Delhi.

2. Ronald E. Walpole,Raymond H. Myers,Sharon L. Myers,Keying Ye, Probability & Statistics For Engineers & Scientists, 9th Ed. Pearson Publishers.

3. Probability and Statistics for Engineers: Miller and John E. Freund, PHI Publishers, 9th Edition

**REFERENCE BOOKS:**

1. Advanced Engineering Mathematics, S.R.K. Iyengar and R.K.Jain, Narosa Publication.
2. Probability and Statistics, T.K.V. Iyengar, B. Krishna Gandhi, S. Ranganatham, M.V.S.S.N. Prasad, S. Chand Publications.
3. Miller and Freund’s, Probability and Statistics for Engineers, 8th Edition, pearson Educations.
4. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.

***Course Outcomes:***

*Students will able to*

1. *Form partial differential equations and find the solution to first order linear and nonlinear partial differential equations.*
2. *Applications of PDE.*
3. *Learn basic concepts of probability and able to evaluate probability.*
4. *Will able to solve problems on discrete and continuous probability distributions.*
5. *Learn basic concepts of sampling distribution and able solve problems on estimation.*
6. *Learn basic concepts of test of hypothesis and able solve problems.*

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**7K301: Introduction to Solid Mechanics**

**B.Tech II Year I Sem. L T P/D C**

**3 1 - 3**

**Course Objectives:**

1. To understand the basic concept of the stress and strain for different materials.

2. To know the mechanism of the development of shear force and bending moments in beams.

3. To analyze and understand flexural stress, direct and bending stresses.

4. To study deflection of beams, in different types of loadings and support conditions.

5.To understand the basic concepts of Principal Stresses and Strains

6. To study about Shear Stresses and Theories of Failure

**Course Outcomes:**

At the end of the course the student should have learnt,

1. To evaluate the strength of concept of the stress and strain for different materials

2. To evaluate the behavior of different beams for Shear Force and Bending Moment diagrams

3. To evaluate the behavior and strength of flexural stress, direct and bending stresses

4. To evaluate the deflection of beams subjected to various loads.

5. To determine the Principal Stresses and Strainsin the members subjected to stresses

6. To evaluate the Shear Stresses and Theories of Failure.

**UNIT – I**

**Simple Stresses and Strains:** Elasticity and plasticity – Types of stresses and strains – Hooke’s law – stress – strain diagram for mild steel – Working stress – Factor of safety – Lateral strain, Poisson’s ratio and volumetric strain – Elastic moduli and the relationship between them – Bars of varying section – composite bars – Temperature stresses. Elastic constants.

**UNIT – II**

**Shear Force and Bending Moment:** Definition of beam – Types of beams – Concept of shear force and bending moment – S.F and B.M diagrams for cantilever, simply supported and overhanging beams subjected to point loads, uniformly distributed load, uniformly varying loads and combination of these loads – Point of contra flexure – Relation between S.F., B.M and rate of loading at a section of a beam.

**UNIT – III**

**Flexural Stresses:** Theory of simple bending – Assumptions – Derivation of bending equation: M/I = f/y = E/R - Neutral axis – Determination of bending stresses – Section modulus of rectangular and circular sections (Solid and Hollow), I,T, Angle and Channel sections – Design of simple beam sections.

**Direct and Bending Stresses:** Stresses under the combined action of direct loading and bending moment, core of a section**.**

**UNIT – IV**

**Deflection of Beams:**

Bending into a circular arc – slope, deflection and radius of curvature – Differential equation for the elastic line of a beam – Double integration and Macaulay’s methods – Determination of slope and deflection for cantilever and simply supported beams subjected to point loads, U.D.L, Uniformly varying load-Mohr’s theorems – Moment area method – application to simple cases including overhanging beams.

**UNIT – V**

**Principal Stresses and Strains :** Introduction – Stresses on an inclined section of a bar under axial loading – compound stresses – Normal and tangential stresses on an inclined plane for biaxial stresses – Two perpendicular normal stresses accompanied by a state of simple shear– Mohr’s circle of stresses – Principal stresses and strains – Analytical and graphical solutions.

**UNIT – VI**

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

**Theories of Failure**: Introduction – Various theories of failure - Maximum Principal Stress Theory, Maximum Principal Strain Theory, Maximum shear stress theory- Strain Energy and Shear Strain Energy Theory (Von Mises Theory).

**TEXT BOOKS:**

1. Strength of Materials by Subramanian, Third Edition 2016, Oxford University Press, ISBN:0-19-946473-
2. Strength of materials   by B.C. PUNMIA, Laxmi publishers TENTH EDITION JUNE 2013, ISBN 978-81-318-0925-9. [15 copies]

**REFERENCES:**

1. Mechanics of materials by Egor P Popov, Second Edition, Pearson, ISBN 978-93-325-5954
2. Strength of Materials by W.A Nash, MC Graw Hills 2014 6th edition.
3. Mechanics of Materials by James M Gere and Barry J Goodno Cengage Learning India Pvt. Ltd Eight edition.
4. Mechanics of Structures Vol –I by H. J. Shah and S. B. Junnarkar, Charotar Publishing House Pvt. Ltd.
5. Strength of Materials by S. S. Rattan, McGraw Hill Education Pvt. Ltd.
6. Fundamentals of Solid Mechanics by M. L. Gambhir, PHI Learning Pvt. Ltd.

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# 7K302: Surveying AND GEOMATICS

**B.Tech II Year I Sem.**  **L T P/D C**

**3 1 --- 3**

**Course objectives:**

The student is being exposed to the subject with following Objectives:

1. Study the basic concepts and principles of surveying
2. Know the importance of compass, levelling survey and its practical applications
3. To understand the concept of Trigonometric levelling and applying the same for finding the elevations of object by various methods
4. To understand the importance of various curves and the methods of setting them.
5. Get acquainted with the principles and methods of Remote sensing and GIS/GPS surveying
6. Understand the theory of Aerial mapping

**Course outcomes:**

After studying this course, the students will be able to:

1. Calculate angles, distances using chain and tape
2. Identify data collection methods using a compass and enhance knowledge of the various field applications of levelling
3. Apply the concepts of Trigonometric levelling
4. Set out curves on the field and overcome obstructions in curve ranging
5. To apply the concepts of Remote sensing and GIS/GPS to Civil Engineering problems
6. Read Aerial maps and perform necessary calculations

**UNIT – I**

Introduction to Surveying, principles, linear, angular and graphical methods, Survey stations, Survey lines - Ranging, Calculation of Areas - Mid Ordinate, Average Ordinate, Trapezoidal and Simpsons methods

*Applications: To calculate areas by measuring distances of ground features using various accessories*

**UNIT – II**

Compass Surveying - Bearing of survey lines, Local Attraction, Declination, Dip

Leveling - Principles of leveling - Booking and reducing levels; Types of leveling, Digital and Auto Level, Errors in leveling

Contouring - Characteristics, methods, uses, areas and volumes

*Applications: To measure distances and inclinations between different physical features on the ground.*

**UNIT – III**

Theodolite survey - Instruments, Measurement of horizontal and vertical angle; Horizontal and vertical control - methods - Intervisibility of height and distances - Trigonometric leveling (Single and Double plane)

Triangulation **-** Network - Signals and Towers.Baseline - choices - instruments and accessories - extension of base lines - corrections - Satellite station - reduction to centre

Traversing - Methods of traversing, traverse computations and adjustments, Gale’s traverse table, Omitted measurements

*Applications: To estimate topographic and elevation details necessary for major construction sites such as highways, bridges, tunnels, and dams.*

**UNIT – IV**

Tacheometric Surveying - Principle of Tacheometry, Distance measurement for horizontal Line of Sight

Curves - Types of curves and their necessity, Horizontal Curves - Elements of simple and compound curves - Method of setting them

Modern Field Survey Systems - Principle of Electronic Distance Measurement, Modulation, Types of EDM instruments - Total Station - Parts of a Total Station - Accessories - Advantages and Applications, Field Procedure for total station survey, Errors in Total Station Survey

*Applications: Used for planning and design of transportation systems such as highways and railways.*

**UNIT – V**

Global Positioning Systems - Segments, GPS measurements, errors and biases, Surveying with GPS, Co-ordinate transformation, accuracy considerations

Remote Sensing - Introduction - Electromagnetic Spectrum, interaction of electromagnetic radiation with the atmosphere and earth surface, remote sensing data acquisition - platforms and sensors; visual image interpretation; Introduction to digital image processing

*Applications: To precisely mark the boundaries of properties such as in Cadastral Surveying*

**UNIT – VI**

Photogrammetric Surveying - Introduction, Basic concepts, perspective geometry of aerial photograph, relief and tilt displacements, terrestrial photogrammetry, flight planning; Stereoscopy, ground control extension for photographic mapping- aerial triangulation, radial triangulation, methods

*Applications: To mark the national and state boundaries, chart coastlines, navigable streams and lakes*

**TEXT BOOKS:**

1. Surveying and Leveling by R. Subramanian, Second Edition Oxford University Press - 2012
2. Anji Reddy, M., Remote sensing and Geographical information system, B.S. Publications, 2001.

**REFERENCES:**

1. Surveying Theory and Practice Seventh edition by James M. and Anderson Edward M. Mikhail TATA McGraw Hill
2. Duggal S K, “Surveying (Vol – 1 & 2), Tata McGraw Hill Publishing Co. Ltd. New Delhi, 2004.
3. Arthur R Benton and Philip J Taety, Elements of Plane Surveying, McGraw Hill – 2000
4. “Advanced Surveying Total Station GIS and Remote Sensing by Satheesh Gopi, R. Sathi Kumar and N. Madhu.

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# 7K303: BUILDING MATERIALS AND PLANNING

**B.Tech II Year I Sem.**  **L T P/D C**

**3 - - 2**

**Course Objectives:**

To introduce the students to,

1. To study about the basic building materials, properties and their applications.
2. The manufacturing process of cement, its basic composition and its testing specifications.
3. The types of masonry, mortars and finishes provided in a building.
4. The types of timber, paints and the emerging building materials.
5. To understand the different types of arches, roofs and floors.
6. The principles of planning and construction bye-laws.

**Course Outcomes:**

At the end of the course, the student will be able to,

1. Identify the different materials and use them appropriately.
2. Test the various properties of cement and to use the appropriate admixtures.
3. Identify the various mortars and check for its suitability in various jobs.
4. To effectively use new building materials and appropriate paints for the various works undertaken.
5. Appropriately suggest the different roof and floor types for different construction practices.
6. Plan construction activities in adherence with the bye-laws.

**UNIT- I:**

**Stones:** Uses of stones as building materials. Characteristics of good building stones. Classification of stones. Quarrying -Various methods. Dressing and polishing of stones.

**Bricks:** Composition of brick clay. Methods of manufacturing bricks. Preparation of brick earth, Tempering, Pugmill. Various steps of moulding. Drying and method of burning of bricks-clamps. Intermittent and continuous kilns. Bull's trench kiln, Holfman's kiln. Characteristics of good building bricks. Classification of bricks

**Building Blocks:** Hollow building blocks for walls and roofing. Load bearing and non-load bearing blocks. Provisions of IS2572.Fly ash bricks and their manufacture.

**UNIT- II:**

**Cement:** Chemical composition of the ingredients for manufacturing cement. Outline of manufacturing process, flow diagram. Tests of cement.I.S.269 specifications for Ordinary Portland Cement.Various types of cements.

**Blended Cements:** Various types and their uses.

Fine aggregates: Characteristics of good mortar sand, availability of sand and its classifications. Alternatives to natural sand. Bulking of sand.

**Coarse Aggregates:** Characteristics of good coarse aggregates for manufacture of concrete. Tests on aggregate. Light weight aggregates.

**UNIT - III**

**Mortar:** Different types of mortars, preparation, setting and curing. Manufacturing methods of mortar.

**Concrete:** Batching, mixing, transporting, compacting and curing. Ready mix concrete.

**Reinforced steel:** Types of reinforcement, specifications, storage and handling.

**Plastering, pointing and white/colour washing:** Types of Plastering, preparation of surfaces and defects. Types of pointing, preparation of surfaces.

Forms work and scaffolding: Requirements, types, materials, accessories, reuses and maintenance.

**UNIT - IV**

**Timber:** Timber as a building material and its uses. Various types of timber. Seasoning and its importance. Preservation of wood. Laminates and their uses.

**Paints, Varnish and Distemper:** Constituents, characteristics of good paints. Bases, vehicles, thinners and colouring pigments. Painting of different types of surfaces; types of varnish, and application. Types of distemper and application.

**Emerging Building Materials:** Energy conservation in buildings. Recycled materials, local materials and industrial waste products as a means of sustainable development, Glass, FRPs, composites and smart materials, Aluminum composite paneling, Structural

Glazing , UPVC door frames.

**UNIT - V**

**Lintels and Arches:**

Definition, function and classification of lintels, balconies, chejja and canopy, Arches; Elements and Stability of an Arch.

**Floors and roofs:**

Floors: Requirements of good floor, Components of ground floor, Selection of flooring material, Laying of Concrete, Mosaic, Marble, Granite, Tile flooring, Cladding of tiles.

Roof: Requirement of good roof, Types of roof, Elements of a pitched roof, trussed roof, King post Truss, Queen Post Truss, Steel Truss, Different roofing materials, R.C.C.Roof.

**UNIT - VI**

**Building Planning:** Principles of Building Planning; General Building regulations and Bye laws for Residential Buildings; Climate and its influence on planning- Elements of climate: Solar radiation, Wind, Relative Humidity, Temperature, precipitation, topography.

**TEXT BOOKS:**

1. Building Construction by B. C. Punmia, Ashok Kumar Jain and Arun Kumar Jain - Laxmi Publications (P) Ltd., New Delhi.

2. Building Materials and Construction – Arora & Bindra, Dhanpat Roy Publications.

**REFERENCE BOOKS:**

1. Building Materials and Construction by G C Sahu, Joygopal Jena McGraw hill Pvt Ltd 2015.

2. Building Materials by Duggal, New Age International.

3. Building Materials by P. C. Varghese, PHI.

4. Building Construction by PC Varghese PHI.

5. Construction Technology – Vol – I & II by R. Chubby, Longman UK.

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**7ZC01: MANAGEMENT SCIENCE AND FINANCIAL ACCOUNTING (MSFA)**

**L T P Cr**

2 0 0 2

**Course Objective:** To make students understand the basics of management and Financial Accounting, its principles, practices and latest concepts for increasing the performance of engineering graduates in their respective fields, which facilitate them in making better planning and decisions

**Course Outcomes:**

1. Outlines the significance of management, defines the basic concepts and applicability of management principles in changing paradigms.
2. Helps in understanding organization behavior, personality determinants and other key aspects
3. Infers the need to understand the importance of Strategic management and Business environment in particular
4. Enrich students with basic concepts of Financial Accounting.
5. Understand basic concepts of Depreciation and need for preparing trial balance.
6. Helps in preparation of Financial Statements (final accounts).

**UNIT I**

**INTRODUCTION TO MANAGEMENT:** Management- Definitions, Levels of Management, Functions of management- Planning: types of planning, planning process; Organizing: Organizational Design and Structure, Staffing; Directing; Controlling: Basic control process- Fayol’s principles of Management - Taylor’s principles of scientific management- Maslow’s Motivational theory.

**UNIT II**

**INTRODUCTION TO ORGANIZATIONAL BEHAVIOR:** Definition, Nature and Scope of OB, Personality-determinants of Personality – Perception- Attitudes- Attribution theory- Johari Window and Transactional Analysis, Stress Management- factors and remedies

**UNIT III**

**STRATEGIC MANAGEMENT: I**ntroduction to Strategic Management, Vision, Mission, Goals, Objectives, Environmental Scanning- PESTEL, SWOT Analysis, Competitive Advantage, Concept of Core Competence, PORTER’s five force model, types of strategies, Strategic formulation and Implementation.

**UNIT IV**

**FUNDAMENTALS OF FINANCIAL ACCOUNTING:** Definition of Accounting, Accounting Concepts and conventions, principles of Double-Entry system, Book Keeping, Overview of books of original records Journal, Ledger and Subsidiary books

**UNIT V**

**TRIAL BALANCE AND DEPRECIATION OF FIXED ASSETS:** Significance of Trial balance, Preparation of trial balance Definition of Depreciation, Depreciation of fixed assets, Methods of Depreciation – Straight line method and Diminishing Balance method

**UNIT VI**

**CLASSIFICATION OF REVENUE AND CAPITAL EXPENSES, AND PREPARATION OF FINAL ACCOUNTS:** Revenue expenditure, Capital expenditure, Preparation of Final Accounts - Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments

**References:**

* A R Aryasri: Management Science, Tata Mc Graw Hill
* Ambrish Gupta, Financial Accounting for Management, Pearson Education, New Delhi
* A R Aryasri: Managerial Economics and Financial Analysis, Tata Mc Graw Hill

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# 7K371: MECHANICS of SOLIDS Laboratory

**B.Tech II Year I Sem.**  **L T P/D C**

**- - 3 1.5**

**Course Objectives:**

The objective of the course is to make the student understand the behavior of materials under different types of loading for different types structures

**Course Outcomes:** At the end of the course, the student will be able to:

1. Conduct tension test on Materials like steel etc.
2. Conduct compression tests on spring, wood and concrete
3. Conduct flexural and torsion test to determine elastic constants
4. Determine hardness of metals

**List of Experiments:**

1. Tension test

2. Bending test on (Steel / Wood) Cantilever beam.

3. Bending test on simple support beam.

4. Torsion test

5. Hardness test

6. Spring test

7. Compression test on wood or concrete

8. Impact test

9. Shear test

10. Verification of Maxwell’s Reciprocal theorem on beams.

11. Use of electrical resistance strain gauges

12. Continuous beam – deflection test.

**List of Major Equipment:**

1. UTM for conducting tension test on rods

2. Steel beam for flexure test

3. Wooden beam for flexure test

4. Torsion testing machine

5. Brinnell’s / Rock well’s hardness testing machine

6. Spring testing machine

7. Compression testing machine

8. Izod Impact machine

9. Shear testing machine

10. Beam setup for Maxwell’s theorem verification.

11. Continuous beam setup

12. Electrical Resistance gauges.

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# 7K372: Surveying LabORATORY

**B.Tech II Year I Sem.**  **L T P/D C**

**- - 3 1.5**

**Course Objectives:**

The student is being exposed to the course with the following purpose.

1. Gain hands on experience with the working principles of various instruments such as Total Station.
2. Be able to set out any Civil Engineering work in the field.
3. Learn about the various automation processes being used in surveying works

**Course Outcomes:**

At the end of the course, the student is expected to have learnt the following.

1. Stake out/Lay out different types of curves in the field.
2. Use modern instruments such as Total Station and GPS for locating and plotting any/all ground features.
3. Develop contour maps for vast swathes of lands at ease and with minimum supervision

**List of Experiments**

1. To determine the distance between two points using Direct Ranging
2. Calculate the area of a given piece of land/tract using compass surveying (Traversing or Radiation method)
3. To determine the Reduced Levels of different points using principle of leveling
4. Introduction to Theodolite / Using a Theodolite, Measuring the Horizontal angle between two given points using Repetition method
5. Using a Theodolite, Measuring the Horizontal angle between given points using Reiteration method and calculating the area of given tract of land
6. Plotting a Simple Curve using Angular Method – Rankines Method
7. Introduction to Total Station / Determination of area of a given tract of land using Total Station
8. Contouring using Total Station
9. Determining the Remote Height using Total Station
10. Setting out a Curve Setting using Total Station
11. Calculating the Distance, gradient, differential height between two inaccessible points using Total Station
12. With the help of Total Station, Stake out / Setting layouts for Buildings, Pipelines, etc

**Miscellaneous Experiments (Demonstration Only)**

1. Plotting a Simple Curve using Linear Method – Offsets from Long Chord
2. Resection using Total Station
3. Traversing using Total Station
4. Introduction to GPS – locating ground Features

**Textbooks**

1. Surveying and Levelling by NN Basak, McGraw Hill – 2014
2. Laboratory Manual

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# 7K373: Computer Aided Drafting of Buildings Laboratory

**B.Tech II Year I Sem.**  **L T P/D C**

**- - 3 1.5**

**Course Objectives:**

The objective of this lab is to teach the student basic drawing fundamentals in various civil engineering applications, especially in building drawing, 3d modeling of building, interior designing etc using Auto CAD, Sketch up and 3ds Max.

**Course Outcomes:**

At the end of the course, the student will be able to:

1. Master the usage of AutoCAD commands for drawing 2D & 3D building drawings;
2. Get basic knowledge on Sketch up and 3ds Max for architectural work required for different civil engineering applications.

**List of Experiments**

1. Introduction to computer aided drafting.
2. Practice exercises on CAD software.
3. Theoretical study on buildings and Drawing Plans of
   1. Single storied buildings b) Multi storied buildings
4. Developing sections and elevations for
   1. Single storied buildings b) Multi storied buildings
5. Detailing of building components like Doors, Windows, Roof Trusses etc., using CAD software.
6. Exercises on development of working drawings of buildings.
7. Introduction to Sketch up.
8. Preparing working model of simple single story, multi storey and duplex house etc. using Sketch up.
9. Introduction to 3ds Max.
10. Preparing working model of simple single storey, multi storey and duplex house etc. using 3ds Max

**TEXT BOOKS:**

1. Computer Aided Design Laboratory by M. N. Sesha Praksh & Dr. G. S. Servesh – Laxmi Publications.
2. Engineering Graphics by P. J. Sha – S. Chand & Co.

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**Syllabus for B. Tech II Year I Semester**

**Civil Engineering**

**TECHNICAL SEMINAR –III**

**Code: 7K391 L T P C**

**- - 2 1**

**Course Objective :**

1. Develop ability to be a public speaker with the aid of Power Point Presentations.
2. Learn delivering technical seminars demonstrating clarity in thinking and enunciating complex technical concepts.
3. Practice and develop communication skills and interview performance skills.

**Course Outcomes:**

1. Demonstrate public speaking with the aid of Power Point Presentations
2. Identify current general and specific technological topics of interest and prepare and present the content cogently.
3. Demonstrate communication skills and interview performance skills

**Procedure**

1. Seminar in-charges shall highlight the significance of technical seminar in the first two sessions and enlighten the students on the utility of these seminars.
2. The slots, titles shall be decided upfront and seminar in charge shall take signatures.
3. The same sheet shall be affixed in the respective classrooms and seminar register.
4. Progress of the seminars is reviewed by the concerned HOD once in 15 days.
5. The evaluation for technical seminars is informed to students and displayed in the classrooms.
6. The presentation (PPT) must contain topic, introduction, explanation, diagrams, tables, applications and conclusions.

**Distribution of marks**

There shall be a Technical Paper writing and seminar evaluated for 100 marks in First Year Second Semester. The evaluation is purely internal and will be conducted as follows:

Content : 20 marks

Presentation including PPT : 20 marks

Seminar Notes : 10 marks

Interaction : 10 marks

Report : 25 marks

Attendance : 10 marks

Punctuality : 5 marks

**Total 100 marks**

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**7AC48: ELECTRICAL & ELECTRONICS ENGINEERING**

**L T P/D C**

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**Course Outcomes:**

CO’s: after studying this course, the student will be able to

1. Understand the fundamentals of electrical engineering and DC machines.
2. Understand the principles of AC circuits.
3. Understand the principle and operation of three phase induction motor and measuring instruments.
4. Understand the principle and operation of diode.
5. Understand the principle and operation of transistor.
6. Understand the principles of digital electronics.

**Unit – I: Fundamentals of Electrical Engineering and DC Machines:**

Ohm’s Law, Kirchhoff’s Laws, types of sources, passive elements. Series parallel circuits, mesh and nodal analysis. Superposition, Reciprocity theorem.

**DC Machines**: Principle of operation of D.C generators, types, E.M.F equation. Principle of operation of D.C motors, Types motors, Torque equation, Losses and efficiency, simple problems on D.C Generators and motors.

**Unit – II: Fundamentals of AC circuits:**

AC voltage wave form and basic definitions: Peak Value, R.M.S. value, Average values, Form factor and Peak factor, ’j’ operator, Analysis of single phase AC circuits series and parallel (Simple circuits). Three phase circuits – Star - delta connection, Relation between line and phase voltages / currents in a 3-phase Star-Delta balanced system.

**Unit – III: Induction Motors and Instruments:**

Concept of Faraday’s laws, 3- phase induction motor working principle, operation and construction details.

**Instruments**: Introduction, classification of instruments, operating principles, essential features of measuring instruments, permanent magnet moving coil (PMMC) instruments, moving iron (MI) instruments.

**UNIT IV-DIODE:** Overview of Semiconductors, PN junction diode and Zener diode –Diode circuits: rectifiers (bridge type only), filters, clippers and clampers.

**UNIT V- TRANSISTOR**: BJT construction, operation, characteristics (CB, CE and CC configurations) and uses – JFET and MOSFET construction, operation, characteristics (CS configuration) and uses.

**UNIT VI-DIGITAL ELECTRONICS** :Number systems – binary codes –binary arithmetic - Boolean algebra, laws & theorems - simplification of Boolean expression using K maps - logic gates - implementation of Boolean expressions using logic gates - standard forms of Boolean expression.

**Text Books:**

1. Basic Electrical Engineering –T.K. Nagesarkar and M.S. Sukhja, Oxford University Press.2nd edition.
2. Basic electrical Engineering – M.S. Naidu and S. Kamakshiah – TataMcGraw-Hill, 2005 edition.
3. Basic Electrical & Electronics Engineering –T.K. Nagesarkar and M.S. Sukhja, Oxford University Press.2nd edition.

4. Principles of Electronics - V.K.Mehta, S.Chand Publications, 2nd edition.

**References:**

1. Theory and problems of Basic electrical Engineering- D.P.Kotahari & I.J.Nagrath PHI.

Electronic Devices and Circuits, Millman & Halkias, TMH publications.

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**7K404: Mechanics of Materials**

**B.Tech II Year II Sem. L T P C**

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**Course Objectives:**

* Understand the deformation and strains under different load action and response in terms of forces and moments.
* Understand the behavior under different loading actions.
* Comprehend the deformation of structures under load actions.
* Understand the force-stress equilibrium relationship in Multiaxial load condition.
* Understand the displacement-strain relationship in Multiaxial load condition.
* Understand the stress behavior in the thin cylinders and sphere.

**Course Outcomes:**

* Able to evaluate the deformation of structures.
* Describe the stability of structures under certain loading conditions.
* To assess the deformation for structures under load actions.
* To evaluate the force-stress equilibrium relationship in Multiaxial load condition.
* To evaluate the displacement-strain relationship in Multiaxial load condition.
* To solve the stress behavior pattern in thin cylinder and sphere.

**UNIT I:**

Deformation and Strain covering description of finite deformation, Infinitesimal deformation; Analysis of statically determinate trusses; Stress analysis of thin, thick and compound cylinder;

**UNIT II:**

Generalized state of stress and strain: Stress and strain tensor, Yield criteria and theories of failure; Tresca, Von-Mises, Hill criteria, Heigh-Westerguard’s stress space.

**UNIT III:**

Momentum Balance and Stresses covering Forces and Moments Transmitted by Slender Members, Shear Force and Bending Moment Diagrams, Momentum Balance, Stress States / Failure Criterion.

**UNIT IV:**

Mechanics of Deformable Bodies covering Force-deformation Relationships and Static Indeterminacy, Uniaxial Loading and Material Properties, Trusses and Their Deformations, Statically Determinate and Indeterminate Trusses.

**UNIT V:**

Bending: Stress and Strains; Deflections and Torsion covering Pure Bending, Moment-curvature Relationship, Beam Deflection, Symmetry, Superposition, and Statically Indeterminate Beams, Shear and Torsion, Torsion and Twisting, General energy theorems, Castigliano’s theorem, Maxwell Bettie’s reciprocal theorem; Virtual work and unit load method for deflection, Application to problems of beams and frames.

**UNIT VI:**

Structural stability; Stability of columns, Euler’s formula, end conditions and effective length factor, Columns with eccentric and lateral load; Plasticity and Yield Design covering 1D-Plasticity – An Energy Approach, Plasticity Models, Limit Analysis and Yield Design

**Text Books:**

1. Timoshenko, S. and Young, D. H., “Elements of Strength of Materials”, DVNC, New York, USA.

2. Hibbeler, R. C. Mechanics of Materials. 6th ed. East Rutherford, NJ: Pearson Prentice Hall, 2004

**Reference Books:**

1. Crandall, S. H., N. C. Dahl, and T. J. Lardner. An Introduction to the Mechanics of Solids. 2nd ed. New York, NY: McGraw Hill, 1979

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**7K405: Fluid Mechanics**

**B.Tech II Year II Sem.** **L T P/D C**

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**Course Objectives:**

1. Understand fluid properties of Newtonian fluids.
2. Study analytical solutions to a variety of simplified problems.
3. Understand the dynamics of fluid flows and the governing equations.
4. Apply concepts of mass, momentum and energy conservation to flows.
5. Grasp the basic ideas of turbulence and energy loss in fluid flows.
6. Study the influence of boundaries of a body under fluid flow.

**Course Outcomes:**

1. Apply conservation laws to derive governing equations of fluid flows.
2. Compute hydrostatic and hydrodynamic forces.
3. Analyze and design simple pipe systems.
4. Apply principles of dimensional analysis to design experiments.
5. Compute drag and lift coefficients.
6. Applying boundary influences on a body moving within fluid

**UNIT-I:**

**Fluid Properties:** Basic Concepts and Definitions – Distinction between a fluid and a solid; Density, Specific weight, Specific gravity, Kinematic and dynamic viscosity; variation of viscosity with temperature, Newton law of viscosity; vapour pressure, boiling point, cavitation; surface tension, capillarity, Bulk modulus of elasticity, compressibility.

**UNIT-II:**

**Fluid Statics** - Fluid Pressure: Pressure at a point, Pascals law, hydrostatic law, pressure variation with temperature, density and altitude. Piezometer, U-Tube Manometer, Single Column Manometer, U-Tube Differential Manometer, Micromanometers. pressure gauges, Hydrostatic force on submerged horizontal, vertical, and inclined surfaces. Buoyancy and stability of floating bodies.

**UNIT – III:**

**Fluid Kinematics:** Description of fluid flow, Stream line, path line and streak lines and stream tube. Classification of flows : Steady, unsteady, uniform, non uniform, laminar, turbulent, rotational and irrotational flows – Equation of continuity for one, two , three dimensional flows– stream and velocity potential functions, circulation and vortices, flow net analysis.

**UNIT – IV:**

**Fluid Dynamics**: Surface and body forces – Euler’s and Bernoulli’s equations for flow along a stream line for 3-D flow, Navier – Stokes equations (Explanatory), Momentum equation and its application – forces on pipe bend.

Pitot tube, Venturi meter, and orifice meter – classification of orifices, flow over rectangular, Triangular and trapezoidal and stepped notches - Broad crested weirs.

Dimensional Analysis and Dynamic Similitude - Definitions of Reynolds Number, Froude Number, Mach Number, Weber Number and Euler Number; Buckingham’s π-Theorem.(Added)

**UNIT – V:**

**Closed Conduit Flow:** Reynolds’s experiment – Characteristics of Laminar & Turbulent flows. Laws of Fluid friction – Darcy’s equation, variation of friction factor with Reynolds’s number – Moody’s Chart, Minor losses – pipes in series – pipes in parallel – Total energy line and hydraulic gradient line. Pipe network problems Flow between parallel plates, Flow through long tubes, flow through inclined tubes, water hammer (no derivations).

**UNIT – VI:**

**Boundary Layer Theory:** Approximate Solutions of Navier Stokes Equations – Boundary layer – concepts, Prandtl contribution, Characteristics of boundary layer along a thin flat plate, Von-karmen momentum integral equation, laminar and turbulent Boundary layers (no derivations) BL in transition, separation of BL, control of BL, flow around submerged objects-Drag and Lift- Magnus effect .

**TEXT BOOKS:**

1. Fluid Mechanics by RC Hibbeler, SI Units ISBN 978-93-325-4701-8, Pearson Publications.
2. Bansal. R. K, “Fluid Mechanics and Hydraulics Machines”, 5th edition, Laxmi publications (P) Ltd., New Delhi, Ninth Edition, 2006.

**REFERENCE BOOKS:**

1. Fluid Mechanics and Machinery by CSP. Ojha, R Berndtsson, PN. Chandramouli, Oxford University Press.
2. Fluid Mechanics 8th Edition in SI units By Frank M White, McGraw-Hill, ISBN 978-93-85965-49-4.
3. Fluid Mechanics and Machinery By Mohd. Kaleem Khan, Oxford University Press, ISBN 978-0-19-945677-2.
4. Fluid Mechanics by Piyush Kundu.
5. Rajput.R.K, “A text book of Fluid Mechanics and Hydraulic Machines”, S. Chand & Company Ltd., New Delhi, Fourth edition, 2010.

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# 7K406: CONSTRCUTION ENGINEERING AND MANAGEMENT

**B.Tech II Year II Sem.**  **L T P/D C**

**3 1 - 3**

**Course Objectives:**

1. Understand construction planning.
2. Study and understand different construction methods.
3. Understand and familiarize with various construction equipment.
4. Understand basics of construction planning.
5. Grasp the basic ideas of construction monitoring and control.
6. Study and grasp importance of contracts management.

**Course Outcomes:**

1. Apply construction planning to actual construction works;
2. Able to differentiate different construction methods and their suitability;
3. Understand conventional and mechanized construction methods.
4. Able to apply construction planning to construction projects;
5. Able to apply the knowledge of construction monitoring and control to construction projects;
6. Able to apply the knowledge of contracts management and cost management to construction projects;

**Unit I**

**Basics of Construction**- Unique features of construction, construction projects types and features, phases of a project, agencies involved and their methods of execution;

**Construction project planning**- Stages of project planning: pre-tender planning, pre-construction planning, detailed construction planning, role of client and contractor, level of detail. Process of development of plans and schedules, work break-down structure, activity lists, assessment of work content, concept of productivities, estimating durations, sequence of activities, activity utility data; Techniques of planning- Bar charts, Gantt Charts. Networks: basic terminology, types of precedence relationships, preparation of CPM networks: activity on link and activity on node representation, computation of float values, critical and semi critical paths, calendaring networks.PERT- Assumptions underlying PERT analysis, determining three time estimates, analysis, slack computations, calculation of probability of completion.

**Unit II**

**Construction Methods basics**: Types of foundations and construction methods; Basics of Formwork and Staging; Common building construction methods (conventional walls and slabs; conventional framed structure with block work walls; Modular construction methods for repetitive works; Precast concrete construction methods; Basics of Slip forming for tall structures; Basic construction methods for steel structures; Basics of construction methods for Bridges.

**Unit III:**

**Construction Equipment basics***:* Conventional construction methods Vs Mechanized methods and advantages of latter; Equipment for Earthmoving, Dewatering; Concrete mixing, transporting & placing; Cranes, Hoists and other equipment for lifting; Equipment for transportation of materials. Equipment Productivities.

**Unit IV:**

**Planning and organizing construction site and resources**- Site: site layout including enabling structures, developing site organization, Documentation at site; Manpower: planning, organizing, staffing, motivation; Materials: concepts of planning, procurement and inventory control; Equipment: basic concepts of planning and organizing; Funds: cash flow, sources of funds; Histograms and S-Curves. Earned Value; Resource Scheduling- Bar chart, line of balance technique, resource constraints and conflicts; resource aggregation, allocation, smoothening and leveling. Common Good Practices in Construction

**Unit V:**

**Project Monitoring & Control-**Supervision, record keeping, periodic progress reports, periodical progress meetings. Updating of plans: purpose, frequency and methods of updating. Common causes of time and cost overruns and corrective measures. Basics of Modern Project management systems such as Lean Construction; Use of Building Information Modelling (BIM) in project management; Quality control: concept of quality, quality of constructed structure, use of manuals and checklists for quality control, role of inspection, basics of statistical quality control. Safety, Health and Environment on project

sites: accidents; their causes, effects and preventive measures, costs of accidents, occupational health problems in construction, organizing for safety and health.

**Unit VI:**

**Contracts Management basics***:* Importance of contracts; Types of Contracts, parties to a contract; Common contract clauses (Notice to proceed, rights and duties of various parties, notices to be given, Contract Duration and Price. Performance parameters; Delays, penalties and liquidated damages; Force Majeure, Suspension and Termination. Changes & variations, Dispute Resolution methods.

**Construction Costs:**Make-up of construction costs;Classification of costs, time cost trade-off in construction projects, compression and decompression.

**Text/Reference Books:**

1. Varghese, P.C., “*Building Construction”*, Prentice Hall India, 2007.

2. *National Building Code,* Bureau of Indian Standards, New Delhi, 2017.

3. Chudley, R., *Construction Technology*, ELBS Publishers, 2007.

4. Peurifoy, R.L. Construction Planning, Methods and Equipment, McGraw Hill, 2011

5. Nunnally, S.W. Construction Methods and Management, Prentice Hall, 2006

6. Jha, Kumar Neeraj., Construction Project management, Theory & Practice, Pearson

Education India, 2015

7. Punmia, B.C., Khandelwal, K.K., Project Planning with PERT and CPM, Laxmi

Publications, 2016.

**7K407: Hydrology and Water Resources Engineering**

**B. Tech II Year II Sem.**  **L T P/D C**

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**Course objectives:**

To enable the students,

1. Get comprehensive knowledge about occurrence, quantification of precipitaion;
2. understand abstractions of precipitation;
3. understand runoff calculation
4. know about various water withdrawals and uses;
5. understand different water distribution systems;
6. study various types of dams and spillways.

**Course outcomes:**

At the End of the course the student will be able to,

1. quantify precipitation;
2. estimate various abstractions of precipitation;
3. estimate runoffs from given data;
4. grasp and apply the knowledge of various water withdrawals and uses to practical problems;
5. able to apply design basic water distribution systems;
6. able to arrive at hydrologic design of spillways.

**Unit I: Introduction**

Hydrologic cycle, water-budget equation, history of hydrology, world water balance, applications in engineering, sources of data. Precipitation - forms of precipitation, characteristics of precipitation in India, measurement of precipitation, rain gauge network, mean precipitation over an area, depth area-duration relationships, maximum intensity/depth-duration-frequency relationship, Probable Maximum Precipitation (PMP), rainfall data in India.

**Unit II: Abstractions from precipitation**

Evaporation process, evaporimeters, analytical methods of evaporation estimation, reservoir evaporation and methods for its reduction, evapotranspiration, measurement of evapotranspiration, evapotranspiration equations, potential evapotranspiration over India, actual evapotranspiration, interception, depression storage, infiltration, infiltration capacity, measurement of infiltration, modelling infiltration capacity, classification of infiltration capacities, infiltration indices.

**Unit III: Runoff**

Runoff volume, SCS-CN method of estimating runoff volume, flowduration curve, flow-mass curve, hydrograph, factors affecting runoff hydrograph, components of hydrograph, base flow separation, effective rainfall, unit hydrograph surface water resources of India, environmental flows.

**Unit IV: Water withdrawals and Uses**

Water for energy production, water for agriculture, water for hydroelectric generation; flood control. Analysis of surface water supply, Water requirement of crops-Crops and crop seasons in India, cropping pattern, duty and delta; Quality of irrigation water; Soil-water relationships, root zone soil water, infiltration, consumptive use, irrigation requirement, frequency of irrigation; Methods of applying water to the fields: surface, sub-surface, sprinkler and trickle / drip irrigation.

**Unit V: Distribution systems**

Canal systems, alignment of canals, canal losses, estimation of design discharge. Design of channels- rigid boundary channels, alluvial channels, Kennedy’s and Lacey’s theory of regime channels. Canal outlets: non-modular, semi-modular and modular outlets. Water logging: causes, effects and remedial measures. Lining of canals, types of lining, drainage of irrigated lands: necessity, methods.

**Unit VI: Dams and Spillways**

Embankment dams: Classification, design considerations, estimation and control of seepage, slope protection. Gravity dams: forces on gravity dams, causes of failure, stress analysis, elementary and practical profile. Arch and buttress dams.

Spillways: components of spillways, types of gates for spillway crests; Reservoirs- Types, capacity of reservoirs, yield of reservoir, reservoir regulation, sedimentation, economic height of dam, selection of suitable site.

**Text/Reference Books:**

1. K Subramanya, Engineering Hydrology, Mc-Graw Hill.

2. K N Muthreja, Applied Hydrology, Tata Mc-Graw Hill.

3. K Subramanya, Water Resources Engineering through Objective Questions, Tata McGraw Hill.

4. G L Asawa, Irrigation Engineering, Wiley Eastern

5. L W Mays, Water Resources Engineering, Wiley.

6. J D Zimmerman, Irrigation, John Wiley & Sons

7. C S P Ojha, R Berndtsson and P Bhunya, Engineering Hydrology, Oxford.

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# 7K408: Engineering Geology

**B.Tech II Year II Sem.**  **L T P/D C**

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**Course Objectives**

Student shall be able,

1. To definebasic geological concepts from civil engineering point of view
2. To identifythe various physical properties of minerals and rocks
3. To understand the concept of structural geology
4. To understandthe significance of Geology as applied to Civil Engineering
5. To applythis knowledge in Civil Engineering projects such as dams, roads, tunnels and slopes
6. To acquire proper knowledge about natural geological hazards

**Course Outcomes**

After the completion of the course student should be able to,

1. Describe different concepts and terms used in Engineering Geology
2. Identify and explain various types of minerals and rocks
3. Apply the various concepts of Engineering Geology to civil engineering field
4. Examine and select the sites related to dams, roads, tunnels and slopes
5. Identify the hazards prior and able to take the necessary precautions
6. Knowledgeable about geological hazards

**UNIT – I**

**Introduction**

Definition of Geology, Engineering Geology. Importance of geology from Civil Engineering point of view. Importance of physical geology, petrology and structural geology. Case studies of failures of few civil engineering constructions, weathering of rocks and its effect on the properties of rocks, importance of weathering with reference to dams, reservoirs and tunnels. Earth structure- Lithosphere- Internal structure of the earthquake, Plate Tectonics.

*Applications: For selection of sites and design for major structures such as dams, reservoirs, bridges, deep foundations for high-rise buildings, etc.*

**UNIT – II**

**Mineralogy**

Definition of mineral, mineralogy, Importance of study of minerals: rock forming and ore forming minerals. Different methods of study of minerals.Study of minerals by physical identification method and their physical properties. Determination of Physical properties of following minerals: Feldspar, Quartz, Flint, Jasper, Olivine, Augite, Hornblende, Muscovite, Biotite, Asbestos, Chlorite, Kyanite, Garnet, Talc, Calcite. Study of ore forming minerals such as Pyrite, Hematite, Magnetite, Amethyst, Galena, Pyrolusite, Graphite, Magnesite, and Bauxite, Coral reefs.

*Applications: To Identify the various minerals useful in design of foundations*

**UNIT – III**

**Petrology**

Definition of a rock, petrology. Classification of rocks-Geological classification of rocks. Rock Cycle. Classification of igneous Forms, structures and textures of igneous rocks. Classification of sedimentary rocks, and its structures and textures. Classification of metamorphic rocks, its structures and textures.

Megascopic Study of Granite, Dolerite, Basalt, Pegmatite, Charnockite, Sandstone, Shale, Limestone, Gneiss, Schist, Quartzite, Marble and Slate.

*Applications: To Identify various rocks useful for design of foundations.*

**UNIT – IV**

**Structural Geology**

Out Crop, Study of geological structures associated with rocks such as folds, faults, joints, unconformities-their important types. Significance of Strike and dip in geological structures, shield areas and seismic belts, seismic waves, Richter scale, Precautions to be taken for building construction in seismic areas, Ground Water, water table, common types of ground water, springs, geological controls of ground water movement, ground water exploration.

*Applications: In selection of site for major structures such as dam, reservoir, bridges, and high-rise buildings*

**UNIT – V**

Importance of Geophysical investigations, Principles of geophysical methods. Importance of Electrical resistivity method and seismic refraction method from civil engineering point of view.

**Geology of Dams, Reservoirs, Tunnels**

Types of Dams, Importance of geological considerations in the site selection of dams, reservoirs and tunnels. Case histories of dams, geological factors affecting the water tightness and life of a reservoir. Purpose of tunneling, types of tunnels, over break, lining of tunnels.

*Applications: Site selection for dams, life of reservoirs, planning of tunnels*

**UNIT-VI**

**Geological Hazards:** Geographical aspects of earthquake, tsunamis and landslides. Disaster prevention mitigation and management.

*Applications: Taking necessary measures when the disasters occur*

**TEXT BOOKS:**

1. Engineering Geology By N. Chennakesavulu, McMillan India Ltd.

2. Engineering Geology by S K Duggal, H K Pandey Mc Graw Hill Education Pvt Ltd 2014.

**REFERENCES:**

1. Geology for Engineers and Environmental Scientists, Pearson.

2. Krynine & Judd, Principles of Engineering Geology & Geotechnics, CBS Publishers & Distribution.

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**7AC95: Electrical and Electronics Engineering Lab**

**B.Tech II Year II Sem**

L T P/D C

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**OBJECTIVES:** To Understand the fundamentals of electrical and applications of these in electrical appliances.

**COURSE OUTCOMES:**

1. Understand the performance of three phase induction motor.
2. Understand the different speed control methods of DC motor.
3. Understand the performance of DC motor with and without loading.
4. Understand the no-load characteristics of Dc shunt generator.
5. Understand the applications of superposition and reciprocity theorems in circuit analysis.
6. Understand the characteristics of PN-junction, Zener diodes, bipolar junction transistor and MOSFET.
7. Understand the applications of half wave and full wave rectifier.
8. Understand the applications of digital electronics.

**Electrical Experiments**

1. Brake test on 3-phase induction motor (performance characteristics).
2. Speed control of DC shunt motor by

a) Armature Voltage Control .

b) Field flux control method.

1. Brake test on DC shunt motor.
2. Swinburne’s test on DC shunt machine.
3. OCC characteristics of DC shunt generator.
4. Verification of superposition and Reciprocity Theorems.

**Electronics Experiments**

1. V-I Characteristics of PN –junction diode.
2. V-I Characteristics of Zener –junction diode.
3. Half wave and full wave rectifier.
4. V-I Characteristics of Bipolar junction Transistor.
5. V-I Characteristics of MOSFET.

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# 7K471: Fluid Mechanics Laboratory

**B.Tech II Year II Sem.**  **L T P/D C**

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**Pre Requisites**: FM Theory

**Course Objectives:**

To give the student an exposure to various hydraulic devices and Pipe Flow.

**Course Outcomes:**

At the end of the course, the student will be able to:

1. Determine coefficient of discharge for orifice and mouthpiece.
2. Calibrate notches, venturimeter, orifice meters
3. Determine major and miner losses in pipes

**List of Experiments:**

1. Verification of the Bernoulli’s theorem;
2. Calibration of Venturimeter and Orifice meter;
3. Determination of Friction Factor of Pipe line: Major Losses;
4. Determination of Losses due to Sudden Expansion and Sudden Contraction: Minor Losses;
5. Determination of Coefficients of Discharge for Rectangular, Trapezoidal and V-Notch;
6. Determination of Coefficient of Discharge, Coefficient of Contraction and Coefficient of Velocity Mouthpiece setup;
7. Determination of Coefficient of Discharge, Coefficient of Contraction and Coefficient of Velocity Orifice setup;
8. Calibration of Rotameter and Flow Nozzle meter;
9. Conduct Heleshaw Experiment;
10. Conduct Reynolds’s Experiment to determine the Reynolds’s number and type of flow.
11. Verification of Water Hammer Condition for Sudden Closure of Valve;

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# 7K472: Engineering Geology Laboratory

**B.Tech II Year II Sem.**  **L T P/D C**

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**Pre Requisites**: Engineering Geology Theory

**Course Objectives:**

The object of this lab is that to provide practical knowledge about physical properties of minerals, rocks, drawing of geological maps, showing faults, uniformities etc.

**Course Outcomes:**

At the end of the course, the student will be able to identify the various rocks and minerals depending on geological classifications

**List of Experiments:**

1. Study of physical properties and identification of minerals.

2. Study of physical properties and identification Rock forming minerals.

3. Megascopic description and identification of Rocks.

4. Megascopic description and identification of igneous rocks.

5. Megascopic description and identification of sedimentary rocks.

6. Megascopic description and identification of metamorphic rocks.

7. Structural geology problems simple strike

8. Structural geology problems dip problems (calculation of amount of true dip and direction).

9. Interpretation and drawing of sections for geological maps showing normal beds.

10. Interpretation and drawing of sections for geological maps showing tilted beds.

11. Interpretation and drawing of sections for geological maps showing fault beds.

12. Interpretation and drawing of sections for geological maps showing folded beds.

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**B. Tech II Year II Semester**

**TECHNICAL SEMINAR –IV**

**Code: 7K491 L T P C**

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**Course Objective :**

1. Develop ability to be a public speaker with the aid of Power Point Presentations.
2. Learn delivering technical seminars demonstrating clarity in thinking and enunciating complex technical concepts.
3. Practice and develop communication skills and interview performance skills.

**Course Outcomes:**

1. Demonstrate public speaking with the aid of Power Point Presentations
2. Identify current general and specific technological topics of interest and prepare and present the content cogently.
3. Demonstrate communication skills and interview performance skills

**Procedure**

1. Seminar in-charges shall highlight the significance of technical seminar in the first two sessions and enlighten the students on the utility of these seminars.
2. The slots, titles shall be decided upfront and seminar in charge shall take signatures.
3. The same sheet shall be affixed in the respective classrooms and seminar register.
4. Progress of the seminars is reviewed by the concerned HOD once in 15 days.
5. The evaluation for technical seminars is informed to students and displayed in the classrooms.
6. The presentation (PPT) must contain topic, introduction, explanation, diagrams, tables, applications and conclusions.

**Distribution of marks**

There shall be a Technical Paper writing and seminar evaluated for 100 marks in First Year Second Semester. The evaluation is purely internal and will be conducted as follows:

Content : 20 marks

Presentation including PPT : 20 marks

Seminar Notes : 10 marks

Interaction : 10 marks

Report : 25 marks

Attendance : 10 marks

Punctuality : 5 marks

**Total 100 marks**

**7K488: COMPREHENSIVE VIVA VOCE –I**

**B. Tech II Year II Sem.** L T P/D C

- - - 1

**Course Objectives :**

Prepare students in basics and advanced relevant courses to revise and face technical interviews for enhancing employability.

**Course Outcomes:**After completing this course, student shall be able to

1. Assess the relevant courses they have undergone till the completion of that academic year.
2. Assessment is done in the relevant courses they have undergone till the completion of that academic year.
3. Comprehend the concepts in the core subjects and the elective subjects, to make them ready to face technical interviews which improve their employability skills.
4. They are asked to comprehend the concepts in the core subjects and the elective subjects, to make them ready to face technical interviews which improve their employability skills.

There will be 100 marks in total with 50 marks of internal evaluation and 50 marks of external evaluation.

**Internal:**

Comprehensive Viva Voce is Conducted twice in a semester and evaluated for 25 marks each.

**End examination : 50 Marks.**

The end examination will be carried out by a committee consisting of an external examiner, head of the department, a senior faculty member and the supervisor.