AUDISANKARA COLLEGE OF ENGINEERING & TECHNOLOGY

(AUTONOMOUS)

(Approved by AICTE | Accredited by NAAC | Affiliated to JNTUA)

Gudur, Nellore Dist - 524101, A.P (India)

OUTCOME BASED EDUCATION
WITH
CHOICE BASED CREDIT SYSTEM

BACHELOR OF TECHNOLOGY

ACADEMIC REGULATIONS
UNDER AUTONOMOUS STATUS

DEPARTMENT OF
CIVIL ENGINEERING

B.Tech Regular Four Year Degree Programme
(For the batches admitted from the academic year 2018 - 2019)
B.Tech (Lateral Entry Admission)
(For the batches admitted from the academic year 2019 - 2020)

FAILURE TO READ AND UNDERSTAND THE REGULATIONS
IS NOT AN EXCUSE

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One best book is equal to hundred good friends, but one good friend is equal to a library.

All of us do not have equal talent, but all of us have an equal opportunity to develop our talents

"This is the way to success"

Dr.A.P.J.Abdul Kalam

VISION AND MISSION OF THE INSTITUTE

VISION

To make Audisankara College of Engineering & Technology a centre for academic excellence where 21st century innovative minds manage with novel ideas & spread out new technologies relevant to the social needs with increased employment opportunities and changed life style.

MISSION

To provide the students with Technological direction and support, acclaimed in latest cutting edge technologies with a blend of academic concepts and practical nuances in hot areas of Engineering and Technology so that they develop all the resourcefulness, competence and confidence to take on the technological challenges of tomorrow.

FOREWORD

The autonomy is conferred to AUDISANKARA COLLEGE OF ENGINEERING & TECHNOLOGY, (ASCET) Gudur, Nellore Dist, Andhra Pradesh by University Grants Commission (UGC), New Delhi based on its performance as well as future commitment and competency to impart quality education. It is a mark of its ability to function independently in accordance with the set norms of the monitoring bodies like J N T University Anantapur (JNTUA), Ananthapuramu and AICTE. It reflects the confidence of the affiliating University in the autonomous institution to uphold and maintain standards it expects to deliver on its own behalf and thus awards degrees on behalf of the college. Thus, an autonomous institution is given the freedom to have its own curriculum, examination system and monitoring mechanism, independent of the affiliating University but under its observance.

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

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

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

PRINCIPAL

PRELIMINARY DEFINITIONS AND NOMENCLATURES

Academic Council: The Academic Council is the highest academic body of the institute and is responsible for the maintenance of standards of instruction, education and examination within the institute. Academic Council is an authority as per UGC regulations and it has the right to take decisions on all academic matters including academic research.

Academic Autonomy: It's a privilege conferred to an institute by UGC following meticulous evaluation process to manage its academic programmes independently for promoting excellence.

Academic Year: An academic year consists of two semesters each lasting 20 weeks i.e., (one odd + one even). It is the period necessary to complete an actual course of study within a year.

AICTE: All India Council for Technical Education, New Delhi.

Autonomous Institute: An institute designated as autonomous by University Grants Commission (UGC), New Delhi in concurrence with affiliating University (Jawaharlal Nehru Technological University, Ananthapuramu) and State Government.

Backlog Course: A course is considered to be a backlog course if the student has not cleared and due to which obtained a failure grade (F) in that course.

Basic Sciences: Basic sciences are Mathematics, Physics, Chemistry, English etc., They provide the basic knowledge of all Engineering sciences.

Betterment: Betterment is a way that contributes towards improvement of the student's grade in any course(s). It can be done by either (a) re-appearing or (b) re-registering for the course.

Board of Studies (BoS): BoS is an authority as defined in UGC regulations, constituted by Head of

the Organization for each of the departments separately. They are responsible to update and design curricula in respect of all the programs offered by the department.

Branch: It's specialization in an Engineering discipline like Electronics & Communication Engineering, Computer Science & Engineering, Electical & Electronics Engineering, Mechanical Engineering, Civil Engineering etc.

Certificate Course: It is a course that makes a student gain hands-on expertise and skills required for holistic development in a specific area/field.

Choice Based Credit System: The credit based semester system is one which provides flexibility in designing curriculum and assigning credits based on the course content and hours of teaching along with provision of choice for the student in the course selection.

Compulsory course: Course required to be undertaken for the award of the degree as per the program.

UGC: University Grants Commission (UGC), New Delhi.

Continuous Internal Examination: It's an examination that evaluates a student's progress throughout a prescribed course.

Course: A course is a unit of teaching that typically lasts one academic term. Courses explore the practice of teaching from both applied and theoretical perspective.

Course Outcomes: Learning outcomes are statements that describe significant and essential learning that learners have achieved, and can reliably demonstrate at the end of a course or program.

Credit: A credit is a unit that gives weight to the value, level or time requirements of an academic course. The number of 'Contact Hours' in a week of a particular course determines its credit value. One credit is equivalent to one lecture/tutorial hour per week.

Credit point: It is the product of grade point and number of credits for a course.

Cumulative Grade Point Average (CGPA): It is a measure of cumulative performance of a student over all the completed semesters. The CGPA is the ratio of total credit points secured by a student in various courses in all semesters and the sum of the total credits of all courses in all the semesters. It is expressed up to two decimal places.

Curriculum: Curriculum incorporates the planned interaction of students with instructional content, materials, resources, and processes for evaluating the attainment of Program Educational Objectives.

Department: An academic entity that conducts relevant curricular and co-curricular activities, involving both teaching and non-teaching staff and other resources in the process of study for a degree.

Dropping from the Semester: A student who doesn't want to register for any semester can apply in writing in prescribed format before commencement of that semester.

Elective Course: A course that can be chosen from a set of courses. An elective can be Professional Elective and/or Open Elective.

Evaluation: Evaluation is the process of judging the academic performance of the student in her/his courses. It is done through a combination of continuous internal assessment and semester end examinations.

Grade: Standardized measurements of achievement in a course. It is an index of the performance of the students in a said course. Grades are indicated by alphabets.

Grade Point: It is a numerical weight allotted to each letter grade on a 10 - point scale.

ASCET: AUDISANKARA COLLEGE OF ENGINEERING & TECHNOLOGY, Gudur, Nellore Dist, Andhra Pradesh.

Massive Open Online Course (MOOC): MOOC courses inculcate the habit of self learning. MOOC courses would be additional choices in all the elective group courses.

Pre-requisite: A course, the knowledge of which is required for registration into higher level course.

Core: The courses that are essential constituents of each engineering discipline are categorized as professional core courses for that discipline.

Professional Elective: It indicates a course that is discipline centric. An appropriate choice of minimum number of such electives as specified in the program will lead to a degree with specialization.

Program: Bachelor of Technology (B.Tech) degree program / PG degree program: Master of Technology (M.Tech) / Master of Business Administration (MBA) / Master of Computer Applications (MCA).

Program Educational Objectives: The broad career, professional and personal goals that every student will achieve through a strategic and sequential action plan.

Project work: It is a design or research based work to be taken up by a student during his/her final year to achieve a particular aim. It is a credit based course and is to be planned carefully by the student.

Re-Appearing: A student can reappear only in the semester end examination for the theory component of a course, subject to the regulations contained herein.

Registration: Process of enrolling into a set of courses in a semester of a Program.

Regulations: The regulations, common to all B.Tech programs offered by Institute are designated as "ASCET Regulations R-16" and are binding on all the stakeholders.

Semester: It is a period of study consisting of 15 to 18 weeks of academic work equivalent to normally 90 working days. The odd Semester starts usually in July and even semester in December.

Semester End Examinations: It is an examination conducted for all courses offered in a semester at the end of the semester.

S/he: A written representation of 'he or she' used as a neutral alternative to indicate someone of either sex.

Student Outcomes: The essential skill sets that need to be acquired by every student during her/his program of study. These skill sets are in the areas of employability, entrepreneurial, social and behavioral.

JNTUA: Means the Jawaharlal Nehru Technological University Anantapur, Ananthapuramu.

AUDISANKARA COLLEGE OF ENGINEERING & TECHNOLOGY

(AUTONOMOUS)

Gudur, Nellore Dist - 524101, A.P (India)

ACADEMIC REGULATIONS

B.Tech. Regular Four Year Degree Programme

(For the batches admitted from the academic year 2018 - 19)

&

B.Tech. (Lateral Entry Scheme)

(For the batches admitted from the academic year 2019 - 20)

For pursuing four year undergraduate Bachelor Degree programme of study in Engineering (B.Tech) offered by AUDISANKARA COLLEGE OF ENGINEERING & TECHNOLOGY under Autonomous status and herein after referred to as ASCET.

1.0 CHOICE BASED CREDIT SYSTEM

The Indian Higher Education Institutions (HEI's) are changing from the conventional course structure to Choice Based Credit System (CBCS) along with introduction to semester system at first year itself. The semester system helps in accelerating the teaching -learning process and enables vertical and horizontal mobility in learning.

The credit based semester system provides flexibility in designing curriculum and assigning credits based on the course content and hours of teaching. The choice based credit system provides a 'cafeteria' type approach in which the students can take courses of their choice, learn at their own pace, undergo additional courses and acquire more than the required credits, and adopt an interdisciplinary approach to learning.

Choice Based Credit System (CBCS) is a flexible system of learning and provides choice for students to select from the prescribed elective courses. A course defines learning objectives and learning outcomes and comprises of lectures / tutorials / laboratory work / field work / project

work / comprehensive Examination / seminars / assignments / alternative assessment tools / presentations / self-study etc. or a combination of some of these.

Under the CBCS, the requirement for awarding a degree is prescribed in terms of number of credits to be completed by the students.

The CBCS permits students to:

- Choose electives from a wide range of elective courses offered by the departments.
- Undergo additional courses of interest.
- Adopt an interdisciplinary approach in learning.
- Make the best use of expertise of the available faculty.

2.0 ELIGIBILITY FOR ADMISSION

The total seats available as per the approved intake are grouped into two categories viz. category A and Category B with a ratio of 70:30 as per the state government guidelines vide G.O No.52.

2.1 The admissions for category A and B seats shall be as per the guidelines of Andhra Pradesh State Council for Higher Education (APSCHE) in consonance with government reservation policy.

- Under Category A: 70% of the seats are filled through EAMCET counseling.
- Under Category B: 30% seats are filled based on 10+2 merits in compliance with guidelines of APSCHE.

2.2 Admission eligibility - Under Lateral Entry Scheme Students with diploma qualification have an option of direct admission into 2nd year B. Tech. (Lateral entry scheme). Under this scheme 20% seats of sanctioned intake will be available in each course as supernumerary seats. Admissions to this three year B Tech later entry Programme will be through ECET. The maximum period to complete B. Tech. under lateral entry scheme is six consecutive academic years from the date of joining.

3.0. DURATION OF PROGRAMME

The course duration for the award of the Degree in **Bachelor of Technology** will be four academic years, with two semesters in each year. However if a student is unable to complete the course within 4 years, he/ she can do so by giving more attempts but within 8 consecutive academic years from the date of admission.

Academic Calendar

For all the eight semesters a common academic calendar shall be followed in each semester by having sixteen weeks of instruction, one week for the conduct of practical exams and with three weeks for theory examinations and evaluation. Dates for registration, sessional and end semester examinations shall be notified in the academic calendar of every semester. The schedule for the conduct of all the curricular and co-curricular activities shall be notified in the planner.

4.0.MEDIUM OF INSTRCTION

The medium of instruction shall be English for all courses, examinations, seminar presentations and project work. The curriculum will comprise courses of study as given in course structure, in accordance with the prescribed syllabi.

5.0 BRANCHES OF STUDY

- Civil Engineering (CE)
- Electrical & Electronics Engineering (EEE)
- Mechanical Engineering (ME)
- Electronics & Communication Engineering (ECE)
- Computer Science & Engineering (CSE)

6.0 TYPES OF COURSES

6.1 Foundation / Skill Course

Foundation courses are the courses based upon the content leads to enhancement of skill and knowledge as well as value based and are

aimed at man making education. Skill subjects are those areas in which one needs to develop a set of skills to learn anything at all. They are fundamental to learning any subject.

6.2 Core Course

There may be a core course in every semester. This is the course which is to be compulsorily studied by a student as a core requirement to complete the requirement of a programme in a said discipline of study.

6.3 Elective Course

Electives provide breadth of experience in respective branch and applications areas. Elective course is a course which can be chosen from a pool of courses. It may be:

- Supportive to the discipline of study
- Providing an expanded scope
- Enabling an exposure to some other discipline/domain
- Nurturing student's proficiency/skill.

An elective may be discipline centric (Professional Elective) focusing on those courses which add generic proficiency to the students or may be chosen from an unrelated discipline called as "Open Elective".

There are four professional elective groups; students can choose not more than two courses from each group. Overall, students can opt for four professional elective courses which suit their project work in consultation with the faculty advisor/mentor. Nevertheless, one course from each of the two open electives has to be selected.

6.4 Mandatory Course

For mandatory courses like Induction Training, Environmental Sciences, Indian Constitution, Essence of Indian Traditional Knowledge, a student has to secure 40 marks out of 100 marks (i.e 40% of the marks allotted) in the continuous internal evaluation for passing the subject/course. For **Mandatory** courses "Satisfactory" or "Unsatisfactory" shall be indicated instead of the letter grade and this will not be counted for the computation of SGPA/CGPA.

6.5 Activity Point Programme (APP)

For Activity Point Programme (APP) courses like Professional Society Activities, Communication Skills Practice, Soft Skills Practice, Quantitative Aptitude and Technical Aptitude, a student has to secure 40 marks out of 100 marks (i.e 40% of the marks allotted) in the continuous internal evaluation for passing the subject/course. For **APP** courses "Satisfactory" or "Unsatisfactory" shall be indicated instead of the letter grade and this will not be counted for the computation of SGPA/CGPA.

6.6 NCC/ NSO and NSS Courses

For the courses of NCC / NSO and NSS, a satisfactory participation certificate shall be issued to the student from the authorities concerned.

6.7 Mandatory/ Non-credit Courses Marks/Grade

No marks or letter grade shall be allotted for all mandatory/non-credit courses.

7.0 SEMESTER STRUCTURE

Each academic year is divided into two semesters, TWO being Main Semesters (one odd + one even). Main Semesters are for regular class work. However, the following cases are exempted:

7.1 Students admitted on transfer from JNTUA affiliated institutes, Universities and other institutes in the subjects in which they are required to earn credits so as to be on par with regular students as prescribed by concerned 'Board of Studies'.

7.2 Each main semester shall be of 21 weeks (Table 1) duration and this period includes time for registration of courses, course work, examination preparation and conduct of examinations.

7.3 Each main semester shall have a minimum of 90 working days; out of which number of contact days for teaching / practical are 75 and 15 days for conduct of exams and preparation.

7.4 The academic calendar shown in Table 1 is declared at the beginning of the academic year.

Table 1: Academic Calendar

FIRST SEMESTER (21 weeks)	I Spell Instruction Period	8 weeks	19 weeks
	I Mid Examinations	1 week	
	II Spell Instruction Period	8 weeks	
	II Mid Examinations	1 week	
	Preparation and Practical Examinations	1 week	
	Semester End Examinations		2 weeks
Semester Break and Supplementary Examinations			2 weeks
SECOND SEMESTER (21 weeks)	I Spell Instruction Period	8 weeks	19 weeks
	I Mid Examinations	1 week	
	II Spell Instruction Period	8 weeks	
	II Mid Examinations	1 week	
	Preparation & Practical Examinations	1 week	
	Semester End Examinations		2 weeks
Summer Vacation and Supplementary Examinations			8 weeks

8.0 REGISTRATION

8.1 Each student has to compulsorily register for course work at the beginning of each semester as per the schedule mentioned in the Academic Calendar. It is absolutely compulsory for the student to register for courses in time. The registration will be organized departmentally under the supervision of the Head of the Department.

8.2 IN ABSENTIA registration will not be permitted under any circumstance.

8.3 At the time of registration, students should have cleared all the dues of Institute and Hostel in the previous semesters, paid the prescribed fees for the current semester and not been debarred from institute for a specified period on disciplinary or any other ground.

9.0 UNIQUE COURSE IDENTIFICATION CODE

Every course of the B.Tech program will be placed in one of the four groups of courses as listed in the Table 2. The various courses and their two-letter codes are given below;

Table 2: Group of courses

S. No	Branch	Code
1	Civil Engineering	01
2	Electrical & Electronics Engineering	02
3	Mechanical Engineering	03
4	Electronics & Communication Engineering	04
5	Computer Science & Engineering	05

10.0 CURRICULUM AND COURSE STRUCTURE

The curriculum shall comprise Foundation/ Skill Courses, Core Courses, Elective Courses, Open Electives, Laboratory Courses, Technical Seminar, Term Paper, Communication Skills Practice, Soft Skills Practice, Professional Society Activities, Mini Project, Internship and Major Project and Comprehensive Viva-Voce. The list of elective courses may include subjects from allied disciplines also.

Contact Periods: Depending on the complexity and volume of the course, the number of contact periods per week will be assigned. Each Theory and Laboratory course carries credits based on the number of hours/week as follows:

- Contact classes (Theory): 1credit per lecture hour per week.
- Tutorial Classes (Theory): 1credit per 2 lecture hours per week.
- Laboratory Hours (Practical): 1 credit for 2 Practical hours.

10.1Credit distribution for courses offered is shown in Table 3.

Table 3: Credit distribution

S. No	Course	Hours	Credits
1	Theory Course (Core/Foundation/Elective)	3	3
2	Theory Course (Core/Foundation/Elective)	4	4
3	Theory Course (Core/Foundation/Elective)	3	3
4	Open Elective Courses	2	2
5	Drawing Courses	1+4	3
6	MOOC Courses	3	3
7	Laboratory Courses	4	2
8	Laboratory Courses	2	1
9	Technical Seminar	2	1
10	Term Paper	2	1
11	Project Work Phase-I	4	2
12	Comprehensive Assessment	2	1
13	Project Work Phase-II	20	10
14	Mandatory Courses	2	0
15	Internship	20	10
16	Professional Society Activities	2	0
17	Soft Skills Practice	2	0
18	Communication Skills Practice	2	0
19	Quantitative Aptitude	2	0
20	Technical Aptitude	2	0

10.2 Course Structure

Every program of study shall be designed to have 42 theory courses and 21 laboratory courses. Every course of the B.Tech program will be placed in one of the eight categories with minimum credits as listed in the Table 4.In addition, a student has to carry out a mini project, project work and comprehensive Examination.

Table 4: Category Wise Distribution of Credits

S. No	Category	Subject Area and % of Credits	Average No. of Credits
1	Humanities and Social Sciences (HS), including Management.	HS (05% to 10%)	**08**
2	Basic Sciences (BS) including Mathematics, Physics and Chemistry.	BS (10% to 15%)	**19**
3	Engineering Sciences (ES), including Workshop, Drawing, Basics of Electrical / Electronics / Mechanical / Computer Engineering.	ES (10% to 15%)	**20**
4	Professional Subjects - Core (PC), relevant to the chosen specialization/branch.	PC (40% to 50%)	**74**
5	Professional Subjects - Electives (PE), relevant to the chosen specialization/branch.	PE (10% to 15%)	**18**
6	Open Subjects - Electives (OE), from other technical and/or emerging subject areas.	OE (01% to 5%)	**06**
7	Project Work and Comprehensive Viva-Voce, Mini Project and Internship	5% to 10%	**13**
8	Technical Seminar and Term Paper	CRT	**02**
TOTAL			**160**

10.3 For Four year regular programme

Year/Sem	No. of Theory Courses	No. of Lab Courses	Total Credits
B.Tech I Semester	5 Foundation	Induction Training + 3	20
B.Tech II Semester	5 Foundation	3	20
B.Tech III Semester	5 + 1 (2 Credit Course)	3 + Mandatory Course	20
B.Tech IV Semester	5 + 1 (2 Credit Course)	3 + Technical Seminar	21
B.Tech V Semester	5 + OE-I (2 Credit Course)	3 + Mandatory Course	20
B.Tech VI Semester	5 + OE-II (2 Credit Course)	3 + Term Paper	21
B.Tech VII Semester	4 + OE-III (2 Credit Course)	3 + Comprehensive Assessment + PW Phase-I	19
B.Tech VIII Semester	3	Project Work Phase-II	19
Total	42	20+TS+TP+ Project Work Phase-I + Comprehensive Assessment + Project Work Phase-II	160

10.4 For Three year lateral entry Programme

Year/Sem	No. of Theory Courses	No. of Lab Courses	Total Credits
B.Tech III Semester	5 + 1 (2 Credit Course)	3 + Mandatory Course	20
B.Tech IV Semester	5 + 1 (2 Credit Course)	3 + Technical Seminar	21
B.Tech V Semester	5 + OE-I (2 Credit Course)	3 + Mandatory Course	20
B.Tech VI Semester	5 + OE-II (2 Credit Course)	3 + Term Paper	21
B.Tech VII Semester	4 + OE-III (2 Credit Course)	3 + Comprehensive Assessment + PW Phase-I	19
B.Tech VIII Semester	3	Project Work Phase-II	19
Total	32	14 + TS + TP + Project Work Phase-I + Comprehensive Assessment + Project Work Phase-II	120

10. 5Course wise break-up for Regular program

Total Theory Courses - 42 (35Foundation and Core + 6 Professional Electives + 3 Open Elective)	2 @ 4 credits each 35 @ 3credits each 5 @ 2credits each	123
Laboratory Courses – 20	2 @ 2 credits each 18 @ 1 credits each	22
Technical Seminar	1@ 1 credit	01
Term Paper with self study report	1 @ 1credit	01
Comprehensive Assessment	1 @ 1credit	01
Project Work Phase-I	1 @ 2 credit	02
Project Work Phase-II/ Internship	1 @ 10 credits	10
TOTAL CREDITS		**160**

10.6 Course wise break-up for three year lateral entry program

Total Theory Courses - 32 (35Foundation and Core + 6 Professional Electives + 3 Open Elective)	27 @ 3credits each 5 @ 2credits each	91
Laboratory Courses – 14	14 @ 1 credit	14
Technical Seminar	1@ 1 credit	01
Term Paper with self study report	1 @ 1credit	01
Comprehensive Assessment	1 @ 1credit	01
Project Work Phase-I	1 @ 2 credit	02
Project Work Phase-II/ Internship	1 @ 10 credits	10
TOTAL CREDITS		**120**

11.0 DIVISION OF MARKS FOR INTERNAL AND EXTERNAL ASSESSMENT

Name of the Course	Continuous Internal Assessment (CIA)	Semester End Examination (SEE)
Theory	30	70
Laboratory	25	50
Technical Seminar	50	-
Term Paper	50	-
Comprehensive Assessment	100	-
Project Work Phase-I	50	50
Project Work Phase-II/ Internship	60	140

12.0 EVALUATION METHODOLOGY

The performance of a student in each semester shall be evaluated through Continuous Internal Assessment (CIA) and / or an Semester End Examination (SEE) conducted semester wise.

12.1 Theory Course

The performance of a student in every theory course shall be evaluated for total of 100 marks each, of which the relative weightage for Continuous Internal Assessment and Semester End Examination shall be 30 marks and 70 marks respectively.

12.2 Practical Course

The performance of a student in every practical course shall be evaluated for total of 75 marks each, of which the relative weightage for Continuous Internal Assessment and Semester End Examination shall be 25 marks and 50 marks respectively.

12.3 Internal Evaluation for Theory Course

The total internal weightage for theory courses is 30 marks with the following distribution.

- 20 marks for Mid-Term Examination
- 10 marks for Assignment Test

While the first mid-term examination shall be conducted on the 50% of the syllabus (Unit-I, Unit-II & 50% of Unit-III), the second mid-term examination shall be conducted on the remaining 50% of the syllabus (50% of Unit III, Unit-IV & Unit-V).

10 marks are allocated for assignment test (as specified by the subject teacher concerned). The first assignment should be conducted after completion of Unit-I & Unit-II for 5 marks and the second assignment should be conducted after completion of Unit-III & Unit-IV for 5 marks. The final Assignment Test marks will be the addition of these two.

Two midterm examinations each for **20 marks** with the duration of 90 minutes each will be conducted for every theory course in a semester. The midterm examination marks shall be awarded giving a weightage of 80% in the midterm examination in which the student scores better performance and 20% in the remaining midterm examination.

The final mid-term marks obtain by the addition of these two (80% + 20%).

Example: If a student scores 23 marks and 24 marks in the first and second mid-term examinations respectively, then Weighted Average Marks = 24 x 0.8 + 23 x 0.2 = 23.8, rounded to 24 Marks.

Note: The marks of any fraction shall be rounded off to the next higher mark.

12.4 Pattern of the midterm examination question paper is as follows

- A total of two Sections (Section-I & Section-II)
- Section-I contains three one mark questions. One questions from each unit and a student has to be answered two questions (2X1=2 Marks)
- Section-II contains six questions are to be designed taking two questions from each unit (Unit wise – Either or type) of the three units.. (3X6=18 Marks)

Pattern of the Assignment Test is as follows

- Five assignment questions are given in advance, out of which two questions given by the concerned teacher has to be answered during the assignment test
- Sum of Assignment Tests marks is considered.

Note: A student who is absent for any Mid-Term Examination/ Assignment Test, for any reason whatsoever, shall be deemed to have scored zero marks in that Mid-Term Examination/ Assignment Test and no make-up test shall be conducted.

12.5 Internal Evaluation for Practical Course

For practical subjects there shall be a Continuous Internal Evaluation during the semester for 25 internal marks. Out of the 25 marks for internal evaluation, day-today assessment in the laboratory shall be evaluated for 10 marks and internal practical examination shall be evaluated for 15 marks conducted by the laboratory teacher concerned.

12.6 Internal Evaluation for Design/ Drawing Courses

For the subject having design and/or drawing, (such as engineering graphics, engineering drawing, machine drawing, production drawing and building drawing) the internal marks distribution shall be 10 marks for day-to-day performance and 20 marks for Mid-Term Examinations.

12.7 Internal Evaluation for Technical Seminar

There shall be a Technical seminar presentation in B.Tech IV Semester. A Technical Seminar shall have two components, one chosen by the student from the course work as an extension and approved by the faculty supervisor. The other component is suggested by the supervisor and can be a reproduction of the concept in any standard research paper or an extension of concept from earlier course work. A hard copy of the information on seminar topic in the form of a report is to be submitted for evaluation along with presentation. The presentation of the seminar topics shall be made before a committee consisting of Head of the department, seminar supervisor and a senior faculty member. Each Technical Seminar shall be evaluated for 50 marks. Technical Seminar component-I for 25 marks and component-II for 25 marks making total 50 marks. (**Distribution of marks for 25:** 5 marks for report, 5 marks for subject content, 10 marks for presentation and 5 marks for queries).

12.8 Internal Evaluation for Term Paper

The Term Paper is a self study report and shall be carried out either during B.Tech VI Semester along with other lab courses. Every student will take up this term paper individually and submit a report. The scope of the term paper could be an exhaustive literature review choosing any engineering concept with reference to standard research papers or an extension of the concept of earlier course work in consultation with the term paper supervisor. The term paper reports submitted by the individual students during the B.Tech VI Semester shall be evaluated for a total of 50 marks for continuous assessment, it shall be conducted by two Examiners, one of them being term paper supervisor as Examiner-1 and an Examiner-2 nominated by the Principal from the panel of experts recommended by HOD.

12.9 Project Work

The Project work is spread over to two semesters having Project Work Phase-I and Project Work Phase-II. Project Work Phase-I is included in B.Tech VII Semester and Project Work Phase-II in B.Tech VIII Semester as detailed below:

A student has to select topic of his Project Work based on his interest and available facilities, in the B.Tech VII semester which he will continue through B.Tech VIII semester also.

12.10 Internal Evaluation for Project Work Phase-I

The object of Project Work Phase-I is to enable the student to take up investigative study in the broad field of his branch of Engineering, either fully theoretical/practical or involving both theoretical and practical work to be assigned by the department on an individual basis or three/four students in a group under the guidance of a supervisor/ guide. This is expected to provide a good initiation for the student(s) in R&D work.

The assignment normally includes:

- Survey and Study of published literature of on the assigned topic.
- Working out a preliminary approach to the problem relating to the assigned topic.
- Conducting preliminary analysis/ modeling/simulation/experiment/ design/ feasibility.
- Preparing a written report on the study conducted for presentation to the department.
- Final seminar presentation before Project Review Committee.

The supervisor/ guide will evaluate the execution of the project periodically.

Project Work Phase-I is allocated 100 marks with 2 credits. Out of 100, 25 marks are allocated for the supervisor/guide to be awarded based on periodical project reviews and submission of the report on the work done. 25 marks are allocated for the supervisor/guide and head of the department to be awarded based on seminar given by each student on the topic of the project. The other 50 marks shall be awarded on the basis of his presentation on the work done on his project by the Departmental committee comprising of Head of the Department, respective supervisor/ guide and two senior faculty of the department appointed by the Principal.

The candidate is declared to have passed in Project work Phase-I when he gets 40% marks given by the Departmental Committee and 50% marks overall.

12.11 Internal Evaluation for Project Work Phase-II

The Project work Phase-II will be an extension of Phase-I project work. The object of Project work phase-II is to enable the student to extend further the investigative study taken up as the project in Phase-I under the guidance of the supervisor/ guide from the department.

The assignment normally includes:

- Preparing an action plan for conducting the investigation including the team work.
- In depth study of the topic assigned.
- Review and finalization of the approach to the problem relating to the assigned topic.
- Final development of product/process, testing, results, conclusions and further direction.
- Preparing a paper for conference presentation/ publication in journal if possible.
- Preparing a dissertation in the standard format for being evaluated by the department.
- Final presentation of the work done before the Project Review Committee (PRC).

Project Work Phase-II is allocated 50 internal marks. Out of 50, 25 marks are allocated for the supervisor/guide and head of the department to be evaluated based on two seminars given by each student on the topic of the project. The other 25 marks shall be evaluated on the basis of his presentation on the work done on his project by the Departmental Committee comprising of Head of the Department, respective supervisor/ guide and two senior faculty of the department appointed by the Principal.

12.12 Internal Evaluation for Internship

Internship course is 60 marks for continuous internal assessment and will be evaluated based on day to day assessment by concern industry.

12.13 External Evaluation for Theory Course - Semester End Examination

The Semester End Examination in each theory subject shall be conducted for 3 hours duration at the end of the semester for 70 marks.

12.14 Pattern of the Semester End Examination question paper is as follows

- A total of two Sections (Section-I & Section-II)
- Section-I contains five two mark questions. One question from each unit and a student has to be answered all the five questions compulsory $(5 \times 2 = 10 \text{ Marks})$
- Section-II contains ten questions are to be designed taking two questions from each unit (Unit Wise - Either or type) of the total five units. $(5 \times 12 = 60 \text{ Marks})$

A student has to secure not less than a minimum of 35% of marks (25 marks) exclusively at the Semester End Examinations in each of the theory subjects in which the candidate had appeared. However, the candidate shall have to secure a minimum of 40% of marks (40 marks) in both external and internal components put together to become eligible for passing in the subject.

The emphasis on the questions is broadly based on the following criteria:

50 %	To test the objectiveness of the concept
30 %	To test the analytical skill of the concept
20 %	To test the application skill of the concept

12.15 External Evaluation for Practical Course

Out of 50 marks **35** marks are allocated for experiment (procedure for conducting the experiment carries 15 marks & readings, calculation and result-20) and **10** marks for viva-voce examination with **5** marks for the record.

Each Semester External Lab Examination shall be evaluated by an Internal Examiner along with an External Examiner appointed by the Principal.

A candidate shall be declared to have passed in individual lab course if he secures a minimum of 50% aggregate marks (38 marks) (Internal & Semester External Examination marks put together), subject to a minimum of 50% marks (25 marks) in the semester external examination.

12.16 External Evaluation for Project Work Phase-II

The Semester End Examination for project work done during VII Semester and VIII Semester for 140 marks shall be conducted by a Project Review Committee (PRC). The committee comprises of an External Examiner appointed by the Principal, Head of the Department and Project Guide/ Supervisor. The evaluation of project work shall be conducted at the end of the VIII Semester. The above committee evaluates the project work report with weightages of 50% of the marks (50 marks) awarded by external examiner, 20% of marks (20 marks) awarded by HOD & 30% of the marks (30 marks) by Project Guide/Supervisor respectively for a total of 100marks. Of the 40 marks for Presentation & Viva-Voce examination, HOD evaluates for 10 marks and external examiner for 30 marks. The evaluation of 140 marks is distributed as given below:

Distribution of Project Work Marks

S. No.	Criterion	Marks
1	Report	100
2	Presentation & Viva – Voce	40

A candidate shall be declared to have passed in project work phase-II if he secures a minimum of 50% aggregate marks (100 marks) (Internal & Semester External Examination marks put together), subject to a minimum of 50% marks (70 marks) in the project work phase-II end examination.

12.17 Massive Open Online Courses (MOOCs)

Meeting with the global requirements, to inculcate the habit of self learning and incompliance with UGC guidelines, MOOC (Massive Open Online Course) courses have been introduced as electives. The main intension to introduce MOOCs is to obtain enough exposure through online tutorials, self-learning at one's own pace, attempt quizzes, discuss with professors from various universities and finally to obtain certificate of completion for the course from the MOOCs providers

Regulations for MOOCs

- The respective departments shall give a list from NPTEL or any other standard providers, whose credentials are endorsed by the HOD.
- Each department shall appoint Coordinators/Mentors and allot the students to them who shall be responsible to guide students in selecting online courses and provide guidance for the registration, progress and completion of the same.
- A student shall choose an online course (relevant to his/her programme of study) from the given list of MOOCs providers, as endorsed by the teacher concerned, with the approval of the HOD.
- The details of MOOC(s) shall be displayed in Grade card of a student, provided he/she submits the proof of completion of it to the department concerned through the Coordinator/Mentor.
- Student can get certificate from SWAYAM/NPTEL or any other standard providers, whose credentials are endorsed by the HOD. The course work should not be less than 12 weeks or student may appear for end examination conducted by the Institute.
- There shall be one Mid Continuous Internal Examination (Quiz exam for 40 marks) after 9 weeks of the commencement of the course and semester end examination (Descriptive exam for 60 marks) shall be done along with the other regular courses.

Three credits will be awarded upon successful completion of each MOOC courses having minimum of 8 weeks duration.

12.18 Internship

The total internal weightage for internship course is 60 marks and will be evaluated based on day to day assessment by concern industry.

The external examination shall be evaluated by the two senior faculties (i.e one faculty act as external examiner and other one as internal examiner) for 140 marks based on the his/her report and presentation.

12.19 Full Semester Internship

Full Semester Internship programme carries 10 credits. During Internship, student has to spend one full semester in an identified industry /firm / organization and has to carry out the internship as per the stipulated guidelines of that industry / firm / organization and the institute.

12.19 Following are the evaluation guidelines

- Profile and abstract –Student has to submit the industry profile and abstract of the project within four weeks from date of commencement of internship through mail or post.

  Weightage: 10%.

- Seminar 1 -at 9th week from date of commencement of internship - weightage: 10%
- Seminar 2 -Pre submission at 17th week from date of commencement of internship– Weightage: 10%
- Internship Diary, weightage: 15 %
- Project Report, weightage: 15%
- Viva-voce & Final Presentation, weightage: 40%

The internship shall be evaluated for 200 marks out of which 60 marks for internal evaluation and 140 marks for external evaluation.

The external evaluation based on the report submitted and viva-voce exam for 140 marks by a committee comprising the HOD, Project supervisor and external examiner (Industry/ Academia).A minimum of 60% of maximum marks shall be obtained to earn the corresponding credits.

FSI shall be open to all the branches in the VII semester. The selection procedure is:

- Choice of the students

CGPA (> 7.5) upto IV semester with no current arrears and maintains the CGPA of 7.5 till VI Semester

13.0 GRADING PROCEDURE

Grades will be awarded to indicate the performance of students in each theory subject, laboratory / practicals, Technical Seminar, Term Paper, Mini Project, Communication Skills Practice, Soft Skills Practice, Quantitative Aptitude, Technical Aptitude and Major Project. Based on the percentage of marks obtained (Continuous Internal Evaluation plus Semester End Examination, both taken together) as specified in item 11 above, a corresponding letter grade shall be given.

13.1 As a measure of the performance of a 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
Greater than or equal to 90%	S (Superior)	10
80 and less than 90%	A (Excellent)	9
70 and less than 80%	B (Very Good)	8
60 and less than 70%	C (Good)	7
50 and less than 60%	D (Average)	6
40 and less than 50%	E (Pass)	5
Below 40%	F (FAIL)	0
Absent	AB	0

13.2 A student who has obtained an '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

13.3 To a student who has not appeared for an examination in any subject, 'Ab' grade will be allocated in that subject, and he is deemed to have 'failed'. A student will be required to reappear as a 'supplementary student' in the semester end examination, as and when offered next. In this case also, the internal marks in those subjects will remain the same as those obtained earlier.

13.4 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.

13.5 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

13.6 A student passes the subject/ course only when GP ³5 ('E' grade or above)

13.7 A student obtaining Grade F shall be considered failed and will be required to reappear for that subject when the next supplementary examination offered.

For Mandatory courses "Satisfactory? or "Unsatisfactory? shall be indicated instead of the letter grade and this will not be counted for the computation of SGPA/CGPA.

13.8 Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA)

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

$$SGPA = \sum(C_i \times G_i)/\sum C_i$$

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

ii. The Cumulative Grade Point Average (CGPA) will be computed in the same manner taking into account all the courses undergone by a student over all the semesters of a program, i.e.,

$$CGPA = \sum(C_i \times S_i)/\sum C_i$$

where "S_i" is the SGPA of the i^{th} semester and C_i is the total number of credits in that semester.

iii. Both SGPA and CGPA shall be rounded off to 2 decimal points and reported in the transcripts.

iv. While computing the SGPA the subjects in which the student is awarded Zero grade points will also be included.

Grade Point: It is a numerical weight allotted to each letter grade on a 10-point scale.

Letter Grade: It is an index of the performance of students in a said course. Grades are denoted by letters S, A, B, C, D, E and F.

Example: Computation of SGPA and CGPA

Illustration for SGPA

Course	Credit	Grade Letter	Grade Point	Credit Point
Course-I	3	S	10	3x10=30
Course-II	3	A	9	3x9=27
Course-III	3	B	8	3x8=24
Course-IV	3	D	6	3x6=18
Course-V	2	B	8	2x8=16
Course-VI	1	C	7	1x7=7
	15			122

Thus, SGPA $= \frac{122}{15} = 8.13$

Illustration for CGPA

I Semester	II Semester	III Semester	IV Semester
Credit: 20 SGPA: 8.13	Credit: 20 SGPA: 6.9	Credit: 20 SGPA: 7.3	Credit: 21 SGPA: 6.8
V Semester	**VI Semester**	**VII Semester**	**VIII Semester**
Credit: 20 SGPA: 8.2	Credit: 21 SGPA: 7.4	Credit: 19 SGPA: 7.2	Credit: 19 SGPA: 7.8

Thus, CGPA

$$\frac{(21\times 8.13)+(21\times 6.9)\times(26\times 7.3)+(27\times 6.8)+(28\times 8.2)(28\times 7.2)(24\times 7.2)(21\times 7.8)}{196}$$

$=7.432$

14.0 AWARD OF CLASS

14.1 After a student has satisfied the requirement prescribed for the completion of the program and is eligible for the award of B.Tech. Degree he/she shall be placed in one of the following four classes:

CGPA ≥ 7.5	CGPA ≥ 6.5 and < 7.5	CGPA ≥ 5.0 and < 6.5	CGPA ≥ 4.0 and < 5.0	CGPA < 4.0
First Class with Distinction	**First Class**	**Second Class**	**Pass Class**	**Fail**

A student with final CGPA is < 4.00 will not be eligible for the Award of the Degree.

15.0 CONDUCT OF SEMESTER END EXAMINATIONS AND EVALUATION

15.1 Semester end examination shall be conducted by the Controller of Examinations (COE) by inviting Question Papers from the External Examiners

15.2 Question papers may be moderated for the coverage of syllabus, pattern of questions by a Semester End Examination Committee chaired by CoE and senior subject expert before the commencement of semester end examinations. Internal Examiner shall prepare a detailed scheme of valuation.

15.3 The answer papers of semester end examination should be evaluated by the first examiner immediately after the completion of exam and the award sheet should be submitted to CoE in a sealed cover before the same papers are kept for second evaluation by external examiner.

15.4 In case of difference is more than 15% of marks, the answer paper shall be re-evaluated by a third examiner appointed by the Examination Committee and the marks awarded by third examiner is compared with first and second evaluation marks and higher marks of minimum difference pair will be considered as final marks.

15.5 CoE shall invite required number of external examiners to evaluate all the end-semester answer scripts on a prescribed date(s). Practical laboratory exams are conducted involving external examiners.

15.6 Examinations Control Committee shall consolidate the marks awarded by both the examiners and award grades.

16.0 SUPPLEMENTARY EXAMINATIONS

Apart from the regular End Examinations the institute may also schedule and conduct supplementary examinations for all subjects for the benefit of students with backlogs. Such students writing supplementary examinations as supplementary candidates may have to write more than one examination per day.

17.0 ATTENDANCE REQUIREMENTS AND DETENTION POLICY

17.1 A candidate shall put in a minimum required attendance of 75 % in that semester. Otherwise, s/he shall be declared detained and has to repeat semester.

17.2 For cases of medical issues, deficiency of attendance in a semester to the extent of 10% may be condoned by the College Academic Committee (CAC) on the recommendation of Head of the department if their attendance is between 75% and 65% in a semester, subjected to submission of medical certificates, medical case file and other needful documents to the concerned departments. The condonation is permitted maximum of two times during the entire course of study.

17.3 A prescribed fee shall be payable towards condonation of shortage of attendance.

17.4 A student shall not be promoted to the next semester unless he/she satisfies the attendance requirement of the present semester, as applicable. They may seek readmission into that semester when offered next. If any candidate fulfills the attendance requirement in the present semester, he/she shall not be eligible for readmission into the same class.

17.5 Any student against whom any disciplinary action by the institute is pending shall not be permitted to attend any SEE in that semester.

18.0 PROMOTION POLICIES

The following academic requirements have to be satisfied in addition to the attendance requirements mentioned in item no. 17.

18.1 A student shall be promoted from IV Semester to V Semester only if he/she acquires 24 credits (i.e 40% of total credits) that have been studied up to III Semester from the following examinations, irrespective of whether the candidates takes the end examinations or not as per the normal course of the study

B.Tech I Semester - one Regular and two Supplementary

B.Tech II Semester - one Regular and one Supplementary

B.Tech III Semester - one Regular only

18.2 A student shall be promoted from VI Semester to VII Semester only if he/she acquires 40 credits(i.e 40% of total credits) that have been studied up to V Semester from the following examinations, irrespective of whether the candidates takes the end examinations or not as per the normal course of the study

B.Tech I Semester - one Regular and four Supplementary

B.Tech II Semester - one Regular and three Supplementary

B.Tech III Semester - one Regular and two Supplementary

B.Tech IV Semester - one Regular and one Supplementary

B.Tech V Semester - one Regular only

18.3 A student shall be promoted from VI Semester to VII Semester only if he/she acquires 24 of the credits (i.e 40% of the credits) from the courses that have been studied up to V Semester from all the regular and supplementary examinations until V Semester.

- Two regular and one supplementary examinations of III Semester.
- One regular and one supplementary examinations of IV Semester.
- One regular examination of V semester.

18.4 A student shall register and put up minimum attendance in all 120 credits and earn all the 120 credits. Marks obtained in all 120 credits shall be considered for the calculation of aggregate percentage of marks obtained.

18.5 Students who fail to earn 120 credits as indicated in the course structure within six academic years from the year of their admission shall forfeit their seat in B.Tech. Course and their admission shall stand cancelled.

19.0 GRADUATION REQUIREMENTS

The following academic requirements shall be met for the award of the B.Tech degree.

19.1 Student shall register and acquire minimum attendance in all courses and secure 196 credits for regular program and 154 credits for lateral entry program.

19.2 A student of a regular program, who fails to earn 196 credits within eight consecutive academic years from the year of his/her admission with a minimum CGPA of 4.0, shall forfeit his/her degree and his/her admission stands cancelled.

19.3 A student of a lateral entry program who fails to earn 154 credits within six consecutive academic years from the year of his/her admission with a minimum CGPA of 4.0, shall forfeit his/her degree and his/her admission stands cancelled.

20.0 REVALUATION

A student, who seeks the re-evaluation of the answer script, is directed to apply for the photocopy of his/her semester examination answer paper(s) in the theory course(s), within 5 working days from the declaration of results in the prescribed format with prescribed fee to the Controller of Examinations through the Head of the department. On receiving the photocopy, the student can consult with a competent member of faculty and seek the opinion for revaluation. Based on the recommendations, the student can register for the revaluation with prescribed fee. The Controller of Examinations shall arrange for the revaluation and declare the results. Revaluation is not permitted to the courses other than theory courses.

21.0 TEMPORARY BREAK OF STUDY FROM THE PROGRAMME

21.1 A candidate is normally not permitted to break the study. However, if a candidate intends to temporarily discontinue the program in the middle for valid reasons (such as accident or hospitalization due to prolonged ill health) and to rejoin the program after the break from the commencement of the respective semester as and when it is offered , s/he shall apply to the Principal in advance. Such application shall be submitted before the commencement of the semester in question and forwarded through the Head of the department stating the reasons for

such withdrawal together with supporting documents and endorsement of his / her parent / guardian.

21.2 The institute shall examine such an application and if it finds the case to be genuine, it may permit the student to rejoin. Such permission is accorded only to those who do not have any outstanding dues like tuition fee etc.

21.3 The total period for completion of the program reckoned from the commencement of the semester to which the candidate was first admitted shall not exceed the maximum period specified in clause 19.0. The maximum period includes the break period.

22.0 TERMINATION FROM THE PROGRAMME

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

22.1 The student fails to satisfy the requirements of the program within the maximum period stipulated for that program.

22.2 A student shall not be permitted to study any semester more than three times during the entire Program of study.

22.3 The student fails to satisfy the norms of discipline specified by the institute from time to time.

23.0 WITH-HOLDING OF RESULTS

If the candidate has any dues not paid to the institute or if any case of indiscipline or malpractice is pending against him/her, the result of the candidate shall be withheld and he/she will not be allowed / promoted into the next higher semester. The issue of awarding degree is liable to be withheld in such cases.

24.0 STUDENT TRANSFERS

Student transfers shall be as per the guidelines issued by the Government of Andhra Pradesh from time to time.

25.0 GRADUATION DAY

The institute shall have its own annual Graduation Day for the award of

Degrees to students completing the prescribed academic requirements in each case, in consultation with the University and by following the provisions in the Statute. The college shall institute prizes and medals to meritorious students and award them annually at the Graduation Day. This will greatly encourage the students to strive for excellence in their academic work.

26.0 CONDUCT AND DISCIPLINE

- Students shall conduct themselves within and outside the premises of the Institute in a descent and dignified manner befitting the students of Audisankara College of Engineering & Technology.
- As per the order of the Honorable Supreme Court of India, ragging in any form is considered a criminal offence and is totally banned. Any form of ragging will be severely dealt with the following acts of omission and / or commission shall constitute gross violation of the code of conduct and are liable to invoke disciplinary measures with regard to ragging.

(i) Lack of courtesy and decorum; indecent behavior anywhere within or outside the college campus.

(ii) Damage of college property or distribution of alcoholic drinks or any kind of narcotics to fellow students / citizens.

- Possession, consumption or distribution of alcoholic drinks or any kind of narcotics or hallucinogenic drugs.
- Mutilation or unauthorized possession of library books.
- Noisy and unruly behavior, disturbing studies of fellow students.
- Hacking in computer systems (such as entering into other person's areas without prior permission, manipulation and / or damage of computer hardware and software or any other cyber crime etc.
- Usage of camera /cell phones in the campus.
- Plagiarism of any nature.
- Any other act of gross indiscipline as decided by the college academic council from time to time.

- Commensurate with the gravity of offense, the punishment may be reprimand, fine, expulsion from the institute/ hostel, debarring from examination, disallowing the use of certain facilities of the Institute, rustication for a specified period or even outright expulsion from the Institute, or even handing over the case to appropriate law enforcement authorities or the judiciary, as required by the circumstances.
- For an offence committed in (i) a hostel (ii) a department or in a class room and (iii) elsewhere, the chief Warden, the concern Head of the Department and the Principal respectively, shall have the authority to reprimand or impose fine.
- Cases of adoption of unfair means and/ or any malpractice in an examination shall be reported to the principal for taking appropriate corrective action.
- All cases of serious offence, possibly requiring punishment other than reprimand, shall be reported to the Academic council of the college.
- The Institute Level Standing Disciplinary Action Committee constituted by the academic council shall be the authority to investigate the details of the offence, and recommend disciplinary action based on the nature and extent of the offence committed.
- The Principal shall deal with any problem, which is not covered under these rules and regulations.

27.0 GRIEVANCE REDRESSAL COMMITTEE

Grievance and Redressal Committee constituted by the Principal shall deal with all grievances pertaining to the academic / administrative / disciplinary matters. All the students must abide by the code and conduct rules prescribed by the college from time to time.

28.0 TRANSITORY REGULATIONS

required to do all the courses in the curriculum prescribed for the batch of students in which the student joins subsequently. However, exemption will be given to those candidates who have already passed such courses in the earlier semester(s) s/he was originally admitted into and substitute subjects

are offered in place of them as decided by the Board of Studies. However, the decision of the Board of Studies will be final.

28.1 Four Year B.Tech Regular course

A student who is following Jawaharlal Nehru Technological University Anantapur (JNTUA) curriculum and detained due to shortage of attendance at the end of the first semester shall join the autonomous batch of first semester. Such students shall study all the courses prescribed for the batch in which the student joins and considered on par with regular candidates of Autonomous stream and will be governed by the autonomous regulations.

A student who is following JNTUA curriculum, detained due to lack of credits or shortage of attendance at the end of the second semester or at the subsequent semesters shall join with the autonomous batch in the appropriate semester. Such candidates shall be required to pass in all the courses in the program prescribed by the Board of Studies concerned for that batch of students from that semester onwards to be eligible for the award of degree. However, exemption will be given in the courses of the semester(s) of the batch which he had passed earlier and substitute courses will be offered in place of them as decided by the Board of Studies. The student has to clear all his backlog courses up to previous semester by appearing for the supplementary examinations conducted by JNTUA for the award of degree. The total number of credits to be secured for the award of the degree will be sum of the credits up to previous semester under JNTUA regulations and the credits prescribed for the semester in which a candidate seeks readmission and subsequent semesters under the autonomous stream. The class will be awarded based on the academic performance of a student in the autonomous pattern.

28.2 Three Year B.Tech program under Lateral Entry Scheme

A student who is following JNTUA curriculum and detained due to shortage of attendance at the end of the first semester of second year shall join the autonomous batch of third semester. Such students shall study all the courses prescribed for the batch in which the student joins and considered on par with Lateral Entry regular candidates of Autonomous stream and will be governed by the autonomous regulations.

A student who is following JNTUA curriculum, detained due to lack of credits or shortage of attendance at the end of the second semester of second year or at the subsequent semesters shall join with the autonomous batch in the appropriate semester. Such candidates shall be required to pass in all the courses in the program prescribed by the Board of Studies concerned for that batch of students from that semester onwards to be eligible for the award of degree. However, exemption will be given in the courses of the semester(s) of the batch which he had passed earlier and substitute courses are offered in place of them as decided by the Board of Studies. The student has to clear all his backlog courses up to previous semester by appearing for the supplementary examinations conducted by JNTUA for the award of degree. The total number of credits to be secured for the award of the degree will be sum of the credits up to previous semester under JNTUA regulations and the credits prescribed for the semester in which a candidate seeks readmission and subsequent semesters under the autonomous status. The class will be awarded based on the academic performance of a student in the autonomous pattern.

28.3 Transfer candidates (from non-autonomous college affiliated to JNTUA)

A student who is following JNTUA curriculum, transferred from other college to this institute in third semester or subsequent semesters shall join with the autonomous batch in the appropriate semester. Such candidates shall be required to pass in all the courses in the program prescribed by the Board of Studies concerned for that batch of students from that semester onwards to be eligible for the award of degree. However, exemption will be given in the courses of the semester(s) of the batch which he had passed earlier and substitute courses are offered in their place as decided by the Board of Studies. The student has to clear all his backlog courses up to previous semester by appearing for the supplementary examinations conducted by JNTUA for the award of degree. The total number of credits to be secured for the award of the degree will be the sum of the credits upto previous semester under JNTUA regulations and the credits prescribed for the semester in which a candidate joined after transfer and subsequent semesters under the autonomous status. The class will be awarded based on the academic performance of a student in the autonomous pattern.

28.4 Transfer candidates (from an autonomous college affiliated to JNTUA)

A student who has secured the required credits upto previous semesters as per the regulations of other autonomous institutions shall also be permitted to be transferred to this institute. A student who is transferred from the other autonomous colleges to this institute in third semester or subsequent semesters shall join with the autonomous batch in the appropriate semester. Such candidates shall be required to pass in all the courses in the program prescribed by the Board of Studies concerned for that batch of students from that semester onwards to be eligible for the award of degree. However, exemption will be given in the courses of the semester(s) of the batch which he had passed earlier and substitute subjects are offered in their place as decided by the Board of Studies. The total number of credits to be secured for the award of the degree will be the sum of the credits upto previous semester as per the regulations of the college from which he is transferred and the credits prescribed for the semester in which a candidate joined after transfer and subsequent semesters under the autonomous status. The class will be awarded based on the academic performance of a student in the autonomous pattern.

29.0 REVISION OF REGULATIONS AND CURRICULUM

The Institute from time to time may revise, amend or change the regulations, scheme of examinations and syllabi if found necessary and on approval by the Academic Council and the Governing Body shall come into force and shall be binding on the students, faculty, staff, all authorities of the Institute and others concerned.

FAILURE TO READ AND UNDERSTAND

THE REGULATIONS IS NOT AN EXCUSE

B.TECH - PROGRAM OUTCOMES (POS)

PO-1: Apply the knowledge of Mathematics, Science, Engineering fundamentals, and Engineering specialization to the solution of complex Engineering problems (**Engineering Knowledge**).

PO-2: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences **(Problem Analysis).**

PO-3: 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 **(Design/Development of Solutions).**

PO-4: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions **(Conduct Investigations of Complex Problems).**

PO-5: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations **(Modern Tool Usage).**

PO-6: 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 **(The Engineer and Society).**

PO-7: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development **(Environment and Sustainability).**

PO-8: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice **(Ethics).**

PO-9: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings **(Individual and Team Work).**

PO-10: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions (Communication).

PO-11: Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO-12: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change **(Life-long learning).**

FREQUENTLY ASKED QUESTIONS AND ANSWERS ABOUT AUTONOMY

1. Who grants Autonomy? UGC, Govt., AICTE or University

In case of Colleges affiliated to a university and where statutes for grant of autonomy are ready, it is the respective University that finally grants autonomy but only after concurrence from the respective state Government as well as UGC. The State Government has its own powers to grant autonomy directly to Govt. and Govt. aided Colleges.

2 Shall Audisankara College of Engineering & Technology award its own Degree?

No. Degree will be awarded by Jawaharlal Nehru Technological University Anantapur, Ananthapuramu with a mention of the name Audisankara College of Engineering & Technology on the Degree Certificate.

3 What is the difference between a Deemed to be University and an Autonomy College?

A Deemed to be University is fully autonomous to the extent of awarding its own Degree. A Deemed to be University is usually a Non-Affiliating version of a University and has similar responsibilities like any University. An Autonomous College enjoys Academic Autonomy alone. The University to which an autonomous college is affiliated will have checks on the performance of the autonomous college.

4 How will the Foreign Universities or other stake – holders know that we are an Autonomous College?

Autonomous status, once declared, shall be accepted by all the stake holders. The Govt. of Andhra Pradesh mentions autonomous status during the First Year admission procedure. Foreign Universities and Indian Industries will know our status through our website.

5 What is the change of Status for Students and Teachers if we become Autonomous?

An autonomous college carries a prestigious image. Autonomy is actually earned out of our continued past efforts on academic performances, our capability of self- governance and the kind of quality education we offer.

6 Who will check whether the academic standard is maintained / improved after Autonomy? How will it be checked?

There is a built in mechanism in the autonomous working for this purpose. An Internal Committee called Academic Programme Evaluation Committee, which will keep a watch on the academics and keep its reports and recommendations every year. In addition the highest academic council also supervises the academic matters. The standards of our question papers, the regularity of academic calendar, attendance of students, speed and transparency of result declaration and such other parameters are involved in this process.

7 Will the students of Audisankara College of Engineering & Technology as an Autonomous College qualify for University Medals and Prizes for academic excellence?

No. Audisankara College of Engineering & Technology has instituted its own awards, medals, etc. for the academic performance of the students. However for all other events like sports, cultural on co-curricular organized by the University the students shall qualify.

8 Can Audisankara College of Engineering & Technology have its own Convocation?

No. Since the University awards the Degree the Convocation will be that of the University, but there will be Graduation Day at Audisankara College of Engineering & Technology.

9 Can Audisankara College of Engineering & Technology give a provisional degree certificate?

Since the examinations are conducted by Audisankara College of Engineering & Technology and the results are also declared Audisankara College of Engineering & Technology, the college sends a list of successful candidates with their final Grades and Grade Point Averages including CGPA to the University. Therefore with the prior permission of the University the college will be entitled to give the provisional certificate.

10 Will Academic Autonomy make a positive impact on the Placements or Employability?

Certainly. The number of students qualifying for placement interviews is expected to improve, due to rigorous and repetitive classroom teaching and continuous assessment. Also the autonomous status is more responsive to the needs of the industry. As a result therefore, there will be a lot of scope for industry oriented skill development built-in into the system. The graduates from an autonomous college will therefore represent better employability.

11 What is the proportion of Internal and External Assessment as an Autonomous College?

Presently, it is 60 % external and 40% internal. As the autonomy matures the internal assessment component shall be increased at the cost of external assessment.

12 Is it possible to have complete Internal Assessment for Theory or Practicals?

Yes indeed. We define our own system. We have the freedom to keep the proportion of external and internal assessment component to choose.

13 Why Credit based Grade System?

The credit based grade system is an accepted standard of academic performance the world over in all Universities. The acceptability of our graduates in the world market shall improve.

14 What exactly is a Credit based Grade System?

The credit based grade system defines a much better statistical way of

judging the academic performance. One Lecture Hour per week of Teaching Learning process is assigned One Credit. One hour of laboratory work is assigned half credit. Letter Grades like S,A+,A, B+,B,C,F etc. are assigned for a Range of Marks. (e.g. 90% and above is S, 80 to 89 % could be A+ etc.) in Absolute Grading System while grades are awarded by statistical analysis in relative grading system. We thus dispense with sharp numerical boundaries. Secondly, the grades are associated with defined Grade Points in the scale of 1 to 10. Weighted Average of Grade Points is also defined Grade Points are weighted by Credits and averaged over total credits in a Semester. This process is repeated for all Semesters and a CGPA defines the Final Academic Performance

15 What are the norms for the number of Credits per Semester and total number of Credits for UG/PG programme?

These norms are usually defined by UGC or AICTE. Usually around 28 Credits per semester is the accepted norm.

16 What is a Semester Grade Point Average (SGPA)?

The performance of a student in a semester is indicated by a number called SGPA. The SGPA is the weighted average of the grade points obtained in all the courses registered by the student during the semester.

$$SGPA = \sum_{i=1}^{n} (C_i G_i) / \sum_{i=1}^{n} C_i$$

Where, C_i is the number of credits of the i^{th} course and G_i is the grade point scored by the student in the i^{th} course and i represent the number of courses in which a student registered in the concerned semester. SGPA is rounded to two decimal places.

17 What is a Cumulative Grade Point Average (CGPA)?

An up-to-date assessment of overall performance of a student from the time of his first registration is obtained by calculating a number called CGPA, which is weighted average of the grade points obtained

in all the courses registered by the students since he entered the Institute.

$$CGPA = \sum_{j=1}^{m} (C_j S_j) / \sum_{j=1}^{m} C_j$$

Where, S_j is the SGPA of the j^{th} semester and C_j is the total number of credits upto the semester and *m*represent the number of semesters completed in which a student registered upto the semester. CGPA is rounded to two decimal places.

18 Is there any Software available for calculating Grade point averages and converting the same into Grades?

Yes, the institute has its own MIS software for calculation of SGPA, CGPA, etc.

19 Will the teacher be required to do the job of calculating SGPAs etc. and convert the same into Grades?

No. The teacher has to give marks obtained out of whatever maximum marks as it is. Rest is all done by the computer.

20 Will there be any Revaluation or Re-Examination System?

No. There will double valuation of answer scripts. There will be a makeup Examination after a reasonable preparation time after the End Semester Examination for specific cases mentioned in the Rules and Regulations. In addition to this, there shall be a 'summer term' (compressed term) followed by the End Semester Exam, to save the precious time of students.

21 How fast Syllabi can be and should be changed?

Autonomy allows us the freedom to change the syllabi as often as we need.

22 Will the Degree be awarded on the basis of only final year performance?

No. The CGPA will reflect the average performance of all the semester taken together.

23 What are Statutory Academic Bodies?

Governing Body, Academic Council, Examination Committee and Board of Studies are the different statutory bodies. The participation of external members in every body is compulsory. The institute has nominated professors from IIT, NIT, University (the officers of the rank of Pro-vice Chancellor, Deans and Controller of Examinations) and also the reputed industrialist and industry experts on these bodies.

24 Who takes Decisions on Academic matters?

The Governing Body of institute is the top academic body and is responsible for all the academic decisions. Many decisions are also taken at the lower level like Boards of Studies. Decisions taken at the Board of Studies level are to be ratified at the Academic Council and Governing Body.

25 What is the role of Examination committee?

The Examinations Committee is responsible for the smooth conduct of internal, End Semester and makeup Examinations. All matters i nvolving the conduct of examinations spot valuations, tabulations preparation of Grade Cards etc, fall within the duties of the Examination Committee.

26 Is there any mechanism for Grievance Redressal?

The institute has grievance redressal committee, headed by Dean - Student affairs and Dean - IQAC.

27 How many attempts are permitted for obtaining a Degree?

All such matters are defined in Rules & Regulation

28 Who declares the result?

The result declaration process is also defined. After tabulation work wherein the SGPA, CGPA and final Grades are ready, the entire result is reviewed by the Moderation Committee. Any unusual deviations or gross level discrepancies are deliberated and removed. The entire result is discussed in the Examinations and Result Committee for its approval. The result is then declared on the institute notice boards as well put on the web site and Students Corner. It is eventually sent to the University.

29 Who will keep the Student Academic Records, University or Audisankara College of Engineering & Technology?

It is the responsibility of the Dean, Academics of the Autonomous College to keep and preserve all the records.

30 What is our relationship with the JNT University?

We remain an affiliated college of the JNT University. The University has the right to nominate its members on the academic bodies of the college.

31 Shall we require University approval if we want to start any New Courses?

Yes, It is expected that approvals or such other matters from an autonomous college will receive priority.

32 Shall we get autonomy for PG and Doctoral Programmes also?

Yes, presently our PG programmes also enjoying autonomous status..

MALPRACTICES RULES

DISCIPLINARY ACTION FOR / IMPROPER CONDUCT IN EXAMINATIONS

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

4.	Smuggles in the Answer book or additional sheet or takes out or arranges to send out the question paper during the examination or answer book or additional sheet, during or after the examination.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all semester end examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
5.	Uses objectionable, abusive or offensive language in the answer paper or in letters to the examiners or writes to the examiner requesting him to award pass marks.	Cancellation of the performance in that subject.
6.	Refuses to obey the orders of the Controller of Examinations /Additional Controller of Examinations/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 COE 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 COE 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 Institute premises or engages in any other act which in the opinion of the officer on duty amounts to use of unfair means or misconduct or has the tendency to disrupt the orderly conduct of the examination.	In case of students of the college, they shall be expelled from examination halls and cancellation of their performance in that subject and all other subjects the candidate(s) has (have) already appeared and shall not be permitted to appear for the remaining examinations of the subjects of that semester/year. The candidates also are debarred and forfeit their seats. In case of outsiders, they will be handed over to the police and a police case is registered against them.
7.	Leaves the exam hall taking away answer script or intentionally tears of the script or any part thereof inside or outside the examination hall.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all semester end examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.

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

B.Tech I Semester – Civil Engineering

S.No	Course Code	Course Title	Hours per Week			Marks			Credits
			L	T	P	IM	EM	T	
1	18MD101	Induction Training – 3 weeks (Mandatory Course)	-	Z`-	-	-	-	-	-
2	18BS101	Mathematics-I	3	1	0	30	70	100	4
3	18BS102	Applied Physics	3	0	0	30	70	100	3
4	18ME101	Engineering Mechanics	3	0	0	30	70	100	3
5	18EE101	Basic Electrical Engineering	3	0	0	30	70	100	3
6	18CS101	Programming for Problem Solving	3	0	0	30	70	100	3
7	18BS107	Physics Lab	0	0	2	25	50	75	1
8	18ME104	Workshop Practice	0	0	2	25	50	75	1
9	18CS102	Programming for Problem Solving Lab	0	0	4	25	50	75	2
Total			**15**	**1**	**8**	**225**	**500**	**725**	**20**

B.Tech II Semester – Civil Engineering

S.No	Course Code	Course Title	Hours per Week			Marks			Credits
			L	T	P	IM	EM	T	
1	18BS201	Mathematics-II	3	1	0	30	70	100	4
2	18BS103	Applied Chemistry	3	0	0	30	70	100	3
3	18BS104	English	3	0	0	30	70	100	3
4	18ME102	Engineering Graphics	1	0	4	30	70	100	3
5	18CS201	Fundamentals of Data Structures	3	0	0	30	70	100	3
6	18BS108	Chemistry Lab	0	0	2	25	50	75	1
7	18BS109	English Lab	0	0	2	25	50	75	1
8	18CS203	Fundamentals of Data Structures Lab	0	0	4	25	50	75	2
Total			**13**	**1**	**12**	**225**	**500**	**725**	**20**

B.Tech III Semester – Civil Engineering

S.No	Course Code	Course Title	Hours per Week			Marks			Credits
			L	T	P	IM	EM	T	
1	18CE301	Materials, Testing and Evaluation	3	1	0	30	70	100	3
2	18CE302	Mechanics of Materials-I	3	0	0	30	70	100	3
3	18CE303	Fluid Mechanics	3	0	0	30	70	100	3
4	18CE304	Surveying and Geomatics	3	0	0	30	70	100	3
5	18CE305	Engineering Geology	3	0	0	30	70	100	3
6	18CE306	Civil Engineering Societal and Global Impact	2	0	0	30	70	100	2
7	18CE307	Mechanics of Materials Lab	0	0	2	25	50	75	1
8	18CE308	Engineering Geology Lab	0	0	2	25	50	75	1
9	18CE309	Surveying Lab-I	0	0	2	25	50	75	1
Non-Credit Courses									
10	18AS301	Professional Society Activities-I	2	0	0	0	0	0	0
11	18AS302	Soft Skills Practice	0	0	2	0	0	0	0
12	18MD301	Environmental Sciences (Mandatory Course)	2	0	0	0	0	0	0
		Total	**21**	**1**	**8**	**255**	**570**	**825**	**20**

B.Tech IV Semester – Civil Engineering

S.No	Course Code	Course Title	Hours per Week			Marks			Credits
			L	T	P	IM	EM	T	
1	18BS401	Probability and Statistics	3	1	0	30	70	100	3
2	18CE401	Hydraulic Engineering	3	0	0	30	70	100	3
3	18CE402	Mechanics of Materials-II	3	0	0	30	70	100	3
4	18CE403	Environmental Engineering	3	0	0	30	70	100	3
5	18CE404	Concrete Technology	3	0	0	30	70	100	3
6	18BS303	Managerial Economics and Financial Analysis	2	0	0	30	70	100	2
7	18CE405	Hydraulic Engineering Lab	0	0	2	25	50	75	1
8	18CE406	Environmental Engineering Lab	0	0	2	25	50	75	1
9	18CE407	Surveying Lab-II	0	0	2	25	50	75	1
10	18CE408	Technical Seminar	0	2	0	50	-	50	1
Non-Credit Courses									
11	18AS401	Professional Society Activities-II	2	0	0	0	0	0	0
12	18AS402	Communication Skills Practice	0	0	2	0	0	0	0
		Total	**19**	**3**	**8**	**305**	**570**	**875**	**21**

B.Tech V Semester – Civil Engineering

S.No	Course Code	Course Title	Hours per Week			Marks			Credits
			L	T	P	IM	EM	T	
1	18CE501	Basic Structural Analysis	3	1	0	30	70	100	3
2	18CE502	Hydrology and Water Resources Engineering	3	0	0	30	70	100	3
3	18CE503	Estimation ,Costing and valuation	3	0	0	30	70	100	3
4	18CE504	Basic Reinforced Concrete Design	3	0	0	30	70	100	3
5	18CE505	Geotechnical Engineering	3	0	0	30	70	100	3
6		**Open Elective-I**	2	0	0	30	70	100	2
7	18CE509	Computer Aided Drafting	0	0	2	25	50	75	1
8	18CE510	Material Testing and Evaluation Lab	0	0	2	25	50	75	1
9	18CE511	Geotechnical Engineering Lab	0	0	2	25	50	75	1
Non-Credit Courses									
10	18AS501	Professional Society Activities-III	2	0	0	0	0	0	0
11	18AS502	Quantitative Aptitude	2	0	0	0	0	0	0
12	18MD501	Indian Constitution (Mandatory Course)	2	0	0	0	0	0	0
		Total	**23**	**1**	**6**	**255**	**570**	**825**	**20**

B.Tech VI Semester – Civil Engineering

S.No	Course Code	Course Title	Hours per Week			Marks			Credits
			L	T	P	IM	EM	T	
1	18CE601	Advanced Structural Analysis	3	1	0	30	70	100	3
2	18CE602	Highway Engineering	3	0	0	30	70	100	3
3	18CE603	Advanced Reinforced Concrete Design	3	0	0	30	70	100	3
4	18CE604	Design of Steel Structures-I	3	0	0	30	70	100	3
5	**Elective-I**								
	18CE605	Foundation Engineering	3	0	0	30	70	100	3
	18CE606	Rural Water Supply and On Site Sanitation Systems							
	18CE607	Hydraulic Structures/ Irrigation Engineering							
	18CE608	Available MOOCs/ 12 week NPTEL courses suggested by the department							
6	**Open Elective-II**		2	0	0	30	70	100	2
7	18CE612	Irrigation Design and Practice Lab	0	0	2	25	50	75	1
8	18CE613	Design & Drawing of Environmental Engineering Lab	0	0	2	25	50	75	1
9	18CE614	Transportation Engineering Lab	0	0	2	25	50	75	1
10	18CE615	Term Paper	0	2	0	50	-	50	1
Non-Credit Courses									
11	18AS601	Professional Society Activities-IV	2	0	0	0	0	0	0
12	18AS602	Technical Aptitude	2	0	0	0	0	0	0
		Total	**21**	**3**	**6**	**305**	**570**	**875**	**21**

B.Tech VII Semester – Civil Engineering

S.No	Course Code	Course Title	Hours per Week			Marks			Credits
			L	T	P	IM	EM	T	
1	18CE701	Design of Steel Structures-II	3	1	0	30	70	100	3
2	18CE702	Repair and Rehabilitation of Structures	3	0	0	30	70	100	3
3	**Open Elective-III**		2	0	0	30	70	100	2
4	**Elective-II**								
	18CE706	Advanced Structural Design	3	0	0	30	70	100	3
	18CE707	Construction Planning and Scheduling							
	18CE708	Pavement Design and Geometric Design of Highways							
	18CE709	Available MOOCs							
5	**Elective-III**								
	18CE710	Prestressed Concrete	3	0	0	30	70	100	3
	18CE711	Railway , Airport , Doc and Harbour Engineering							
	18CE712	Remote Sensing and GIS							
	18CE713	Available MOOCs/ 12 week NPTEL courses suggested by the department							
6	18CE714	Structural Designing Lab	0	0	2	25	50	75	1
7	18CE715	Survey Camp	0	0	2	25	50	75	1
8	18CE716	Project Work Phase-I	0	0	4	50	50	100	2
9	18CE717	Comprehensive Assessment	0	0	2	100	-	100	1
Non-Credit Courses									
10	18MD701	Essence of Indian Traditional Knowledge (Mandatory Course)	2	0	0	0	0	0	0
		Total	**16**	**1**	**10**	**350**	**500**	**850**	**19**

B.Tech VIII Semester – Civil Engineering

S.No	Course Code	Course Title	Hours per Week			Marks			Credits
			L	T	P	IM	EM	T	
	Elective-IV								
1	18CE801	Bridge Engineering	3	1	0	30	70	100	3
	18CE802	Experimental Stress Analysis							
	18CE803	Open Channel flow							
	18CE804	Available MOOCs							
	Elective-V								
2	18CE805	Finite Element Analysis	3	0	0	30	70	100	3
	18CE806	Environmental Impact and Assessment							
	18CE807	Traffic Engineering and Management							
	18CE808	Available MOOCs							
	Elective-VI								
3	18CE809	Ground Improvement Techniques	3	0	0	30	70	100	3
	18CE810	Solid and Hazardous Waste Management							
	18CE811	Earth quake engineering							
	18CE812	Available MOOCs/ 12 week NPTEL courses suggested by the department							
4	18CE813	Project Work Phase-II/ Internship	0	0	20	60	140	200	10
		Total	**9**	**1**	**20**	**150**	**350**	**500**	**19**

Open Electives – Civil Engineering

S.No	Code	Course
OPEN ELECTIVE-I		
1	18CE506	Disaster Management
2	18CE507	Global Information System
3	18CE508	Solid & Hazardous Waste Management
OPEN ELECTIVE-II		
4	18CE609	Sustainable Engineering and Technology
5	18CE610	Environmental Fluid Mechanics
6	18CE611	Environmental Impact Assessment and Life Cycle Analysis
OPEN ELECTIVE-III		
7	18CE703	Water and Air Quality Modeling
8	18CE704	Environmental laws and policy
9	18CE705	Infrastructure Development

MATHEMATICS-I

B.Tech I Semester: Common to CE, ME, EEE, ECE & CSE								
Course code	Category	Hours/week			Credits	Maximum Marks		
18BS101	H&S	L	T	P	C	CIA	SEE	TOTAL
		3	1	0	4	30	70	100
Contact Classes:75	Tutorial Classes: 5	Practical Classes: Nil			Total Classes:80			

OBJECTIVES

The course should enable the students to

1. Finding maxima and minima of function of two and three variables.
2. Methods of solving the differential equations of first and higher order.
3. Concept of a rank of the matrix and applying this concept to know the consistency and solving the system of linear equations.
4. Methods of finding solutions for integral and differential equations with initial conditions.

UNIT-1	PARTIAL DIFFERENTIATION AND APPLICATIONS	Classes:15

Partial differentiation; Total derivative; Jacobian; Functional dependence and independence, Taylor's theorem & Machlaurin's theorem (without proof) for function of two variables; Maxima and Minima of functions of two and three variables-method of Lagrange's method of undetermind multipliers.

UNIT-II	ORDINARY DIFFERENTIAL EQUATIONS	Classes:15

Exact- Integrating factors, Linear and Bernoulli's equations; Applications: Newton's law of cooling, Law of natural growth and decay. Second and higher order linear differential equations with constant coefficients: Non-homogeneous terms of the type $e^{ax}, \sin ax, \cos ax$, polynomial in x, $x, e^{ax}v(x)$ and $xv(x)$;Method of variation of parameters.

UNIT-III	MATRICES	Classes:15

Matrices: Types of Matrices-Symmetric, Skew-symmetric, Hermitian, Skew-Hermitian, Orthogonal & Unitary Matrices (Definitions only); Rank of a matrix by Echelon form and Normal form, solutions of system of linear equations.

UNIT-IV	EIGENVALUES AND EIGENVECTORS	Classes:15

Eigenvalues and Eigenvectors and their properties: Cayley-Hamilton theo-

rem (without proof); Finding the inverse and power of a matrix using Cayley-Hamilton theorem.

UNIT-V	LAPLACE TRANSFORMS	Classes:15

Laplace transforms of elementary functions – Properties - Transforms of derivatives, integrals–Unit step function-Dirac delta function- Periodic function. Inverse laplace transforms byPartial fractions – Properties - Convolution theorem – Application of laplace transforms toordinary differential equations of first and second order with initial conditions.

Text Books

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers.
2. T.K.V. Iyengar, B. Krishna Gandhi and Others, Engineering Mathematics (Vol – I & II) –S. Chand & Company.

Reference Books

1. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications.
2. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill.

Web References

1. www.mathplanet.com
2. www.mathworld.com

E-Text Books

1. Baidyanath Patra **–"An Introduction to Integral Transforms".**
2. W W L Chen-**"Multivariable and Vector Analysis".**

Outcomes

At the end of the course students able to

1. Expand various algebraic, trigonometric and hyperbolic functions in Fourier series in different intervals
2. Solve various boundary value problems using Fourier transforms
3. Evaluate the multiple integrals and apply the concept to find areas and volumes
4. Evaluate the line, surface and volume integrals and converting them from one form to another

APPLIED PHYSICS

B.Tech I Semester: Common to CE, ME & CSE								
Course code	Category	Hours/week			Credits	Maximum Marks		
18BS102	H&S	L	T	P	C	CIA	SEE	TOTAL
		3	0	0	3	30	70	100
Contact Classes:60	Tutorial Classes: 5		Practical Classes: Nil			Total Classes: 65		

OBJECTIVES

The course should enable the students to:

1 Students will demonstrate skills in scientific inquiry, problem solving and laboratory techniques.

2 Students will be able to demonstrate competency and understanding of the concepts found in Quantum Mechanics, Fiber optics and lasers, Semiconductor physics and a broad base of knowledge in physics.

3 The graduates will be able to solve non-traditional problems that potentially draw on knowledge in multiple areas of physics.

4 To study applications in engineering like memory devices, transformer

UNIT-I	WAVE OPTICS	Classes:15

Interference: Huygens's principle, Superposition principle and interference of light by wave front splitting and amplitude splitting, Young's double slit experiment,, Interference in thin film, Newton's rings and its applications

Diffraction: Types of Diffraction, Fraunhoffer diffraction due to a single slit, Diffraction grating.

UNIT-II	LASERS	Classes:15

Characteristics of Laser, Principle of Laser, Relation between Einstein coefficients, Population Inversion, Pumping Mechanism, Types of Lasers: Ruby laser, He-Ne laser, Semiconductor Laser, Applications of lasers.

UNIT-III	HARMONIC OSCILLATIONS	Classes:17

Introduction to Mechanical and electrical harmonic oscillators, Damped harmonic oscillator: heavy, critical and light damping, Energy decay in a damped harmonic oscillator, Quality factor, forced mechanical and electrical oscillators, electrical and mechanical impedance, Steady state motion of forced damped harmonic oscillator, Resonance.

UNIT-IV	MECHANICS	Classes:15

Newton's laws, Form of invariance of Newton's second law, Gradient explanation and significance, Equipotential surfaces, Conservation of angular momentum, Centripetal and Coriolis accelerations, Foucault pendulum, Motion of rigid body, Euler's equations of motion for a rigid body.

UNIT-V	QUANTUM MECHANICS	Classes:13

Introduction to quantum physics, Wave-particle duality, de-Broglie's hypothesis, Davisson and Germer experiment, Heisenberg's Uncertainty principle, Schrodinger's time independent wave equation, Physical significance of wave function, Particle in one dimensional box.

Text Books

1. Engineering Physics, B.K. Pandey, S. Chaturvedi - Cengage Learing.
2. K.Thyagarajan, Engineering Physics ,McGraw Hill Eduction 2015
3. Dr.S.L.Guptha,Jaiprakash nath publications-Meerut
4. D.J.Griffiths-Introduction to electrodynamics

Reference Books

1 Richard Robinett, Quantum Mechanics

2 J. Singh, Semiconductor Optoelectronics: Physics and Technology, Mc Graw-Hill inc. (1995).

3 Engineering Physics .S.Chand&Company Pvt.Ltd

Web References

1 www.physics org.com

2 https://en.wikiboos.org

E-Text Books

1 Classical mechanics by **Radovan dermi**

2 Physics of atomic and moleculs –prof K Heyne

3 quantum mechanics- **Weng cho chew**

Outcomes

At the end of the course students able to

1 The student would be able to learn the fundamental concepts on Quantum behavior of matter in its micro state.

2 Design, characterization and study of properties of material help the students to prepare new materials for various engineering applications

ENGINEERING MECHANICS

B.Tech I Semester:	Common to CE & ME							
Course code	Category	Hours/week			Credits	Maximum Marks		
18ME101	Core	L	T	P	C	CIA	SEE	TOTAL
		3	0	0	3	30	70	100
Contact Classes: 60	Tutorial Classes: -Nil		Practical Classes: Nil			Total Classes: 60		

OBJECTIVES

The course should enable the students to

I. Gain knowledge on force and force systems

II. Understand the concept of friction

III. Understand the process of determining centroid and moment of **inertia of different objects**

UNIT-I	BASICS OF ENGINEERING MECHANICS	Classes:12

Basics of Engineering Mechanics: Basic Concepts of Engineering Mechanics: Characteristics of a force – various types of force systems – Resultant – Composition and resolution of forces –Principles of moments of force – Couples.

Resultants of Force System: Resultants of different types of force systems.

Equilibrium of Forces: Free body diagrams – Equations of equilibrium for different force systems

UNIT-II	FRICTION	Classes:12

Friction: Types of Friction, Laws of Friction, equilibrium of force systems involving frictional forces, Limiting Friction–Cone of Limiting Friction - Ladder Friction - Wedge, Screw jack and differential Screw Jack.

UNIT-III	CENTROID	Classes:12

Centroid: Centroids of Simple Figures (From Basic Principles) – Centroids of Composite Figures.

Centre of gravity: Centre of Gravity of Simple Body -Centre of Gravity of Composite Bodies- Pappus Theorem.

Moment of inertia: Definition – Parallel Axis Theorem and Perpendicular Axis Theorem – Polar Moment of Inertia – Radius of Gyration – Moment of Inertia of Basic Shapes - Composite Sections - Simple Solids.

UNIT-IV	KINEMATICS	Classes:12

Kinematics: Introduction, Rectilinear kinematics: Continuous motion, General curvilinear motion, Curvilinear motion: Rectangular components, Motion of a projectile, curvilinear motion: Normal and tangential components, Absolute dependent motion analysis of two particles.

UNIT-V	KINETICS	Classes:12

Kinetics: Newton's law of motion, The equation of motion, Equation of motion for a system of particles, Equation of motion: Rectangular coordinates, Equation of motion: Normal and tangential Coordinates.

Text Books

1. A Textbook of Engineering Mechanics,3rd Edition, Bhavikatti S S , New Age International, 2016
2. Engineering Mechanics, Dr. R. K. Bansal, 4th Edition, Laxmi Publications, 2011

Reference Books

1. Engineering Mechanics, D.S. Kumar, 3rd Edition, S.K. KATARIA & SONS
2. Singer's Engineering Mechanics: Statics and Dynamics, 3rd Edition, K. Vijaya Kumar Reddy, J. Suresh Kumar, B.S. Publications, 2011.

3. Engineering Mechanics: Statics, 6th Edition, J L Meriam, L G Kraige, Wiley India Pvt. Ltd, 2001.

Web References

1. https://nptel.ac.in/courses/122104015/

2. https://nptel.ac.in/courses/112103109/

E-Text Books

1. https://books.google.co.in/books?isbn=8122423744

2. https://books.google.co.in/books?isbn=8122406173

3. https://books.google.co.in/books?isbn=8122427669

Outcomes

At the end of the course student will be able to

1. Construct free body diagrams

2. Develop appropriate equilibrium equations

3. Determine the centroid of composite sections

4. Determine moment of inertia for composite sections

5. Understand the concept of friction and apply in real life problems

6. Understand kinetics and kinematics of bodies.

BASIC ELECTRICAL ENGINEERING

B.Tech I Semester: Common to CE, ME & CSE								
Course code	Category	Hours/week			Credits	Maximum Marks		
18EE101	Core	L	T	P	C	CIA	SEE	TOTAL
		3	-	-	3	30	70	100
Contact Classes:60	Tutorial Classes: -	Practical Classes: Nil				Total Classes:60		

OBJECTIVES

The course should enable the students to

1. To understand the Basic Fundamentals in Electrical Circuits.
2. To study the construction, Principle of operation and performance of DC and AC Machines
3. To understand the concepts of Electrical Installations.

UNIT-I	DC CIRCUITS	Classes:12

DC Circuits: Electrical circuit elements (R, L and C), voltage and current sources, Kirchhoff current and voltage laws, Series-parallel resistive circuits, star-delta transformations. Analysis of simple circuits with dc excitation. Superposition, Thevenin's Theorems-Simple problems.

UNIT-II	AC CIRCUITS	Classes:12

AC Circuits: Representation of sinusoidal waveforms, peak, average and RMS values, real Power, reactive power, apparent power, power factor. Phasor representation, Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC combinations (series only) -Simple problems.

UNIT-III	DC GENERATOR & MOTOR	Classes:12

DC Generator: Principle of operation of dc generator, Types of DC generators, EMF equation of a DC generator-simple problems.

DC Motor: Principle of operation of DC motor, Types of DC Motors, back e.m.f, Torque Equation, Applications-Simple problems.

UNIT-IV	SINGLE PHASE TRANSFORMERS& THREE-PHASE INDUCTION MOTOR	Classes:12

Single Phase Transformers: construction and operation, Types of transformers, EMF equation- simple problems on EMF equation.

Three-phase induction motor: Generation of rotating magnetic field, Construction and working of a three-phase induction motor, torque equation- simple problems on slip.

UNIT-V	SINGLE-PHASE INDUCTION MOTOR& ELECTRICAL INSTALLATIONS	Classes:12

Single-phase induction motor: Construction and working principle, capacitor start induction motor.

Electrical Installations: Components of LT Switchgear: Switch Fuse Unit (SFU), MCB, ELCB, Types of Wires and Cables. Elementary calculations for energy consumption, power factor improvement.

Text Books

1. M.S.Naidu and S.Kamakshaiah, “Introduction to electrical engineering”, Tata McGraw-Hill Education.
2. T.K. Nagasarkar and M.S. Sukhja, “Basic Electric Engineering”:, Oxford University press.

Reference Books

1. V. K. Mehta and Rohit Mehta, Basic Electrical Engineering, S Chand and company Ltd, New Delhi,India, Revised Edition, 2012
2. K.Uma Rao, “Basic Electrical Engineering”, Pearson Eduacation,2011.

Web References

1. https://www.kuet.ac.bd/webportal/ppmv2/uploads/1364120248DC%20Machines2.pdftextofvideo.npt el.iitm.ac.in

2. https://www.djm.cc/library/Principles_of_Alternating_Current_Machinery_Lawrence_edited.pdf
3. https://www.kuet.ac.bd/webportal/ppmv2/uploads/1364120248DC%20Machines2.pdftextofvideo.npt el.iitm.ac.in
4. http://nptel.ac.in

E-Text Books

1. https://www.kisi.deu.edu.tr/aytac.goren/ELK2015/w10.pdfwww.bookboon.com.
2. https://www.leka.lt/sites/default/files/vaizdai/concepts-in-electric-circuits.pdf.

Outcomes

At the end of the course students will be able to

1. understand the basic concepts of electrical circuits analysis
2. gain knowledge about phase and Phasor relationship of basic electrical elements
3. Gain knowledge about electrical installations and protective devices.
4. Understand the working principles of electrical machines and their applications.

PROGRAMMING FOR PROBLEM SOLVING

B. Tech I Semester: Common to CE, ME, EEE, ECE & CSE								
Course code	Category	Hours/week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	TOTAL
18CS101	Core	3	0	0	3	30	70	100
Contact Classes:60	Tutorial Classes: -	Practical Classes: Nil				Total Classes:60		

OBJECTIVES

The course should enable the students to

1. Provide exposure to problem-solving through programming.
2. Train the student to the basic concepts of the C-programming language.
3. Design programs involving decision structures, loops for problem solving
4. Learn string handling and string manipulation operations
5. Know about derived data types like structures and unions.
6. To learn problem solving techniques.

UNIT-I	NTRODUCTION TO COMPUTERS AND C	Classes:12

Introduction to Computers: Definition of a Computer, Block diagram of a Computer, Types of Programming Languages, Algorithms, Flow-charts.

Introduction to C: History of C, General form of a C Program, C-Tokens, Data types, Operators and Expressions, Formatted Input and Output.

UNIT-II	DECISION MAKING, LOOPING AND JUMP STATEMENTS	Classes:12

Decision Making – Branching: if, if-else, Nested if, Ladder if and switch statement.

Looping: While statement, do-while statement, for statement.

Jump Statements: break, continue, goto.

UNIT-III	ARRAYS AND FUNCTIONS	Classes:12

Arrays: Introduction, Declaration, Initialization and Accessing of 1-Dimensional and 2-dimensional arrays.

Functions: Introduction, Categories of a function, Recursive functions, Storage Classes: auto, extern, static and register.

UNIT-IV	POINTERS AND STRINGS	Classes:12

Pointers: Definition, Declaration, initialization & accessing of a pointer variable, Pointers to Pointers, Array of Pointers, Parameter Passing methods.

Strings: Declaring and initializing String variables, String handling functions.

UNIT-V	STRUCTURES, UNIONS AND FILES	Classes:12

Structures and Unions: Introduction, Declaration and Initialization of Structure, Structure within Structure, Array of Structures, Pointer to Structure, Union.

Files: Introduction, Basic operations of files.

Text Books

1. E. Balagurusamy, “Programming with ANSI-C”, Fourth Edition,2008, Tata McGraw Hill.
2. Byron S Gottfried “Programming with C” Second edition, Tata McGrawhill, 2007
3. ISRD Group, “Programming and Problem Solving Using C”, Tata McGraw Hill, 2008.

Reference Books

1. R.G. Dromey, "How to solve it by Computer", Pearson Education, 2008.
2. Kanetkar Y, "Let us C", BPB Publications, 2007.
3. Hanly J R &Koffman E.B, "Problem Solving and Programm design in C", PearsonEducation, 2009.

Web References

1. https://www.toptal.com/c/the-ultimate-list-of-resources-to-learn-c-and-c-plus-plus
2. https://hackr.io/tutorials/learn-c

Outcomes

At the end of the course students able to

1. Understand the fundamentals of C programming.
2. Read, understand and trace the execution of programs written in C language.
3. Choose the loops and decision-making statements to solve the problem.
4. Implement different Operations on arrays.
5. Use functions to solve the given problem.
6. Understand pointers, structures and unions.
7. Implement file Operations in C programming for a given application.

APPLIED PHYSICS LAB

B.Tech I Semester: Common to CE, ME, EEE, ECE & CSE								
Course code	**Category**	**Hours/week**			**Credits**	**Maximum Marks**		
18BS107	**H&S**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**TOTAL**
		0	0	2	1	25	50	75
Contact Classes:30	**Tutorial Classes:**		**Practical Classes: Nil**			**Total Classes: 30**		

COURSE OBJECTIVES

1. To make the students gain practical knowledge to co-relate with the theoretical studies
2. To achieve perfectness in experimental skills and the study of practical applications will bring more confidence and ability
3. To develop and fabricate engineering and technical equipments.

EXPERMENT:1	To determine the frequency of a vibrating bar or turning fork using Melde's arrange ment	**Classes:03**
EXPERMENT:2	To determine the rigidity modulus of the material of the given wire using torsional pendulum	**Classes:03**
EXPERMENT:3	To determine the radius of curvature of the lens by forming Newton's rings.	**Classes:03**
EXPERMENT:4	To determine the wavelength of laser light.	**Classes:03**
EXPERMENT:5	To determine the dispersive power of pri sm by using spectrometer	**Classes:03**
EXPERMENT:6	To determine quality factor and resonant frequency of LCR circuit.	**Classes:03**
EXPERMENT:7	Determine particle size by using laser sou rces	**Classes:03**
EXPERMENT:8	To determine the Numerical aperture of a given fiber	**Classes:03**

EXPERMENT:9	Determination of magnetic field along axis of a current carrying coil.	**Classes:03**
EXPERMENT:10	To determine the time constant of R-C circuit	**Classes:03**

Any eight experiments may be performed in a semester

Reference Books

1. Manual cum Record for Engineering Physics Lab-1&2, by Prof. Sri M. Rama Rao, Acme Learning.
2. Physics lab Manual-Department of H&S, ASCET (Autonomous)

Web References

1. www.physics org.com
2. https://en.wikiboos.org

E-Text Books

1. Classical mechanics by **Radovan dermi**
2. Physics of atomic and moleculs–prof K Heyne

Outcomes

At the end of the course students able to

1. Understand principle, concept, working and application of new technology and comparison of results with theoretical calculations
2. Develop procedures and observational skills as data is taken and gain a fundamental understanding of simple and complex apparatus used in the experiment.

WORKSHOP PRACTICE

B.Tech I Semester: Common to CE, ME, EEE, ECE & CSE								
Course code	**Category**	**Hours/week**			**Credits**	**Maximum Marks**		
18ME104	**Core**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		-	-	3	1	30	70	100
Contact Classes: Nil	**Tutorial Classes: - Nil**		**Practical Classes: 54**			**Total Classes:54**		

OBJECTIVES

The course should enable the students to

1. To familiarize with the basic manufacturing processes and to study the various tools and equipment used, hands-on training is given in different sections.
2. Essentially student should know the labor involved, machinery or equipment necessary, time required to fabricate and also should be able to estimate the cost of the product or job work.

LIST OF EXPERIMENTS

Expt. 1 CARPENTRY SHOP

1. Cross Lap Joint
2. Mortise and Tenon Joint

Expt. 2 FITTING SHOP

1. Square Fitting
2. V- Fitting

Expt. 3 SHEET METAL SHOP

1. 3-Sided Tray (Trapezoidal Tray)
2. Cylinder (Circular Tin)

Expt. 4 HOUSE WIRING

1. Wiring for two lamps (bulbs) with independent switch controls with or without looping
2. Wiring for stair case lamp

Expt. 5	FOUNDRY

1. Single Piece Pattern
2. Double Piece Pattern

Expt. 6	WELDING

1. Lap Joint
2. T – Joint

Expt.7	TRADES FOR DEMONSTRATION

1. Machine Shop (Lathe Machine, Grinding Machine and Drilling Machine)
2. Metal Cutting
3. Plumbing

Reference Books

1. Engineering Work shop practice, V. Ramesh Babu, VRB Publishers Private Limited, 2009
2. Work shop Manual, P.Kannaiah and K.L.Narayana, SciTech Publishers, 2009

Web References

1. Engineering workshop Lab manual, Department of Mechanical Engineering, GMRIT Rajam
2. Workshop Practice Manual, K. Venkata Reddy, BS Publications

Course Outcome

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

1. Utilize workshop tools for engineering practice
2. Analyze and find out suitable method of fabrication of a given simple component.
3. Employ skills acquired to provide quick fixes for routine domestic and/or industrial problems.
4. Appreciate the hard work and intuitive knowledge of the manual workers.

PROGRAMMING FOR PROBLEM SOLVING LAB

Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
18CS102	Core	-	-	4	2	25	50	75
Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes: 45				Total Classes: 45		

OBJECTIVES

The course should enable the students to

1. To develop primary programming skills upto the higher end in order solve the different programming logics...
2. To write different type of logics at the end of the sessions. After learning the C course, the student can able get all the fundamental knowledge in all the languages.
3. To Understand the student can able to attend any MNC Company interview and can solve the technical rounds both theoretically and Practically
4. To Provide lot of logical examples to make as good as.

LIST OF EXPERIMENTS

Expt.1	**Expressions**
Programs on Expressions.	
Expt. 2	**Operators**
Programs on Operators.	
Expt. 3	**Decision Control Statements**
Programs on decision control statements.	
Expt. 4	**Loop Statements**
Programs on loop statements.	
Expt. 5	**Nested Loops**
Programs on Nested Loops.	
Expt. 6	**Arrays**
Programs using arrays.	
Expt.7	**Functions**
Programs to implement on functions.	

Expt. 8	**Recursion**
Programs using recursion.	
Expt. 9	**String Handling Functions**
Programs to implement string handling functions.	
Expt. 10	**Pointers**
Programs to implement on pointers.	
Expt. 11	**Structures**
Programs to implement on structures.	
Expt. 12	**Files**
Programs on files.	

Reference Books

1. E. Balagurusamy, "Programming with ANSI-C", Fourth Edition,2008, Tata McGraw Hill.
2. Byron S Gottfried "Programming with C" Second edition, Tata McGrawhill, 2007
3. ISRD Group, "Programming and Problem Solving Using C", Tata McGraw Hill, 2008..

Course Home Page

SOFTWARE AND HARDWARE REQUIREMENTS FOR STUDENTS:

SOFTWARE: Dev C++, Turbo C

HARDWARE: Desktop Computers

Course Outcome

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

1. To Understand the basic concept of C Programming, and its different modules that includes conditional and looping expressions, Arrays, Strings, Functions, Pointers, Structures and File programming.
2. To Use of conditional expressions and looping statements and to solve problems associated with conditions and repetitions.
3. To Know the Functions involving the idea of modularity.

MATHEMATICS-II

B.Tech II Semester: Common to CE, ME, EEE, ECE & CSE								
Course code	Category	Hours/week			Credits	Maximum Marks		
18BS201	H&S	L	T	P	C	CIA	SEE	TOTAL
		3	1	0	4	30	70	100
Contact Classes:75	Tutorial Classes: 5	Practical Classes: Nil			Total Classes:80			

OBJECTIVES

The course should enable the students to

1. Expansion of various functions as Fourier series and Fourier transforms
2. Evaluation of multiple integrals and their applications
3. Physical quantities involved in engineering field related to vector valued functions
4. The basic properties of vector valued functions and their applications to line, surface and volume integrals

UNIT-I	FOURIER SERIES	Classes:10

Euler formulae (without proof) – Expansion of functions as a Fourier series –Change of interval – Even and odd functions – Half range series – Complex form of Fourier series.

UNIT-II	FOURIER TRANSFORMATIONS	Classes:12

Fourier integral theorem (without proof) – Fourier transformations – Properties - Sine and Cosine transformations - Inverse fourier transformations – Convolution – Parseval's identity.

UNIT-III	Z-TRANSFORMATIONS	Classes:13

Z – Transforms of elementary functions – Properties – Shifting theorems– Initial and Final value theorems - Inverse Z – transforms by convolution and partial fractions – Applications to first and second order difference equations.

UNIT:IV	MULTIPLE INTEGRALS	Classes:20

Evaluation of double integrals (cartesian and polar coordinates); change of order of integration (only cartesian form); Evaluation of triple integrals: Change of variables for double (cartesian to polar) and triple integrals (cartesian to spherical and cylindrical polar coordinates).

UNIT:V	VECTOR CALCULUS	Classes:20

Vector differentiation: Vector point functions and scalar point functions. Gradient, Divergence and Curl. Directional derivatives, Scalar potential functions. Solenoidal and Irrotational vectors.

Vector integration: Line, Surface and Volume integrals. Theorems of Green's, Gauss's and Stoke's (without proofs) and their applications.

Text Books

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers.
2. T.K.V. Iyengar, B. Krishna Gandhi and Others, Engineering Mathematics (Vol – I & II) –S. Chand & Company.

Reference Books

1. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications.
2. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill.

Web References

1. www.mathplanet.com
2. www.mathworld.com

E-Text Books

1. Baidyanath Patra-"An introduction to integral transforms".
2. Michael Corral **–"Vector Calculus"**.

Outcomes

At the end of the course students able to

1. Find the extreme values of functions of two variables with/without constraints.\
2. Solve higher differential equation and apply the concept of differential equation to real world problems.
3. Write the matrix representation of a set of linear equations and to analyze the solution of the system of equations
4. Solutions for integral and differential equations with initial conditions by Laplace transforms.

APPLIED CHEMISTRY

B.Tech II Semester: Common to CE, ME & CSE								
Course code	Category	Hours/week			Credits	Maximum Marks		
18BS103	H&S	L	T	P	C	CIA	SEE	TOTAL
		3	0	0	3	30	70	100
Contact Classes:60	Tutorial Classes: 5		Practical Classes: Nil			Total Classes: 65		

OBJECTIVES

The course should enable the students to:

1. To bring adaptability to the concepts of chemistry and to acquire the required skills to become a perfect engineer.
2. To impart the basic knowledge of atomic, molecular and electronic modifications which makes the students to understand the technology based on them.
3. To acquire the knowledge of electrochemistry, corrosion and water treatment which are essential for the Engineers and in industry.
4. To impart the knowledge of stereochemistry and synthetic aspects useful for understanding reaction pathways.

UNIT-I	MOLECULAR STRUCTURE AND THEORIES OF BONDING	Classes:18

Atomic and Molecular orbitals. Linear Combination of Atomic Orbitals (LCAO), molecular orbitals of diatomic molecules, molecular orbital energy level diagrams of N_2, O_2 and F_2 molecules. π molecular orbitals of butadiene, benzene and Aromaticity.

Crystal Field Theory (CFT): Salient features of CFT – The energy level diagrams for transition metal ions with respect to Tetrahedral, Octahedral and square planar geometries.

UNIT-II	ELECTROCHEMISTRY AND CORROSION SCIENCE	Classes:15

Theories ofElectrolytes, Conductance, Equivalent conductance, Molecular conductance, application of conductance, Conductometric Titration –acid vs. base.

Electrochemical cell: single and Standard electrode potential.

Battery Technology: Ni-Cad cell, Lithium Cells, Fuel Cells, Hydrogen – Oxygen fuel cell, Methanol-oxygen fuel.

Corrosion-definition, examples, effects- Mechanism of Dry and wet corrosion. Factor Influencing corrosion, corrosion control methods-sacrificial anode, impressed current, Cathodic Protective Coatings: - Metal Coatings; Hot dipping, Metal Cladding, Cementation.

UNIT-III	WATER TECHNOLOGY	Classes:15

Water technology-I: Sources and impurities of water, Hardness of Water, Units Of Hardness, Estimation of Hardness, Dissolved oxygen, Alkalinity and chlorides, Boiler troubles –Scales, sludge's, caustic embrittlement and boiler corrosion-causes, disadvantages and prevention, internal conditioning methods-phosphate, calgon and sodium aluminate-External treatment methods- ion-exchange methods process .

Water technology-II: water treatment for drinking purpose-disinfection and concept of break point chlorination –Desalination of brackish water-Principle and Process of electro-dialysis and reverse osmosis.

UNIT-IV	STEREOCHEMISTRY	Classes:12

Introduction to representation of 3-dimensional structures, structural and stereoisomers, configurations, symmetry and chirality. Enantiomers, diastereomers, optical activity and absolute configuration.

INIT-V	REACTION MECHANISM	Classes:15

Substitution reaction: Nucleophilic substitution reactions: Mechanism of S_N1, S_N2 reactions. Electrophilic and nucleophilic addition reactions: Markownikoff and anti Markownikoff's additions. Grignard additions on carbonyl compounds.

Text Books

1. Engineering Chemistry by P.C. Jain & M.Jain; Dhanpat Rai Publishing Company (P) Ltd., New Delhi.
2. University Chemistry, by B.M. Mahan, Pearson IV Edition
3. Engineering Chemistry (NPTEL Web – book), by B.L. Tembe, Kamaluddin and M.S. Krishnan

4. Advanced Physical Chemistry by Gurdepraj
5. Essential Physical chemistry by B.S.Bhal & Arun Bhal and J.D.Tuli , S.Chand Company
6. Organic Spectroscopy by Jag Mohan
7. Engineering chemistry by Sashichawala

Reference Books

1. Physical Chemistry, by P.W. Atkins
2. Organic Chemistry: Structure and Function by K.P.C. Volhardt and N.E.Schore, 5th Edition.
3. Organic chemistry by Jerry March

Web References

1. www.physical chemistry.com
2. https://en.wikiboos.org

E-Text Books

1. Engineering chemistry. Jp Publications.
2. Engineering chemistry. Jain & Jain publications.

Outcomes

At the end of the course students able to

1. The knowledge of atomic, molecular and electronic changes, band theory related to conductivity.
2. The required skills to get clear concepts on water treatment methods.
3. The required principles and concepts of electrochemistry, corrosion and in understanding the problem of water and its treatments.
4. The knowledge of configurational and conformational analysis of molecules and reaction mechanisms.

ENGLISH

B.Tech II Semester: Common to CE, ME,CSE								
Course code	**Category**	**Hours/week**			**Credits**	**Maximum Marks**		
18BS104	**H&S**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**TOTAL**
		3	0	0	3	30	70	100
Contact Classes:60	**Tutorial Classes:**		**Practical Classes: Nil**			**Total Classes:60**		

OBJECTIVES

1. Improve the language proficiency of students in English with an emphasis on Vocabulary, Grammar, Reading and Writing skills.
2. Equip students to study academic subjects more effectively and critically using the theoretical and practical components of English syllabus.
3. Develop study skills and communication skills in formal and informal situations.
4. Acquire fundamental and functional knowledge of English language, grammar and communication skills.

UNIT-I	**"THE ROAD NOT TAKEN" , "WHERE THE MIND IS WITHOUT FEAR"**	**Classes:15**

Introduction of the Poets, Background information of the poems, Literary terms, Setting of the poems, Question and answers.

UNIT-II	**"THE EYES ARE NOT HERE","THE EYES ARE NOT HERE"**	**Classes:15**

Introduction of the authors, Character analysis of the stories, Background information, Literary terms, Question and answers.

UNIT-III	**"THE OPEN WINDOW" , "THE LOST CHILD"**	**Classes:15**

Introduction of the authors, Character analysis of the stories, Background information, Literary terms, Question and answers.

UNIT-IV	"THE ROMANCE OF A BUSY BROKER", REPORT WRITING	Classes:15

Introduction of the author, Character analysis of the story, Background information, Literary terms, Question and answers…. Types of reports, Formats of Reports & Parts of a Formal report.

UNIT-V	"FORMAL LETTERS",GRAMMAR	Classes:15

Format of Formal letters, Different styles, Exercises of Complaint Letters and Exercises of English Grammar.

Text Books

1. Vibrant English, Orient Black Swan.

Reference Books

1. Swan, M. (2016). Practical English Usage. Oxford University Press.
2. Kumar, S and Lata, P. (2018). Communication Skills. Oxfore University Press.
3. Wood, F.T. (2007). Remedial English Grammar. Macmillan.
4. Oxford Dictionary of Thesaurus , Third edition.

Web References

1. www.grammarbook.com
2. www.grammarbytes.com
3. https://en.org/wiki/Category:Short_story_collections_by_R.K._Narayan
5. *https://archive.org/stream/TheLostChild-English-MulkRajAnand/lostchild_djvu.txt*

6. www.english-for-students.com/Where-The-Mind-Is-Without-Fear.html

7. Exercises in Spoken English. Parts I – III. CIEFL, Hyderabad. Oxford University Press.

E-Text Books

1. Fundamentals of English Grammar
2. Oxford English Grammar Course

Outcomes

At the end of the course students able to

1. Use English Language effectively that demonstrates an understanding of the basic components of grammar.
2. Comprehend and explain different phrases in prose and poetry and respond appropriately.
3. Learned the technique of presenting stories with perplexing twist endings
4. Acquire basic proficiency in English, writing official letters including Job Applications and Technical Reports.
5. Apply ethical principles and learn to commit to professional ethics.
6. Inculcated an attitude of evaluating the right path in their lives through varied experiences of eminent people.

ENGINEERING GRAPHICS

B.Tech II Semester: Common to CE, ME, EEE, ECE & CSE								
Course code	**Category**	**Hours/week**			**Credits**	**Maximum Marks**		
18ME102	**Core**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**TOTAL**
		1	-	4	3	30	70	100
Contact Classes: 12	**Tutorial Classes:**	**Practical Classes: 48**				**Total Classes:60**		

OBJECTIVES

The course should enable the students to

i. Convey visual perception information regarding relative locations of objects through an orthographic/isometric view.

ii. Analyze a drawing and bring out any inconsistencies to put forth inferences graphically.

iii. Create feasible designs of simple objects with drawing tools and/or free-hand.

iv. Get training in the transformation of the imagined data to present as drawings so that the communication skill will be increased especially in technical subjects.

UNIT-I	**INTRODUCTION TO ENGINEERING DRAWING**	**Classes:12**

Lettering-Geometrical Constructions-Construction of Polygons. **Conic Sections-** Ellipse-Parabola-Hyperbola general methods and a rectangular hyperbola

UNIT-II	**PROJECTIONS OF POINTS, STRAIGHT LINES**	**Classes:12**

Points: Introduction to Orthographic Projections, Describing of quadrants, First and Third angle projection – Position of points in four quadrants.

Straight Lines: Lines parallel to both the principal planes, perpendicular to one plane and parallel to another plane, lines inclined to one plane, lines inclined to both the planes.

UNIT-III	PROJECTION OF PLANES	Classes:12

Projection of regular plane surfaces, planes parallel to one plane, plane perpendicular to one plane , planes inclined to one plane and inclined to both the planes.

UNIT-IV	PROJECTION OF SOLIDS	Classes:12

Positions of regular solids(prism, cylinder, pyramid, and cone) – Projection of Solids – Axis parallel to both the Principal planes, Axis perpendicular to one plane and parallel to another plane, Axis inclined to one plane, inclined to both the planes.

UNIT-V	ISOMETRIC AND ORTHO-GRAPHIC PROJECTIONS	Classes:12

Principles of Isometric Projection – Isometric Scale – Isometric Views– Conventions – Isometric Views of Lines, Plane Figures, Simple and Compound Solids – Isometric Projection of objects having non- isometric lines.

Text Books

1. N.D. Bhat, Engineering Drawing, Charotar Publishers, 52nd Revised and Enlarged: 2013
2. K.L. Narayana, P. Kanniah, Engineering Drawing, Publisher, Scitech

Reference Books

1. Venugopal, K., A Textbook of Engineering Graphics, New age Publishers,2009

2. Venkata Reddy, Engineering Drawing, B.S.Publishers, 2009

3. Basant Agrawal, C M Agrawal ,Engineering Drawing, 2013

4. V.RameshBabu, Engineering Drawing .2009

Web References

1. https://nptel.ac.in/courses/112103019/
2. http://www.me.umn.edu/courses/me2011/handouts/drawing/blanco-tutorial.html

E-Text Books

1. http://web.iitd.ac.in/~achawla/public_html/201/lectures/sp46.pdf
2. https://books.google.co.in/books/about Engineering_Drawing.html?id=_hdOU8kRb2AC

Outcomes

At the end of the course students able to

1. Impart the training in multi-view representations and its conversion into pictorial views and the reverse also
2. Ability to understand the different standards in technical drawing and to help in reaching future engineering positions especially in research and design
3. To get a clear idea about isometric projection

FUNDAMENTALS OF DATA STRUCTURES

B. Tech II Semester: Common to CE & ME								
Course code	Category	Hours/week			Credits	Maximum Marks		
18CS201	Core	L	T	P	C	CIA	SEE	TOTAL
		3	0	0	3	30	70	100
Contact Classes:60	Tutorial Classes: -	Practical Classes: Nil				Total Classes:60		

OBJECTIVES

The course should enable the students to

1. Demonstrate familiarity with major algorithms and data structures.
2. Choose the appropriate data structure and algorithm design method for a specified application.
3. Determine which algorithm or data structure to use in different scenarios.
4. Improve the logical ability.

UNIT-I	INTRODUCTION TO ALGORITHMS AND DATA STRUCTURES	Classes:12

Algorithms: Definition, Properties, Performance Analysis-Space Complexity, Time Complexity, Asymptotic Notations.

Data structures: Introduction, Data Structures types, Data Structure Operations.

UNIT-II	STACKS AND QUEUES	Classes:12

Stacks: Introduction, Stack Operations, Applications: Infix to Postfix Conversion, Evaluation of Postfix Expression.

Queues: Introduction, Operations on queues, Circular queues.

UNIT-III	LINKED LISTS	Classes:12

Linked lists: Introduction, Singly linked lists, Circular linked lists, Doubly linked lists.

Implementation of Stack and Queue using linked list.

UNIT-IV	SORTING AND SEARCHING	Classes:12

Sorting: Introduction, Selection sort, Bubble sort, Insertion sort, Merge sort, Quick sort.

Searching: Introduction, Linear search, Binary search.

UNIT-V	TREES AND BINARY TREES	Classes:12

Trees: Introduction, Definition and basic terminologies, Representation of trees.

Binary Trees: Basic Terminologies and Types, Binary Tree Traversals, Binary Search Trees.

Text Books

1. G.A.V PAI, Data Structures and Algorithms, Concepts, Techniques and Applications, Volume1, 1stEdition, Tata McGraw-Hill, 2008.
2. Richard F. Gilberg& Behrouz A. Forouzan, Data Structures, Pseudo code Approach with C, 2ndEdition, Cengage Learning India Edition, 2007.

Reference Books

1. Langsam,M. J. Augenstein, A. M. Tanenbaum, Datastructures using C and C++, 2nd Edition, PHI Education, 2008.
2. Sartaj Sahni, Ellis Horowitz, Fundamentals of at Structures in C, 2nd Edition, Orientblackswan, 2010.

Web References

1. https://www.geeksforgeeks.org/data-structures/
2. https://www.programiz.com/dsa
3. https://www.w3schools.in/data-structures-tutorial/intro/

Outcomes

At the end of the course students able to

1. Apply Concepts of Stacks, Queues, Linked Lists.
2. Develop Programs for Searching and Sorting, Trees.
3. Interpret concepts of trees.
4. Develop programs for Sorting and Searching.

APPLIED CHEMISTRY LAB

B.Tech I Semester: Common to CE, ME, EEE, ECE & CSE								
Course code	Category	Hours/week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	TOTAL
18BS108	H&S	0	0	2	1	25	50	75
Contact Classes:60	Tutorial Classes:	Practical Classes: Nil				Total Classes: 30		

OBJECTIVES

1. Estimation of hardness and chloride content in water to check its suitability for drinking purpose.
2. To synthesize the drug molecules and check the purity of organic molecules by thin layer chromatographic (TLC) technique.

EXPERMENT-1	Determination of total hardness of water by complexometric method using EDTA	**Classes:03**
To estimate various hardness such as teporary, permanent and total hardness etc.		
EXPERMENT-2	Determination of dissolved oxygen in the given water samples by using Winkler's method	**Classes:03**
To estimate dissolved oxygen in various water samples using iodo-metric method.		
EXPERMENT-3	Determination of alkalinity of water in the given water samples	**Classes:03**
To estimate various alkalinity in the given water sample.		
EXPERMENT-4	Determination of chloride content of water by Argentometry	**Classes:03**
To estimate presence of chlorine in the given various water samples.		
EXPERMENT-5	Estimation of the strength of HCl by Conductometry titrations	**Classes:03**
EXPERMENT-To determine the strength of strong acid by using conductometric titration methods		
EXPERMENT-6	Estimation of Acetic acid by Conductometric titrations	**Classes:03**

To determine the strength of weak acid by using conductometric titration methods.

EXPERMENT-7	Determination of surface tension of a given liquid using stalagnometer	**Classes:03**

To determine the surface tension of given liquid samples using stalagnometer

EXPERMENT-8	Determination of partition coefficient of acetic acid between n-butanol and water.	**Classes:03**

To determine the partition coefficient of acetic acid between n-butanol and water.

EXPERMENT-9	Thin layer chromatography calculation of R_f values. Eg ortho and para nitro phenols	**Classes:03**

To determine the Rf value of the following compounds

EXPERMENT-10	Synthesis of Aspirin	**Classes:03**

To prepare the aspirin compound in the laboratory.

Reference Books

1. Text book on Experiments and calculations in Engineering Chemistry – S.S Dara
2. Senior practical physical chemistry, B.D. Khosla, A. Gulati and V. Garg (R. Chand &Co., Delhi)

Web References

1. www2.chem.uic.edu
2. https://people.ok.ubc.ca/
3. http://www.elesevier.com/books/experiments.

E-Text Books

1. A Text book of Physical chemistry by Puri,Sharma,Pathania, Kaur.
2. Conceptual Physical chemistry by prabhat kumar.

Outcomes

At the end of the course students able to

1. Determination of parameters like hardness and chloride content in water.
2. Calculation of R_f values of some organic molecules by TLC technique

ENGLISH LAB

B.Tech II Semester: Common to CE, ME, EEE, ECE & CSE								
Course code	**Category**	**Hours/week**			**Credits**	**Maximum Marks**		
18BS109	H&S	L	T	P	C	CIA	SEE	TOTAL
		0	0	3	1	25	50	75
Contact Classes:60	**Tutorial Classes:**	**Practical Classes: Nil**				**Total Classes: 36**		

OBJECTIVES

1. To facilitate computer-assisted multi-media instruction enabling individualized and independent language learning.
2. To sensitize students to the nuances of English speech sounds, word accent and intonation.
3. To bring about a consistent accent and intelligibility in students' pronunciation of English by providing an opportunity for practice in speaking.
4. To improve the fluency of the students in spoken English and neutralize their mother tongue influence.

ACTIVITY-I	Introduction to Phonetics, Vowels, Diphthongs and Consonants.	**Classes:15**

Introduction of the sounds, Vowels, Consonants, Place of Articulation and Manner of Articulation

ACTIVITY-II	Stress & Intonation	**Classes:03**

Stress, Primary Stress, Secondary Stress, Syllable, Falling Tone, Rising Tone, Falling-Rising Tone

ACTIVITY-III	Just a Minute (JAM)	**Classes:06**

Explanation of Impromptu speech, Rules to be followed, Dos and Don'ts.

ACTIVITY-IV	Situational Dialogues	**Classes:06**

Explanation of different types of Dialogues, Dos and Don'ts

ACTIVITY-V	Group Discussion	**Classes:06**

Explanation of various Group Discussions, Dos and Don'ts

Reference Books

1. Daniel Jones, English Pronouncing Dictionary, Current Edition with CD.
2. R.K.Bansal and J. B. Harrison, Spoken English, Orient Longman 2006 Edn.
3. Krishna Mohan & NP Singh, Speaking English Effectively (Macmillan)
4. Meenakshi Raman &Sangeeta Sharma, Technical Communication, Oxford University Press 2009.
5. K R Lakshminarayan and T. Muruguvel, Managing Soft Skills, Sci-Tech Publication, 2010.

Web References

1. www.grammarbook.com
2. www.grammarbytes.com

E-Text Books

1. A Complete Kit for Group Discussion
2. English Conversation Practice

Outcomes

At the end of the course students able to

1. Better understanding of nuances of English language through audio-visual experience and group activities.
2. Neutralization of accent for intelligibility.
3. Speaking skills with clarity and confidence which in turn enhances their employability skills.

FUNDAMENTALS OF DATA STRUCTURES LAB

B. Tech II Semester: Common to CE & ME								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
18CS203	Core	L	T	P	C	CIA	SEE	Total
		-	-	4	2	25	50	75
Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes: 45				Total Classes: 45		

OBJECTIVES

The course should enable the students

1. To develop skills to design and analyze simple linear and nonlinear data structures
2. To Strengthen the ability to identify and apply the suitable data structure for the given real-world problem
3. To Gain knowledge in practical applications of data structures
4. To make the student write ADTS for all data structures.

LIST OF EXPERIMENTS

Expt. 1	**Stack**

Write C program to implement the stack using arrays.

Expt. 2	**Queue**

Write C program to implement the Queue using arrays.

Expt. 3	**Postfix Evaluation**

Write C program to Evaluation a postfix expression.

Expt. 4	**Singly Linked list**

Write C program to implement the Singly linked list.

Expt. 5	Bubble Sort

Write C programs to implement Bubble Sort Algorithm.

Expt. 6	Selection Sort

Write C programs Selection Sort Algorithm.

Expt.7	Insertion sort

Write C programs to implement Insertion Sort Algorithm.

Expt. 8	Merge Sort

Write C programs to implement Merge Sort Algorithm.

Expt. 9	Quick Sort

Write C programs to implement Quick Sort Algorithm.

Expt. 10	Linear Search

Write C programs to implement Linear Search Algorithm.

Expt. 11	Binary Search

Write C programs to implement Binary Search Algorithm.

Expt. 12	Binary Tree

Write a C program to implement binary tree using Arrays.

Reference Books

1. G.A.V PAI, Data Structures and Algorithms, Concepts, Techniques and Applications, Volume1, 1stEdition, Tata McGraw-Hill, 2008.
2. Richard F. Gilberg& Behrouz A. Forouzan, Data Structures, Pseudo code Approach with C, 2ndEdition, Cengage Learning India Edition, 2007.

3. Langsam,M. J. Augenstein, A. M. Tanenbaum, Datastructures using C and C++, 2nd Edition, PHI Education, 2008.

4. Sartaj Sahni, Ellis Horowitz, Fundamentals of at Structures in C, 2nd Edition, Orientblackswan, 2010.

Course Home Page

SOFTWARE AND HARDWARE REQUIREMENTS FOR STUDENTS:

SOFTWARE: Dev C++, Turbo C

HARDWARE: Desktop Computers

Course Outcome

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

1. Implement Stacks and Queues Using Arrays.
2. Develop Programs for Searching and Sorting Algorithms
3. Develop Programs Using Concepts of Trees.
4. Choose appropriate data structure as applied to specified problem definition.

MATERIALS, TESTING AND EVALUATION

B.Tech III Semester: Civil Engineering								
Course code	**Category**	**Hours/week**			**Credits**	**Maximum Marks**		
18CE301	Core	L	T	P	C	CIA	SEE	TOTAL
		3	1	0	3	30	70	100
Contact Classes:48	**Tutorial Classes: -12**	**Practical Classes: Nil**			**Total Classes: 60**			

OBJECTIVES

The course should enable the students to

i. Gain knowledge on traditional and modern construction materials.

ii. Gain knowledge on building components.

iii. Understand construction practices.

UNIT-I	**Classes:12**

STONES: Classification of rocks – Quarrying of stones: tools, methods, precautions – Uses of stones – Characteristics of good building stones.

BRICKS: Classification of bricks – Characteristics of good bricks – Ingredients of good brick earth – Harmful substances in brick earth – Manufacturing of bricks – Defects in bricks. Light weight bricks, Plastic bricks, Flyash bricks.

UNIT-II	**Classes:10**

WOOD: Classification of trees – Classification of timber – Structure of timber – Characteristics of good timber – Seasoning of timber – Defects, diseases and decay of timber.

STEEL: Steel properties, Pig iron – Cast iron, cold formed steel, Stainless steel, Graphene

UNIT-III	**Classes:10**

PAINTS & DISTEMPERS: Composition of oil paint – Preparation of paint – Painting plastered surfaces – Painting wood surfaces – Painting metal surfaces – Defects – Distemper – White wash and color wash – Varnish.

UNIT-IV	**Classes:08**

POLYMERS: Polymers & polymer composites, fiber reinforced polymers

UNIT-V	Classes:08

MISCELLANEOUS MATERIALS: Bituminous materials, Glass – Asbestos – Gypsum – Rubber, Waterproofing materials,

Text Books

1. Building Materials, 4th Edition, Duggal, S.K., New Age International
2. Building Construction, 11th Edition, Dr. B.C. Punmia, Dr. Ashok Kumar Jain, Dr. Arun Kumar Jain, Laxmi Publications.
3. Concrete Technology by M.S. Shetty. – S. Chand& Co.; 2004.

Reference Books

1. Engineering Materials [Material Science], 42nd Edition, Rangwala, Charotar Publishing House Pvt. Ltd
2. A Textbook on Building Construction, Dr. S.K. Sharma, S. Chand Publishers

Web References

1. https://gradeup.co/civil-engineering/building-materials
2. www.vssut.ac.in/lecture_notes/lecture1424085991.pdf
3. https://nptel.ac.in/courses/105102088/

E-Text Books

1. https://books.google.co.in/books?isbn=1351462970
2. https://books.google.co.in/books?isbn=9325960443
3. https://books.google.co.in/books?isbn=8122423922

Outcomes

At the end of the course student will be able to

1. Explain the properties of various construction materials
2. Illustrate the manufacturing process of construction materials
3. Access the quality of construction materials
4. Explain paints & distempers, their composition, preparation and applications
5. Enlist polymers and explain their composites
6. Explain the properties of bituminous materials, glass, asbestos etc.,

MECHANICS OF MATERIALS-I

B.Tech III Semester: Civil Engineering								
Course code	Category	Hours/week			Credits	Maximum Marks		
18CE302	Core	L	T	P	C	CIA	SEE	TOTAL
		3	0	0	3	30	70	100
Contact Classes: 60	Tutorial Classes: -Nil		Practical Classes: Nil			Total Classes: 60		

OBJECTIVES

The course should enable the students to

i. Gain knowledge on simple stresses and strains

ii. Understand the process of determining shear force and bending moment

iii. Impart knowledge on deflection of beams, simple bending and shear distribution

UNIT-I	**Classes:12**

SIMPLE STRESSES AND STRAINS: Concept of stress and strain, St.Venant's principle, stress s and strain diagram, Elasticity and plasticity – Types of stresses and strains – Hooke's law– Factor of safety- Poisson's ratio and volumetric strain – Elastic moduli and the relationship between them – Bars of varying section – composite bars – Temperature stresses.

UNIT-II	**Classes:12**

STRAIN ENERGY: Resilience – Gradual, sudden, impact and shock loadings - Simple Applications.

UNIT-III	**Classes:12**

SHEAR FORCE AND BENDING MOMENTS: Types of supports and beams –Shear force and bending moment diagrams for cantilever,

simply supported and over hanging beams with point loads, uniformly distributed load, uniformly varying loads and couples – Relationship between bending moment, shear force and loading.

UNIT-IV	**Classes:12**

THEORY OF SIMPLE BENDING: Assumptions in the theory of simple bending –Derivation of bending equation: M/I = f/y = E/R.

SHEAR STRESSES: Derivation of formula – Shear stress distribution in rectangular, triangular, circular, I and T sections.

UNIT-V	**Classes:12**

DEFLECTIONOF BEAMS: Introduction, Relation between curvature, Slope & Deflection, Deflection curves, Differential equation for the elastic line of abeam – Double integration and Macaulay's methods. Determination of slope and deflection for cantileverand simply supported beams subjected to point loads, U.D.L. Uniformly varying load–Moment area method: Slope and deflection for Cantilever, simply supported & over hanging beam

Text Books

1. Strength of Materials (Mechanics of Solids), 6th Edition, Dr. R.K. Rajput, S. Chand Publishing
2. A Textbook of Strength of Materials, 6th Edition, Dr. R. K. Bansal, Laxmi Publications.
3. An Introduction to the Mechanics of Solids. 2nd Edition, New York, NY: McGraw Hill, 1979

Reference Books

1. Mechanics of Materials, Revised, 2016 Edition, Dr. B. C. Punmia, Dr. Ashok Dr. Jain, Dr. ArunKumar Jain, Laxmi Publications

2. Strength of Materials, 3rdEdition, R. Subramanian, Oxford University Press

3. Strength of Materials, 24thEdition, R. S. Khurmi, S. Chand Publishing

4. Strength of Materials, 11th Edition, Sadhu Singh, Khanna Publishers

Web References

1. https://nptel.ac.in/courses/112107146/
2. https://www.accessengineeringlibrary.com/maps/strength-of-materials
3. https://mechanicalc.com/reference/strength-of-materials

E-Text Books

1. https://books.google.co.in/books?isbn=8131808149
2. https://books.google.co.in/books?isbn=8131798895
3. https://books.google.co.in/books?isbn=9325971577

Outcomes

At the end of the course student will be able to

1. Understand the behavior of materials under different stress and strain conditions
2. Draw bending moment and shear force diagrams
3. Understand the concept of simple stresses and strains
4. Analyze the beam for deflections
5. Derive formula for shear stress distribution of various sections
6. Understand the theory of simple bending

FLUID MECHANICS

B.Tech III Semester: Civil Engineering								
Course code	Category	Hours/week			Credits	Maximum Marks		
18CE303	Core	L	T	P	C	CIA	SEE	TOTAL
		3	0	0	3	30	70	100
Contact Classes: 60	Tutorial Classes: -Nil	Practical Classes: Nil			Total Classes: 60			

OBJECTIVES

The course should enable the students to

i. Impart knowledge on fluids and their properties

ii. Gain knowledge on pressure and its measuring methods

iii. Understand the applications of fluid kinematics and dynamics

UNIT-I — Classes:12

FLUID PROPERTIES: Dimensions and units – physical properties of fluids-Types of fluids

PRESSURE AND ITS MEASUREMENT: Fluid Pressure at a Point; Pressurevariation with temperature, density and attitude. Pascal's law; Hydrostatic law; Atmospheric, Absolute and gauge pressure; Pressure measurement- manometers: Simple, differential and Micro Manometers.

HYDROSTATIC FORCES ON SURFACES: Total Pressure and Centre of Pressure: on Horizontal Plane Surface; Vertical Plane Surface; Inclined Plane Surface and Curved Surfaces.

UNIT-II — Classes:12

BUOYANCY: Buoyancy; Buoyant Force and Centre of Buoyancy, Stability of submerged bodies and floating bodies; Metacentre and Metacentric height, analytical method for Metacentric height.

KINEMATICS OF FLUID MOTION: Methods of describing fluid motion; Classification of flows; Streamline; Path line; Streak line; Equation for acceleration;Convectiveacceleration; Local acceleration; Continuity

equation; Velocity potential and stream function; Flow net; Vortex flow – free vortex and forced vertex flow.

UNIT-III	Classes:12

DYNAMICS OF FLUID FLOW: Forces acting on a Fluid in Motion; Euler's equation of motion; Bernoulli's equation ; Energy correction factor; Momentum principle; Force exerted on a pipe bend.

FLOW MEASUREMENTS IN PIPES: Discharge through Venturi Meter; Discharge through Orifice Meter; Discharge through flow nozzle; Measurement of velocity by Pitot tube, Pitot - static tube.

UNIT-IV	Classes:12

FLOW THROUGH ORIFICES AND MOUTHPIECES: Flow through Orifices: Classification of Orifices; Determination of coefficients for an Orifice Flow through large rectangular Orifice; Flow through submerged Orifice – fully sub-merged and partially sub-merged. Classification of Mouthpieces; Flow through external and internal cylindrical Mouthpiece, time taken for emptying a tank.

FLOW OVER NOTCHES & WEIRS: Classification of Notches and Weirs; Flow through rectangular, triangular and trapezoidal notches and weirs; End contractions; Velocity of approach; Cipolletti weir, Broad crested weir.

UNIT-V	Classes:12

Analysis Of Pipe Flow: Energy losses in pipelines; Darcy – Weisbach equation; Minor losses in pipelines; Hydraulic Grade Line and Total Energy Line; Concept of equivalent length; Hydraulic power transmission through a pipe; Pipes in series, parallel & branched pipes.

Laminar Flow: Reynolds's experiment; Characteristics of laminar flow; Steady laminar flow through a circular pipe (Hazen poiseuille equation)

Turbulent Flow In Pipes: Characteristics of turbulent flow, Prandtl's mixing length theory, Hydro dynamically smooth and rough boundaries,

Velocity distribution, Friction factor for pipe flow, Variation of friction factor with Reynolds number- Moody's chart.

Text Books

1. P. N. Modi& S. N. Seth; Hydraulics & Fluid Mechanics , Standard Book house, New Delhi,17th edition 2011
2. R. K. Bansal; Fluid Mechanics & Hydraulic Machines ,Laxmi Publications, New Delhi.9th edition,2010

Reference Books

1. A. K. Jain; Fluid Mechanics, Khanna Publishers, Delhi
2. Rajput, Fluid mechanics and fluid machines, S.Chand&Co
3. K R Arora, Fluid Mechanics, Hydraulics and Hydraulic Machines, Standard Publishers

Web References

1. https://nptel.ac.in/courses/112105171/
2. https://www.sciencedirect.com/topics/engineering/fluid-mechanics
3. https://lecturenotes.in/subject/240/fluid-mechanics-fm

E-Text Books

1. https://books.google.co.in/books?isbn=9385676482
2. https://books.google.co.in/books?isbn=8131802949
3. https://books.google.co.in/books?isbn=8121916674

Outcomes

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

1. Understand the concepts of fluid properties like specific gravity, viscosity, density, surface tension
2. Determine the pressure head of a fluid in a pipe by using manometer
3. Calculate the forces acting on submerged bodies
4. Analyze the meta center and met centric height on floating bodies
5. Understand the concept of flow through channels
6. Explain types of flows and determine energy losses in pipelines

SURVEYING AND GEOMATICS

B.Tech III Semester: Civil Engineering								
Course code	Category	Hours/week			Credits	Maximum Marks		
18CE304	Core	L	T	P	C	CIA	SEE	TOTAL
		3	0	0	3	30	70	100
Contact Classes: 60	Tutorial Classes: - Nil		Practical Classes: Nil			Total Classes: 60		

OBJECTIVES

The course should enable the students to

i. Understand the function of surveying in civil engineering construction

ii. Gain knowledge on various instruments of surveying

iii. Understand the process of determining angles, heights and distances

UNIT-I — Classes:10

Basic Concepts: Surveying – History; Definition; primary divisions, Classification, Principles of surveying Plan and map; Basic Measurements; Instruments and Basic methods, Duties of a surveyor. Sources and types of errors.

Chain Surveying: Instruments for chaining, Ranging out, chaining a line on a flat ground; Chaining on an uneven or a sloping ground; Chain & Tape corrections. Offsets, Cross Staff survey; obstacles in chain survey-problems.

UNIT-II — Classes:12

Compass Survey: Introduction, Designation of bearings, Conversion of bearings from one system to the other,Calculation of bearing from angles, Theory of Magnetic compass (i.e. Prismatic compass), Temporary adjustments -Magnetic Declination, Local attraction-Related Problems-Errors in compass survey.

Plane Table Surveying: Introduction, Accessories, Working operations, Methods of plane tabling, three point problem, Two point problem, Errors in plane tabling.

UNIT-III	Classes:12

Leveling: Introduction,definitions, methods of leveling and instruments: dumpy level, leveling staff, Temporary adjustments of dumpy level, theory of simple and differential leveling.

Contouring: Introduction, contour interval, Characteristics of contours Methods of locating contours

Theodolite: Vernier theodolite-Basic definitions; Fundamental lines and desired relations Temporary adjustments; Measurement of a horizontal angle Measurement of vertical angle; Sources of errors in Theodolite survey.

UNIT-IV	Classes:14

Trigonometric Leveling: Introduction; Determination of the level of the top of an object, When its base is accessible and When its base is not accessible; Determination of the height of the object when the two instrument stations are not in the same vertical

Tacheometric Surveying: Definition, Advantages of Tacheometric surveying- Basic systems , Principle of stadia measurements, Determination of constants K and C, Inclined sight with staff vertical; Inclined sight with staff normal to the line of sight, Movable hair method, Tangential method, Errors in Tacheometry.

UNIT-V	Classes:12

Curves: Simple curves–Definitions and Notations, designation of a curve, Elements of simple curves, location of tangent points, selection of peg interval, Methods of setting simple curves(based on equipment) – Rankine's method, Two theodolite method

Text Books

1. Dr. K. R. Arora; Surveying Vol. 1, Standard Book House;2008, Surveying Vol. 2, Rajsonspublications 10thedition 2010

2. Surveying Vol-I&II by B.C. Punmia ,Laxmi Publications, 15thedition, 2005

3. SK.Duggal Surveying 4e, Tata Mcgrawhil

Reference Books

1. AM Chandra, Plane Surveying , New Age International (P)Ltd

2. S K Roy, Fundamentals of Surveying ,Prentice- Hall of India Private Ltd

3. S.K. Duggal. Surveying Vol. 1and 2 , Tata Mc. Graw Hill Publishing Co.

Web References

1. https://nptel.ac.in/courses/105107122/
2. https://nptel.ac.in/courses/105107158/
3. textofvideo.nptel.ac.in/105104101/lec1.pdf

E-Text Books

1. https://books.google.co.in/books?isbn=817371021X
2. https://books.google.co.in/books?isbn=8170088534
3. https://books.google.co.in/books?isbn=8120349911

Outcomes

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

1. Enlist types of surveying, its principles and instruments used for surveying
2. Determine bearings, calculate bearings and angles
3. Enlist instruments used for plane table and explain working with plane table
4. Understand the methods of leveling and instruments used for leveling
5. Explain contours, theodolite and its applications
6. Understand trigonometric leveling, tachometric surveying and curve setting

ENGINEERING GEOLOGY

B.Tech III Semester: Civil Engineering								
Course code	Category	Hours/week			Credits	Maximum Marks		
18CE305	Core	L	T	P	C	CIA	SEE	TOTAL
		3	0	0	3	30	70	100
Contact Classes: 60	Tutorial Classes: - Nil		Practical Classes: Nil			Total Classes: 60		

OBJECTIVES

The course should enable the students to

i. Impart knowledge of geology required for construction of various civil engineering structures.

ii. Gain knowledge on classification minerals, stones their properties.

iii. Gain knowledge on structural geology and its importance in civil engineering structures.

UNIT-I — Classes:10

Introduction: Importance of geology from Civil Engineering point of view, Brief studyof case histories of failure of some Civil Engineering constructions due to geological draw backs.

Weathering of Rocks: Its effects over properties of rocks-importance of weathering with reference to dams, reservoirs and tunnels weathering of common rocks like “Granite”.

UNIT-II — Classes:12

Mineralogy: Definition of mineral- Importance of study of minerals- Different methods of study of minerals- Advantages of study of minerals by physical properties- Role of study of physical properties of minerals in the identification of minerals, Study of physical properties of following common rock forming minerals: Feldspar, Quartz, Olivine, Hornblende, Muscovite, Biotite, Asbestos, Chlorite, Kyanite, Talc, Calcite, Study of other common economic minerals such as Pyrite, Hematite, Magnetite, Graphite, Magnetite and Bauxite

UNIT-III — Classes:13

Petrology: Definition of rock, Geological classification of rocks into igneous, sedimentary and metamorphic rocks,Dykes and sills, common structures and textures of igneous, sedimentary and metamorphic rocks-

Their distinguishing features, Megascopic study of granite, Dolerite, Basalt, Pegmatite, Laterite, Conglomerate, Sand Stone, Shale, Lime stone, Gneiss, Schist, Quartzite, Marble and Slate.

Structural Geology: Out crop, strike and dip study of common geological structures associating with the rocks such as folds, faults Unconformities, and joints – their important types, Their importance In-situ and drift soils, Earth quakes- their causes and effects, shield areas and seismic belts, Seismic waves-Richter scale- Landslides- their causes and effect-measures to be taken to prevent their occurrence, Importance of study of ground water, earth quakes and landslides

UNIT-IV	**Classes:13**

Geology of Dams and Reservoirs

Types of dams and bearing Geology of site in their selection-Geological Considerations in selection of a dam site, Analysis of dam failures of the past, Factor's contributing to the success of a reservoir, Geological factors influencing water Lightness and life of reservoirs.

Tunnels

Purposes of tunneling- effects of tunneling on the ground- Role of Geological considerations in tunneling over break and lining in tunnels.

UNIT-V	**Classes:12**

GROUND WATER & GEOPHYSICAL STUDIES

Ground water, water table, common types of ground water, springs, cone of depression, geological controls of ground water movement, ground water exploration, Importance of geophysical studies- principles of geophysical study by Gravity methods, Magnetic methods, Electrical methods, Seismic methods, Radio metric methods and Geothermal method, Special importance of Electrical resistivity methods and seismic refraction methods, Improvement of competence of sites by grouting etc.

Text Books

1. K.V.G.K Gokhale,Principals of Engineering Geology B.S publications, 2010

2. N.Chennkesavulu,Engineering Geology,Mc-Millian,IndiaLtd.2005.
3. Venkata Reddy, Engineering Geology, Vikas Publications, New Delhi, 2nd, Edition, 2011

Reference Books

1. Prabin Singh, Engineering geology.
2. F.G. Bell, Fundamental of Engineering Geology Butterworrths, Publications, New Delhi, 1992\
3. Krynine&Judd, Priniciples of Engineering Geology &Geotecnics, CBS Publishers & Distribution
4. Mukarjee, Engineering Geology , World Press.

Web References

1. https://opentextbc.ca/geology/
2. https://nptel.ac.in/courses/105105106/
3. engineeringvideolectures.com/course/298

E-Text Books

1. https://books.google.co.in/books?isbn=0230638708
2. https://books.google.co.in/books?id=qxRaAAAAYAAJ
3. https://books.google.co.in/books?isbn=8123900139

Outcomes

At the end of the course student will be able to

1. Understand the process of weathering and formation of rocks
2. Identify and classify the different minerals & rocks
3. Understand strike and dip of folds and faults, their importance in in civil engineering structures
4. Enlist types of dams and factors associated with dams and reservoirs
5. Explain the effects of tunnels and role of geological considerations in tunneling
6. Enlist various geophysical studies and ground water

CIVIL ENGINEERING SOCIETAL AND GLOBAL IMPACT

B.Tech III Semester: Civil Engineering								
Course code	**Category**	**Hours/week**			**Credits**	**Maximum Marks**		
		L	T	P	C	CIA	SEE	TOTAL
18CE306	Core	2	0	0	2	30	70	100
Contact Classes: 60	**Tutorial Classes: - Nil**		**Practical Classes: Nil**			**Total Classes: 60**		

OBJECTIVES

The course should enable the students to

i. Develop a sense of community responsibility by becoming aware of scientific issues

ii. Demonstrate interpretative skills including ability to analyze data statistically, assess reliability

iii. Develop standards of professional behavior that include rules of ethics and etiquette.

UNIT-I — Classes:13

HISTORY OF PLANNINGIN ANCIENT INDIA

Imdisvalley civilization (IVC)- Mohanjo-Daro-Lothal-Present Position of planning in India-Industrial Township-preand post industrial revolution-greenre volution-IT revolution

TOWN PLANNING

General-Objective of town planning-Principle-necessity-planning of modern-a gencies of housing-HUDCO-HDFC-LIC-CIDCO

UNIT-II — Classes:13

POLLUTION

WaterPollution-Source-Classification-Effects-Control measures

AirPollution-Source -Classification-Effects-Controlmeasures

Noise Pollution- Source-Classification-Effects-Control measures

UNIT-III	**Classes:10**

Soil Pollution- Source-Classification-Effects-Controlmeasures

Lightpollution- Effects on human and psychology-reduction-Nuclear Pollution

UNIT-IV	**Classes:12**

GlobalWarming-Causesof GlobalWarming-Effectsof GlobalWarming–Preventionof Global Warming -ClimateChangeandtheGlobalEconomy-Evidences-Causes-EffectsofGlobal climate change onagriculture, Weatherandhumanactivities- Effectsof GlobalClimate Change on DiseaseEpidemics

UNIT-V	**Classes:12**

ENVIRONEMENTAL ACTS(PROTECTION ANDPREVENTION)

NeedforEnvironmentalConservation-EnvironmentalprotectionAct-ThewaterpreventionAct- TheAir (Prevention &Control ofpollution Act.)-Wild lifeAct- Forests(Conservation) Act

Text Books

1. Elements Of Environmental Science And Engineering 2ndEdition2nd Edition (English, Paperback, P. Meenakshi)
2. Town PlanningbyRangwala,29th Edition :2016, Charotar Publishing HousePvt.Ltd
3. Planningand Development of Towns byR.G.Gupta, Oxford and IBH PublishingCo

Reference Books

1. Global ClimateChange and Environment(English, Hardcover, RanveeerKumar, B. S.Singh, M. P. Singh), Nehapublications

Web References

1. https://nptel.ac.in/courses/124107001/16
2. https://nptel.ac.in/courses/103107084/
3. https://nptel.ac.in/courses/105102089/

E-Text Books

1. https://books.google.co.in/books?isbn=8122415075
2. https://books.google.co.in/books?isbn=156252285X
3. https://books.google.co.in/books?isbn=8185594244

Outcomes

At the end of the course student will be able to

1. Understand core concepts and methods from ecological and physical sciences
2. Understand the ethical, cross-cultural, and historical context of environmental issues
3. Understand their roles and identities as environmental actors in a complex, interconnected world.
4. Understand the scope and breadth of planning theories
5. Explain global warming, its causes and effects
6. Explain various environmental acts

MECHANICS OF MATERIALS LAB

B.Tech III Semester – Civil Engineering								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
18CE307	Core	L	T	P	C	CIA	SEE	Total
		-	-	2	1	25	50	75
Contact Classes: Nil	**Tutorial Classes: Nil**	**Practical Classes: 36**				**Total Classes: 36**		

OBJECTIVES

The course should enable the students to

i. Gain knowledge on various tests conducted on materials

ii. Understand the test procedures for determining properties of materials

iii. Work with various testing apparatus

LIST OF EXPERIMENTS

Expt. 1	**BENDING TEST ON SIMPLE SUPPORT BEAM**
Determine the bending strength of simple support beam	
Expt. 2	**COMPRESSION TEST ON WOOD OR BRICK**
Determine the compressive strength of wood and brick	
Expt. 3	**IMPACT TEST ON METAL SPECIMEN (IZOD AND CHARPY)**
Determine the impact valve on metals by Izod and Charpy test	
Expt. 4	**COMPRESSION TEST ON HELICAL SPRING**
Determine the compressive strength on helical spring	
Expt. 5	**TENSION TEST ON MILD STEEL ROD**
Determine the tensile strength of mild steel rod	
Expt. 6	**SHEAR TEST**
Determine the shear strength of given material	
Expt.7	**CONTINUOUS BEAM – DEFLECTION TEST**
Determine the deflection of continuous beam	

Expt. 8	HARDNESS TEST ON METALS(ROCKWELL AND BRINELL HARDNESS NUMBER TESTS)

Determine the hardness of metals by Rockwell and Brinell hardness number test

Expt. 9	VERIFICATION OF MAXWELL'S RECIPROCAL THEOREM ON BEAMS

Inspect Maxwell's reciprocal theorem on beams

Reference Books

1. Mechanics of Materials, Revised, 2016 Edition, Dr. B. C. Punmia, Dr. Ashok Dr. Jain, Dr. ArunKumar Jain, Laxmi Publications
2. Strength of Materials, 3rdEdition, R. Subramanian, Oxford University Press
3. Strength of Materials, 24thEdition, R. S. Khurmi, S. Chand Publishing

Web References

1. https://www.youtube.com/watch?v=GkFgysZC4Vc
2. https://nptel.ac.in/courses/112107147
3. https://mechanicalc.com/reference/strength-of-materials

Course Home Page

SOFTWARE AND HARDWARE REQUIREMENTS FOR A BATCH OF 36 STUDENTS:

SOFTWARE:NIL

HARDWARE: Universal testing machine, Impact testing machine, Torsion testing machine, Spring testing machine, Rockwell hardness tester, Brinell hardness tester

Course Outcome

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

1. Work and carryout various test on materials
2. Determine compressive strength of bricks, wood and concrete blocks
3. Determine the tensile strength of steel rods
4. Determine the deflection of beams
5. Determine the shear strength of materials
6. Determine the impact strength of materials

ENGINEERING GEOLOGY LAB

B.Tech III Semester – Civil Engineering								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
18CE308	**Core**	-	-	2	1	25	50	75
Contact Classes: Nil	**Tutorial Classes: Nil**	**Practical Classes: 36**				**Total Classes: 36**		

OBJECTIVES

The course should enable the students to

I. Gain knowledge on identification of rocks and minerals

II. Impart knowledge on study of structural problems

III. Impart knowledge on tunnel models

LIST OF EXPERIMENTS

Expt. 1	**STUDY OF MINERALS BY THEIR PHYSICAL PROPERTIES**

To study the minerals by their physical properties

Expt. 2	**IDENTIFICATION AND TEXTURE STUDY OF ROCKS**

To Identify the rocks by their texture

Expt. 3	**IDENTIFICATION OF IGNEOUS ROCKS**

To identify various types of igneous rocks

Expt. 4	**IDENTIFICATION OF SEDIMENTARY ROCKS**

To identify various types of sedimentary rocks

Expt. 5	**IDENTIFICATION OF METAMORPHIC ROCKS**

To identify various types of metamorphic rocks

Expt. 6	**STUDY OF STRUCTURAL PROBLEMS(STRIKE AND DIP)**

To Study strike and dip problems

Expt.7	**STUDY OF THICKNESS PROBLEMS**

To study thickness problems

Expt. 8	**STUDY OF GEOLOGICAL MAPS AND THEIR CROSS-SECTION**

To study and analyze geological maps and their cross-section

Expt. 9	STUDY OF STRUCTURAL MODELS
To study structural models like folds and faults	
Expt. 10	**STUDY OF TUNNEL MODELS**
To study the civil engineering structures like tunnels	

Reference Books

1. Prabin Singh, Engineering geology.
2. F.G. Bell, Fundamental of Engineering Geology Butterworrths, Publications, New Delhi
3. Krynine&Judd, Priniciples of Engineering Geology &Geotecnics, CBS Publishers & Distribution

Web References

1. https://opentextbc.ca/geology/
2. https://nptel.ac.in/courses/105105106/
3. engineeringvideolectures.com/course/298

Course Home Page

SOFTWARE AND HARDWARE REQUIREMENTS FOR A BATCH OF 36 STUDENTS

SOFTWARE:NIL

HARDWARE: Rocks: Igneous Rocks: Granite, Dolerite, Basalt, Pegmatite; Sedimentary Rocks: Sand stone, Lime stone, Shale, Laterite; Metamorphic Rocks: Granite gneiss, Slate, Marble, Khondalite; Minerals: Calcite, Gypsum, Magnetite, Hematite, Pyrite, Pyralusite, Graphite, Chromite Structural model: Folds, faults;

Course Outcome

At the end of the course student will be able to

1. Identify minerals by their physical properties
2. Identify rocks by texture
3. Study various structural problems like strike and dip
4. Study thickness problem
5. Study geological maps and cross sections
6. Study structural models and tunnel models

SURVEYING LAB – I

B.Tech III Semester – Civil Engineering								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
18CE309	**Core**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		-	-	2	1	25	50	75
Contact Classes: Nil	**Tutorial Classes: Nil**	**Practical Classes: 36**				**Total Classes: 36**		

OBJECTIVES

The course should enable the students to

I. Plot land by chain, tape and plane table surveys

II. Use compass to determine bearing and angles

III. Use leveling instruments to find levels

LIST OF EXPERIMENTS

Expt. 1 CHAIN SURVEYING

1. Study of chains and its accessories - Aligning, Ranging andChaining
2. Cross staff survey andplotting
3. Chaining across obstacles andplotting

Expt. 2 COMPASS SURVEY

1. Study of prismatic compass- Measurement of bearings of lines
2. Determination of distance between two inaccessible points with compass
3. Compass traversing (closed traverse) and plotting

Expt. 3 PLANE TABLE SURVEY

1. Study of plane table and itsaccessories
2. Radiation and Intersection methods by plane tablesurvey
3. Plane tabletraversing
4. Resection - Two point and three pointproblems

Expt. 4 LEVELING

1. Study of Dumpy level/Auto level and levelingstaff
2. Fly leveling (differentialleveling)

3. Longitudinal and cross-sectioning of a road profile andplotting.
4. Contouringexercise

Reference Books

1. AM Chandra, Plane Surveying , New Age International (P)Ltd
2. S K Roy, Fundamentals of Surveying ,Prentice- Hall of India Private Ltd
3. S.K. Duggal. Surveying Vol. 1and 2 , Tata Mc. Graw Hill Publishing Co.

Web References

1. www.aust.edu/civil/lab_manual/ce_104.pdf
2. https://www.scribd.com/doc/183009640/SURVEYING-I-LAB-MANUAL-pdf
3. textofvideo.nptel.ac.in/105104101/lec1.pdf

Course Home Page

SOFTWARE AND HARDWARE REQUIREMENTS FOR A BATCH OF 36 STUDENTS

SOFTWARE:NIL

HARDWARE: Cross staff, Tapes, Chains, arrows, ranging rods, pegs, auto levels, dumpy levels, prismatic and surveyors compass, plane table along with instruments,

Course Outcome

At the end of the course student will be able to

1. Choose tools, measuring distances and directions of objects accurately andplotting.
2. Choose suitable technique, method and tools to perform field workaccurately.
3. Prepare different profiles of ground along longitudinal andcross-section.
4. Procure knowledge ine determining areas offield.
5. Prepare contours of given area
6. Plot area on plane table

PROFESSIONAL SOCIETY ACTIVITIES-I

B.Tech III Semester: Common to CE, EEE, ME, ECE & CSE								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
18AS301	-	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		2	0	0	0	-	-	-
Contact Classes: 12	**Tutorial Classes: Nil**	**Practical Classes: Nil**				**Total Classes: 12**		

OBJECTIVES

The course should enable the students to

1. Improve communication skills
2. Develop leadership qualities

Professional Society Activities (PSA) course is aimed at enhancing the self-learning, communication, managerial skills of the students by engaging them in various Co & Extra Curricular activities during their course of study. Activities in each of the department shall be designed and conducted by the Professional Society Executive Committee whose composition is:

1. Faculty Mentors- 2 No.
2. Student Chairman: 1 No.- Final year Student
3. Student General Secretary: 1 No.- Third year Student
4. Treasurer: 1 No.- Third year Student

Student Members: 2 No's from each class

PSA related activities would be of the following nature but not limited to:

Activity#1	Just A Minute
Activity#2	Technical Quiz

Activity#3	Open House- Lab Demo
Activity#4	Technical Paper Presentation- Preliminary
Activity#5	Technical Paper Presentation- Final
Activity#6	Poster Presentation
Activity#7	Collage- A theme based event
Activity#8	Debate Competition
Activity#9	Group Discussion Competition
Activity#10	Mock Interviews
Activity#11	Model Exhibition
Activity#12	Valedictory Function

SOFT SKILLS PRACTICE

B.Tech III Semester: Common to CE, EEE, ME, ECE & CSE								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
18AS302	**Core**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		-	-	2	-	-	-	-
Contact Classes: Nil	**Tutorial Classes: Nil**	**Practical Classes: 28**				**Total Classes: 28**		

OBJECTIVES

To give each student a realistic prospective o work & work expectation to help formulate problem solving skills.

LIST OF ACTIVITIES

Activity. 1 | **Introduction - What are Soft Skills?**

Importance of Soft Skills – Selling your soft skills – Attributes regarded as Soft Skills – Soft skills – Social soft skills – Thinking soft skills – Negotiating – Exhibiting your soft skills – Identifying your soft skills – improving your soft skills – will formal training enhance your soft skills – soft skills training – Train yourself – practicing soft skill – Measuring Attitude.

Activity: Measure your Soft Skill.

Activity. 2 | **Know Thyself / Self–Discovery**

Introduction – Importance of knowing yourself – Process of knowing yourself – SWOT analysis – Benefits of SWOT analysis – using of SWOT analysis – SWOT analysis grid – Questions to complete the grid.

Activity: Know yourself.

Activity. 3 | **Developing Positive Attitude**

Introduction – Meaning – Features of Attitude – Attitude and behavior – Formation of attitudes – change of attitudes – what can you do to change attitude ? Ways of changing attitude in a person – Attitude in a work place – The power of positive attitude – Developing positive attitude – Obstacles in developing positive attitude – Staying positive – Examples of positive

attitude – positive attitude and its result – staying negative – examples of negative attitude – Overcoming negative attitude – Negative attitude and its results.

Activity: Measure your attitude.

Activity. 4	**Forming Values**

Introduction – Meaning – What is a value? – A core of Values – Values relating to educations

Values relating to self and others – Values relating to Civic responsibilities – Values and attitudes -Importance of values – Formation of values – Types of Values – Terminal and Instrumental Values – Power of Values – Personal Values – Cultural Values – Values – some examples.

Activity: Identity your values.

Activity. 5	**Improving Perceptions**

Introduction – Meaning – Factors influencing Perception – Perceptual process – Improving perception – Perception and its application in organizations.

Activity: Test your Perception.

Activity. 6	**Career Planning**

Introduction – Benefits of career planning – Guidelines for choosing a career – Myths about choosing a career – Tips for successful career planning – Developing career goals – Final thoughts on career planning – Things one should know while starting career and during his career.

Activity: Test your career interests.

Activity. 7	**Art of Listening**

Introduction –What is Listening? – Two ears, one mouth – Benefits of active listening – kinds of listening – Factors that hamper listening – Common poor listening habits – Advantages of active listening – Listening tips.

Activity: Test your listening skills.

Activity. 8	**Art of Reading**

Introduction – Reading is a Cognitive process – Good readers are what they read – Benefits of reading – Different types of reading – Tips for effective reading – The SQ3R Technique – Different stages of reading – Rates of reading – Determining a students' reading rate – Adjusting reading rate – Activities for increasing reading rate – Problems with reading – Becoming an effective reader.

Activity: Test your reading skills.

Activity. 9	**Body Language**

Introduction – Body talk – Voluntary and involuntary body language – Forms of body language – Parts of body language – Origin of body language in building interpersonal relations – Reasons to study body language – Body language in building industrial relations – Improving body language- Types of body language – Gender differences – Female interest and body language – shaking hands with Women – Interpreting body language – Developing confidence with correct body language.

Activity. 10	**Team Building and Teamwork**

Introduction – Meaning – Aspects of Team building – Skills needed for Team work – A model of team building – Team vs Group – Characterizer of effective team – Role of a team leader – nine persons a successful team should have – inter – group collaboration – Advantages of Intergroup collaboration – Differences faced in intergroup collaboration.

Activity: Test your team work skills.

Activity. 11	**Group Discussion**

Introduction – Meaning of GD – Why Group Discussion – Charaters tested in a GD – Tips of GD – skills required in a GD – consequences of GD – Behaviour in a GD – Essential elements of GD – Traits tested in a GD – GD etiquette – Areas to be concentrated while preparing for a GD – Initiating a GD – Non-verbal communication in GD – Movement and Gestures to be avoided in a GD – Topics for GD.

Activity: Group Discussion.

Activity. 12	Interview Skills

Introduction – Why an interview – Type of interview – Interview panel – Types of Questions asked – Reason for selecting a candidate – Reasons for selecting a candidate – Reasons for rejecting a candidate – on the day of interview – on to the interview table – attending job fair

– common mistakes that you wouldn't want to do – question the candidate should not ask during the interview – pot interview etiquette – How does one follow- up? – Telephonic interview – Dress code at interview – Typical questions asked – Interview mistakes – quick tips – How to present well in interview – Tips to make a good impression in an interview – Job interview – Basic tips – How to search for job effectively – Interview quotations.

Activity. 13	Time Management

Introduction – The 80:20 rule – Take a good look at the people around you – Examine your work – sense of time management – Time is money – Features of Time – Three secrets of time management – Time management matrix – Analysis of time matrix – Effective scheduling – Group of activities – Five steps to successful time management – difficulties in time management – Evil of not planning – time management is a myth – overcoming procrastination – ways to find free time – Time Management tips for students – Interesting facts about time – Ideal way of spending a day – time wasters – time savers – realizing the valve of time – time circle planner.

Activity: Test your time management skills.

Activity. 10	Stress Management

Introduction – Meaning – At one level stress may be a positive aid to performance – At one level stress may be a negative aid to performance – Effects of stress – Kinds of stress – sources of stress – Few other common sources of stress case study – behaviors identified with stress – Assessing the existence of stress – What are signs of stress? – Spotting

stress in you – stress management tips : Teenage stress – Make the mornings memorable.

Text Books

1 Soft Skills : Life skills, Communication Skills, Employability skills and Corporate skills. Authors : S. Hariharan, N. Sundararajan and S.P. Shanmugapriya , Publishers : MJP Publishers

2 Soft Skills : Know yourself and know the world. Authors : Alex .Publishers : S Chand & Co., New Delhi.

3. Making work for highly sensitive person.

Authors : Bevertly Jaeger, Ph.D.

Publishers : Tata Mcgraw hill Education

Reference Books

1 Thill, John V. & Courtland L. Bovée, Excellence in Business Communication, 10th edition. Boston : Pearson, 2013.

2 Thorpe, Edgar & Showick Thorpe. Winning at Interviews. 2nd Edition. Delhi: Dorling Kindersley, 2006.

Web References

1. http://www.indiabix.com/group-discussion/topics-with-answers/

2. http://www.owlnet.rice.edu/~cainproj

Outcomes

1. Receive the support they need to resolve issues and make decisions

2. Explore their personal resources and aptitudes

3. Understand new career prospects and strive for personal development

4. Make a proper and informed decision for their career

5. In an era of stiff competition success can only be received if one knows Team work as team work always pays rich dividends.

6. Problem solving skills for personal and professional development.

ENVIRONMENTAL STUDIES

(Mandatory Course)

B.Tech III Semester: Common to CE, EEE, ME, ECE & CSE								
Course code	Category	Hours/week			Credits	Maximum Marks		
18MD301	H&S	L	T	P	C	CIA	SEE	TOTAL
		2	0	0	0	0	0	0
Contact Classes:30	Tutorial Classes: 0	Practical Classes: Nil			Total Classes: 30			

OBJECTIVES

The course should enable the students to

1. To create a stronger foundation in the understanding of fundamentals of environment with an applied perspective for future engineers with a focus on Engineering & Technology.
2. To impart the awareness among the engineering students about the present day problems of environment, threats to biodiversity, social issues and excess usage of natural resources to reach the heights of technical globe with latest technologies.
3. Prepare with perspective of "**Think Globally Act Locally**"

UNIT-I	Introduction to Environmental Studies	Classes:6

Introduction to Environmental Studies: Definition, scope, need for public awareness.

Natural Resources: Renewable & Non-renewable resources in India,

Forest Resources: Use, Deforestation-Case Studies;

Water Resources: Use, Over-exploitation of surface and ground water, Environmental impacts of Dams, Floods and Droughts;

Food Resources: Changes caused by agriculture, over grazing; Effects of modern agriculture-fertilizer, pesticide problems, water - logging and salinity;

Energy Resources: Renewable & nonrenewable energy resources, Use of alternate energy sources.

UNIT-II	Ecosystems:Biodiversity:	Classes:6

Ecosystems: Definition, Structure of an ecosystem

Functions of ecosystem- Food chains, Food web, Energy flow, Ecological pyramids

Types of Ecosystems: Grass land, Desert, Forest Ecosystem, and Aquatic Ecosystem: Pond, River, and Ocean Ecosystem.

Biodiversity: Definition, levels of biodiversity, Value of biodiversity, Hotspots of biodiversity,

India as mega biodiversity nation, Threats to biodiversity- Poaching, Habitat loss, Endangered & endemic species of India, Conservation of biodiversity: In-situ & Ex-situ conservation.

UNIT-III	**Environmental Pollution**	**Classes:6**

Environmental Pollution: Definition, Causes & Control measures of Air pollution, Water pollution, Soil pollution, noise pollution.

Solid waste management: Causes, effects and control measures

Role of an individual in preventing pollution.

UNIT-IV	**Social Issues & Environment**	**Classes:6**

From unsustainable to sustainable development, water conservation, rain water harvesting, watershed management, environmental ethics & issues, possible solutions, ozone layer depletion, global warming, consumerism & waste products.

UNIT-V	**Human Population and the Environment**	**Classes:6**

Population growth, variation among nations, Population explosion-family welfare programme, Women and Child welfare, Role of Information Technology in Environment and human health, Case Studies.

Text Books

1. Environmental Studies for Undergraduate courses by Erach.Bharucha for University Grants Commission, Universities press
2. Environmental Studies by R Rajagopalan, Oxfords University Press.
3. Kaushik A, Kaushik CP, perspectives in environment, New International Publishers.
4. R.J.Ranjit Daniels and JagdishKrishna Swamy, (2009), "Environmental Studies", Wiley India Private Ltd., New Delhi.

Reference Books

1. P. Meenakshi, "Elements of Environmental Science and Engineering", Prentice Hall of India Private Limited, New Delhi, 2006.
2. G. Tyler Miller Jr., "Environmental Science – working with the Earth", Eleventh Edition, Thomson Brooks /Cole, 2006.
3. S.M. Prakash, "Environmental Studies", Elite Publishers Mangalore, 2007.
4. Raman Siva Kumar, "Principals of Environmental Science and Engineering", Second Edition, Cengage learning Singapore, 2005.
5. Dr.Pratiba Sing, Dr.AnoopSingh and Dr.Piyush Malaviya, "Text Book of Environmental and Ecology", Acme Learning Pvt. Ltd. New Delhi.

Web References

1. www.ugc.ac.in
2. https://en.wikiboos.org

E-Text Books

1. Textbook of Environmental Studies for Undergraduate Courses.By Erach Bharucha (Author)
2. A Textbook of Environmental Studies. By Dr. D.K. Asthana.

Outcomes

At the end of the course students able to

1. Apply their knowledge in biology, physics, chemistry, earth science and economics for better understanding of earth's environment.
2. Understanding the importance of natural resources.
3. Comprehend the environmental problems from multiple perspectives with emphasis on human modern life style and developmental activities.
4. Influence his society in proper utilization of goods & services.
5. Demonstrate knowledge relating to the biological systems involved in the major global environmental problems of the 21st century
6. Recognize the inter connectedness of human dependence on earth's ecosystems- Understanding the value of bio diversity & the conservation of biodiversity.

PROBABILITY AND STATISTICS

B.Tech IV Semester: Common to CE & ME								
Course code	Category	Hours/week			Credits	Maximum Marks		
18BS401	Basic Sciences	L	T	P	C	CIA	SEE	TOTAL
		3	1	0	3	30	70	100
Contact Classes: 48	Tutorial Classes: -12	Practical Classes: Nil			Total Classes: 60			

OBJECTIVES

The course should enable the students to

I. Understand the concepts of measures of Central Tendancy and Curve fitting.

II. Know the concepts of random variables and distributions

III. Understand the concepts of testing of hypothesis

IV. Evaluation of problems on large and Small sample tests

UNIT-I	Basic Statistics	Classes:15

Measures of Central tendency; Moments, Skewness - Pearson's & Quartile coefficient of skewness; kurtosis.

UNIT-II	Curve Fitting	Classes:15

Curve fitting by the method of least squares – Fitting of straight line, second degree parabola, power curve & exponential curve.

UNIT-III	Random Variables & Distributions	Classes:15

Discrete & Continuous Probability Distributions: Binomial, Poisson & Normal distributions –Evolution of Statistical parameters for these three distributions; Poisson Approximation to the Binomial Distributions.

UNIT-IV	Test of Hypothesis and Large Sample Tests	Classes:20

Statistical hypothesis– Test of significance – Null and Alternative hypothesis-Types of errors – Level of significance critical values and region – one and two tailed tests – Procedure of hypothesis testing – Testing of significance of single mean & difference of means; Single proportion & difference of proportions.

UNIT-V	Small Sample Tests	Classes:20

Chi-square (x^2) test for goodness of fit – Independent of attributes– student's t-distribution – testing of single mean and difference of means; F- test.

Text Books

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers.
2. S.C.Gupta , Fundamentals of Statistics -Himalaya Publications .

Reference Books

1. Miller's and Freund's, "Probability and Statistics for Engineers" – Johnson Richard A.
2. Erwin Kreyzig, Advanced Engineering Mathematics - John wiley and sons.

Web References

1. www.mathplanet.com
2. www.mathworld.com

E-Text Books

1. Mathai, Arak M. / Haubold, Hans J-" Probability& Statistics".
2. Paragradke-"Basic probability theory & Statistics".

Outcomes

At the end of the course student will be able to

1. Gain the knowledge in the concepts of Discrete and continuous distributions
2. Apply the knowledge of normal distribution to various practical situations using normal tables
3. Test the hypothesis of various engineering problems
4. Analyze and apply the technics of large and small sample tests in various engineering problems.

HYDRAULIC ENGINEERING

B.Tech IV Semester: Civil Engineering								
Course code	Category	Hours/week			Credits	Maximum Marks		
18CE401	Core	L	T	P	C	CIA	SEE	TOTAL
		3	0	0	3	30	70	100
Contact Classes: 60	Tutorial Classes: -Nil	Practical Classes: Nil				Total Classes: 60		

OBJECTIVES

The course should enable the students to

I. Gain knowledge on open channel flows and hydraulic machines.

II. Learn the different hydraulic models.

III. Impart basics of turbo machinery, hydraulic turbines and performance of turbines.

UNIT-I — Classes:12

OPEN CHANNEL FLOW – UNIFORM FLOW: Introduction, Comparison between open channel flow and pipe flow Classification of flows, Types of channels; Flow analysis: The Chezy equation, Empirical formulae for the Chezy constant, Hydraulically efficient channel sections: Rectangular, Trapezoidal, Triangular and Circular channels; Velocity distribution; Energy and momentum correction factors. Application of Bernoulli's equation to open channel flow.

OPEN CHANNEL FLOW – NON-UNIFORM FLOW: Concept of specific energy; Specific energy curves; Critical flow; Critical flow in a rectangular channel; Critical slope; discharge curve, Different slope conditions; Channel transitions- Reduction in width of a rectangular channel, Raised bottom in a rectangular channel, venture flume, Momentum principle applied to open channel flow; Measurement of Discharge and Velocity, Specific force; Specific force curves

UNIT-II — Classes:13

OPEN CHANNEL FLOW – GRADUALLY VARIED FLOW: Introduction, Dynamic equation; Dynamic equation for GVF in wide Rectangu-

lar channel, classification of channel bottom slopes, Surface Profiles; Characteristics of surface profiles, Back water Curves and Draw down curves; Examples of various types of water surface profiles; Control section, Computation of surface profiles by single step method.

OPEN CHANNEL FLOW – RAPID VARIED FLOW: Hydraulic jump; Elements and characteristics of hydraulic jump; Hydraulic jump in rectangular channels, height and length of the jump, Energy loss in a hydraulic jump, Types of hydraulic jump; applications of hydraulic jump; Location of hydraulic jump,

UNIT-III	**Classes:13**

IMPACT OF JETS: Hydrodynamic force of jets on stationary and moving flat, inclined and curved vanes, jet striking centrally and at tip, velocity triangles at inlet and outlet, expressions forwork done and efficiency-Angular momentum principle, Torque and head transferred in roto dynamic machines.

HYDRAULIC TURBINES-I: Introduction, head and efficiencies of hydraulic turbines, Classification of turbines; pelton wheel: parts, Velocity triangles, work done and efficiency, working proportions, design of pelton wheel. Radial flow reaction turbines: velocity triangles and work done for inward radial flow turbine, degree of reaction, discharge, speed ratio, flow ratio.

HYDRAULIC TURBINES-II: Francis turbine: main components and working, work done and efficiencies, design proportions; design of Francis turbine runner. Kaplan turbine: main components and working, working proportions. Draft tube: theory and efficiency; specific speed, unit quantities, characteristic curves of hydraulic turbines. Cavitations: causes, effects

UNIT-IV	Classes:10

DIMENSIONAL ANALYSIS AND SIMILITUDE: Introduction, dimensions; Dimensional homogeneity; Methods of dimensional analysis-Rayleigh's method; Buckingham – Pi theorem; model analysis; similitude-types of similarities; Dimensionless numbers; Model laws ;Partially submerged objects; types of models; Scale effect

UNIT-V	Classes:12

CENTRIFUGAL PUMPS: Introduction, component parts and working of a centrifugal pump, work done by the impeller; heads, losses and efficiencies; minimum starting speed; Priming ;specific speed; limitation of suction lift, net positive suction head(NPSH);Performance and characteristic curves; Cavitation effects ;Multistage centrifugal pumps; troubles and remedies

BOUNDARY LAYER THEORY & DRAG AND LIFT: Boundary layer – concepts, Prandtl's contribution, Characteristics of boundary layer along a thin flat plate, laminar and turbulent Boundary layers, separation of BL. expression for drag and lift; Lift and Drag Coefficients; pressure drag and friction drag; Streamlined and bluff bodies.

Text Books

1. P.N.Modi&S.N.Seth"Hydraulics &Fluid Mechanics"
2. Dr.R.K.Bansal "Fluid Mechanics & Hydraulic Machines" Laxmi Publications
3. K.Subramanya "Open channel flow", TMH Publishers

Reference Books

1. V.T.Chow"OpenChannelflow", Mc. GrawHill Book Company.

2. Ranga Raju "Elements of Open channel flow", TataMc. GrawHill, Publications.

3. A.K.Jain"Fluid Mechanics", Khanna Publishers, Delhi

Web References

1. https://nptel.ac.in/courses/112103249/
2. https://nptel.ac.in/courses/112105182/
3. https://nptel.ac.in/courses/105103096/

E-Text Books

1. https://books.google.com/books?isbn=1259006840
2. https://books.google.com/books?isbn=9380026013
3. https://books.google.com/books?id=cERVAAAAMAAJ

Outcomes

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

1. Understand the types of channels, design of most economical channel sections
2. Analyze the critical flow condition and hydraulic jump concept
3. Determine the velocity and rate of flow in open channels
4. Select of type of turbine required with reference to available head of water
5. Identify type of turbine with estimated specific speed
6. Determine the impact of jet on vanes

MECHANICS OF MATERIALS – II

B.Tech IV Semester: Civil Engineering								
Course code	Category	Hours/week			Credits	Maximum Marks		
18CE402	Core	L	T	P	C	CIA	SEE	TOTAL
		3	0	0	3	30	70	100
Contact Classes: 60	Tutorial Classes: - Nil	Practical Classes: Nil				Total Classes: 60		

OBJECTIVES

The course should enable the students to

I. Gain knowledge on failure of a material

II. Impart knowledge on effect of combined direct and bending stresses

III. Learn classification of columns and understand buckling load of a column

UNIT-I — Classes:12

PRINCIPAL STRESSES AND STRAINS: Transformation of stresses in two dimensional problems, principal stresses in two dimensional problems, Mohr's circle for two dimensional problems, and Construction of Mohr's circle for stress transformation.

GENERALISED 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-II — Classes:12

COLUMNS AND STRUTS: Introduction, Classification of Columns, Euler's theorem for long columns- Euler's critical load formula for various end conditions, limitations of Euler's theorem, Rankine- Gordon formula, Long columns subjected to eccentric loading, Prof. Perry's formula.

UNIT-III — Classes:10

TORSION: Theory of pure torsion – Derivation of Torsion equation: T/J = q/r = Ne/ l, Assumptions made in the theory. Theory of pure torsion –

Torsional moment of resistance – Polar section modulus – Power transmitted by shafts- Combined bending and torsion.

UNIT-IV	**Classes:12**

COMBINED DIRECT AND BENDING STRESSES: Effect of combined direct and bending stresses. Limit of eccentricity and core of the sections

STABILITY ANALYSIS: Stability of dams, retaining walls and chimneys

UNIT-V	**Classes:14**

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

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

Text Books

1. Strength of Materials (Mechanics of Solids), 6th Edition, Dr. R.K. Rajput, S. Chand Publishing
2. A Textbook of Strength of Materials, 6th Edition, Dr. R. K. Bansal, Laxmi Publications
3. An Introduction to the Mechanics of Solids. 2nd Edition, New York, NY: McGraw Hill, 1979

Reference Books

1. Timoshenko, S. and Young D.H., "Elements of strength of materials", DVNC, Newyork, USA.

2. Strength of Materials, 3rdEdition, R. Subramanian, Oxford University Press

3. Mechanics of Materials, Revised, 2016 Edition, Dr. B. C. Punmia, Dr. Ashok Dr. Jain, Dr. Arun Kumar Jain, Laxmi Publications

Web References

1. https://nptel.ac.in/courses/112107146/
2. https://www.accessengineeringlibrary.com/maps/strength-of-materials
3. https://mechanicalc.com/reference/strength-of-materials

E-Text Books

1. https://books.google.co.in/books?isbn=8131808149
2. https://books.google.co.in/books?isbn=8131798895
3. https://books.google.co.in/books?isbn=9325971577

Outcomes

At the end of the course student will be able to

1. Estimate principle stresses and strains
2. Compute critical load in columns
3. Check the stability in dams and retaining walls
4. Understand the stress and strain concept of thin and thick cylinders
5. Determine torsional moment of resistance and derive torsion equation
6. Understand the concept of power transmitted by shafts

ENVIRONMANTAL ENGINEERING

B.Tech IV Semester: Civil Engineering								
Course code	**Category**	**Hours/week**			**Credits**	**Maximum Marks**		
18CE403	Core	L	T	P	C	CIA	SEE	TOTAL
		3	0	0	3	30	70	100
Contact Classes: 60	**Tutorial Classes: - Nil**		**Practical Classes: Nil**			**Total Classes: 60**		

OBJECTIVES

The course should enable the students to

I. Impart basics concepts of unit operations and processes involved in waste water treatment

II. Gain knowledge on various treatment methods

III. Understand the sewage systems and municipal solid waste management

UNIT-I — Classes:12

Water: Sources of Water and quality issues, water quality requirement fordifferent beneficial uses, Water quality standards, water quality indices, water safety plans, Water Supply systems, Need for planned water supply schemes, Water demand industrial and agricultural water requirements, Components of water supply system, Transmission of water, Distribution system, Various valves used in W/S systems, service reservoirs and design.

UNIT-II — Classes:12

Physical treatment of surface water and groundwater: Sedimentation, filtration, adsorption and ion exchange, membrane.

Chemical treatments of surface water and groundwater: Coagulation-flocculation; Chemical Softening; Chlorination; Oxidation.

UNIT-III	Classes:12

Pre-and primary treatment of wastewater: Process flow sheet; Screen, grit removal, oil and grease removal, primary sedimentation

Secondary Treatment of waste water: Activated sludge process, conventional and extended aeration, trickling filters

UNIT-IV	Classes:12

Sewage: Domestic and Storm water, Quantity of Sewage, Sewage flow variations.Conveyance of sewage- Sewers, shapes design parameters, operation and maintenance of sewers, Sewage pumping; Sewerage, Sewer appurtenances, Design of sewerage systems. Wastewater treatment, aerobic and anaerobic treatment systems, suspended and attached growth systems, recycling of sewage – quality requirements for various purposes.

UNIT-V	Classes:12

Solid waste management: Municipal solid waste, Composition and various chemical and physical parameters of MSW, MSW management: Collection, transport, treatment and disposal of MSW.

Special MSW: waste from commercial establishments and other urban areas, solid waste from construction activities, biomedical wastes, Effects of solid waste on environment: effects on air, soil, water surface and ground health hazards. Disposal of solid waste-segregation, reduction at source, recovery and recycle.

Text Books

1. Water supply and sanitary Engineering by G.S.Birdi, Dhanpat Rai & Sons Publishers
2. Waste water Engineering, Vol.II, B.C.Punmia, Ashok Jain & Arun Jain, Laxmi Publications Pvt. Ltd, New Delhi
3. Water supply and sanitary Engineering by S.K.Garg,

Reference Books

1. Water and Waste Water Technology by Mark JHammar and Mark J.Hammar Jr
2. Environmental Science and Engineering by J.G.Henrya and G.W. Heinke, Person Education
3. Wastewatertreatment,concepts and design approach by G.L.Kariaand R.A.Christian,Prentice Hall of India.

Web References

1. https://nptel.ac.in/courses/120108005/
2. https://nptel.ac.in/courses/104103020/42
3. https://www.pdfdrive.com/solid-waste-management-books.html

E-Text Books

1. https://books.google.com/books?isbn=364228681X
2. https://books.google.com/books?isbn=1118456912
3. https://books.google.com/books?isbn=8183243533

Outcomes

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

1. Understand the impact of humans on environment and environment on humans
2. Understand the distribution system and estimate head loss in water distribution pipe networks
3. Understand basic principles behind water treatment unit and design simple water treatment units.
4. Select the most appropriate technique for the treatment of solid waste, waste water and water
5. Explain physical and chemical treatment of surface and ground water
6. Explain the effects of waste on environment

CONCRETE TECHNOLOGY

B.Tech IV Semester: Civil Engineering								
Course code	Category	Hours/week			Credits	Maximum Marks		
18CE404	Core	L	T	P	C	CIA	SEE	TOTAL
		3	0	0	3	30	70	100
Contact Classes: 60	Tutorial Classes: - Nil	Practical Classes: Nil				Total Classes: 60		

OBJECTIVES

The course should enable the students to

I. Impart knowledge on cement and its properties

II. Gain knowledge about various admixtures and their importance

III. Impart knowledge on concrete mix design

UNIT-I — Classes:12

CEMENT: Historical note, chemical composition, hydration of cement, setting, structure of hydrated cement, different grades of cement, tests on properties of cement

AGGREGATES: Classification of aggregates, tests on strength and other mechanical properties of aggregates, deleterious substances in aggregate, alkali-silica reaction, sieve analysis, grading requirement, practical grading.

UNIT-II — Classes:12

WATER: Quality of water for mixing concrete, Tolerable concentrations of some impurities in mixing water, permissible limit for solids as per IS456-2000, use of sea water for mixing concrete.

ADMIXTURES: Benefits of admixtures, types of admixtures, accelerating admixtures, retarding admixtures, water-reducing admixtures, super plasticizer, special admixtures.

UNIT-III	Classes:13

FRESH CONCRETE: Process of manufacture of concrete, quality of mixing water, properties of fresh concrete, workability, factors affecting workability, measurement of workability, definitions of segregation, bleeding and honey combing.

HARDENED CONCRETE: Compression, split tensile and flexure strength test, methods of non-destructive test of concrete, rebound hammer test, ultrasonic pulse velocity test, and importance of NDT, definitions of modulus of elasticity, creep, shrinkage and Poisson's ratio, introduction to durability of concrete.

UNIT-IV	Classes:10

SPECIAL CONCRETE: Concrete with different cementitious materials containing fly ash, GGBS, silica fume, high performance concrete, self-compacting concrete, light-weight concrete, ready mix concrete, fiber reinforced concrete and polymer concrete.

UNIT-V	Classes:13

CONCRETE MIX DESIGN: Factors in the choice of mix proportions – Durability of concrete – Quality control of concrete – Statistical methods – Acceptance criteria – Proportioning of concrete mixes by various methods – ACI method & IS 10262 method

Text Books

1. M.S.Shetty "Concrete Technology", S.Chand& Co.; 2004
2. A.M.Neville "Properties of Concrete", Pearson publication – 4th editions
3. M.L. Gambhir "Concrete Technology", Tata Mc. Graw Hill Publishers, New Delhi

Reference Books

1. A.R. Santha Kumar "Concrete Technology", Oxford university Press, New Delhi
2. J.Prasad& C.G.K. Nair "Non-Destructive Test and Evaluation of Materials" by, TataMcgraw hill Publishers, New Delhi

Web References

1. https://nptel.ac.in/courses/105102012/
2. https://nptel.ac.in/courses/105106176/
3. https://lecturenotes.in/subject/188/concrete-technology-ct

E-Text Books

1. https://books.google.com/books?isbn=0273732196
2. https://books.google.com/books?isbn=0070151369
3. https://books.google.com/books?isbn=0419201505

Outcomes

At the end of the course student will be able to

1. Understand all available ingredients of concrete and have a comprehensive Overview their mechanism in concrete
2. Acquire the skill of testing, supervision of concrete work & interpretation of tests results
3. Understand new concrete types and their design methods
4. Enlist the concrete materials and the main operations of concreting
5. Explain various test conducted on fresh and hardened concrete
6. Explain the properties of cement and aggregate

MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

B.Tech IV Semester: Common to CE, EEE, ME, ECE & CSE								
Course code	**Category**	**Hours/week**			**Credits**	**Maximum Marks**		
18BS303	**Core**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**TOTAL**
		2	-	-	2	30	70	100
Contact Classes:60	**Tutorial Classes: -**		**Practical Classes: Nil**			**Total Classes:60**		

OBJECTIVES

The course should enable the students to

I. To create knowledge over economic aspects

II. To understand modern principles and methods of microeconomics of real-world business problems.

III. To master the knowledge over the basic tools of micro economics and real world business problems.

IV. To understand various accounting concepts and its applications in managerial decision-making.

UNIT-I — Classes:20

Introduction to Managerial Economics: Definition, Nature and Scope of Managerial Economics– Demand Analysis: Determinants, Law of Demand and its exceptions. Elasticity of Demand: Types, Measurement and Significance of Elasticity of Demand. Demand Forecasting, methods, (survey methods, statistical methods, expert opinion method, test marketing, controlled experiments, judgmental approach to demand forecasting)

UNIT-II — Classes:10

Theory of Production: Production Function – Isoquants and Iso-costs, MRTS, Least Cost Combination of Inputs, Cobb-Douglas Production function, Laws of Returns, Internal and External Economies of Scale. Cost Analysis: Cost concepts, types of costs, (BEA)-Determination of Break-Even Point (simple

problems) Market: Types of competition, Price-Output Determination in case of Perfect Competition and Monopoly, Monopolistic competition. Methods of Pricing: Cost, competition, strategy based pricing

UNIT-III	**Classes:10**

Business Types: Business, features, Sole Proprietorships, Partnerships, Joint Stock Companies, Public Enterprises and their types. Capital and Capital Budgeting: Capital and its significance, Types and sources of raising finance. Nature and scope of Capital Budgeting, Features, Methods: Pay-back Method, Accounting Rate of Return Method (ARR) and Net Present Value Method (simple problems)

UNIT-IV	**Classes:10**

Financial Accounting: Double-Entry Book Keeping, Journal, Ledger, Trial Balance- Final Accounts. (Simple Problems)

UNIT-V	**Classes:10**

Financial Analysis through Ratios: Computation, Analysis and Interpretation of Liquidity Ratios (Current Ratio and quick ratio), Capital structure Ratios (Debt- Equity ratio, Interest Coverage ratio), Activity Ratios (Inventory turnover ratio and Debtor Turnover ratio), and Profitability ratios (Gross Profit Ratio, Net Profit ratio, Operating Ratio, P/E Ratio and EPS), (Simple Problems).

Text Books

1. Managerial Economics and Financial Analysis, J.V.Prabhakar Rao, Maruthi Publications, 2011
2. Managerial Economics and Financial Analysis, N. Appa Rao. & P. Vijaya Kumar, Cengage Publications, New Delhi, 2011

Reference Books

1. Managerial Economics and Financial Analysis, A R Aryasri, TMH, 2011
2. Managerial Economics, Suma damodaran, Oxford, 2011

Web References

1. http://www.economicsdiscussion.net/production-function/least-cost-and-maximum-output-combinations-of-input/23264
2. https://www.ilearnlot.com/capital-budgeting-nature-importance-and-limitations/

E-Text Books

1. https://www.iare.ac.in/sites/default/files/lecture_notes/IARE_MEFA_LECTURE_NOTES_1.pdf
2. https://mrcet.com/downloads/digital_notes/EEE/MEFA%20DIGITAL%20NOTES.pdf

Outcomes

1. To introduce micro as well as macro, economic concepts that are useful in business decision making.
2. To help students better recognize the application of modern principles and methods of microeconomics to real-world business problems in different contexts.
3. To master the basic tools of microeconomics: supply and demand analysis; firms' production and pricing decisions, market equilibrium and market structure analysis.
4. The objective of this course is to acquaint the students regarding various accounting concepts and its application in managerial decision making.

HYDRAULIC ENGINEERING LABORATORY

B.Tech IV Semester – Civil Engineering								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
18CE405	**Core**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		-	-	2	1	25	50	75
Contact Classes: Nil	**Tutorial Classes: Nil**		**Practical Classes: 36**			**Total Classes: 36**		

OBJECTIVES

The course should enable the students to

I. Impart knowledge on determining coefficient of discharge

II. Gain knowledge on loss of head in pipes

III. Get an idea on efficiency of pumps

LIST OF EXPERIMENTS

Expt. 1	**COEFFICIENT OF DISCHARGE OVENTURIME-TER:**

Determine the coefficient of discharge of a venturimeter

Expt. 2	**COEFFICIENT OF DISCHARGE OF ORIFICE MET-ER**

Determine the coefficient of discharge of a orifice meter

Expt. 3	**COEFFICIENT OF DISCHARGE FOR A SMALL ORIFICE BY A CONSTANT HEAD METHOD.**

Determine the coefficient of discharge of an small orifice by a constant head method

Expt. 4	**COEFFICIENT OF DISCHARGE FOR AN EXTER NAL MOUTH PIECE BY VARIABLE HEAD METHOD**

Determine the coefficient of discharge of an external mouth piece by variable head method

Expt. 5	**COEFFICIENT OF DISCHARGE FOR RECTAN GULAR AND V – NOTCHES**
Determine the coefficient of discharge of a rectangular and V-notches	
Expt. 6	**FRICTION FACTOR OF PIPES.**
Determine the friction factor of pipes	
Expt.7	**LOSS OF HEAD IN PIPES**
Determine the loss of head in pipes due to bends, sudden contraction and expansion	
Expt. 8	**VERIFICATION OF BERNOULLI'S EQUATION..**
To verify the Bernoulli's equation	
Expt. 9	**IMPACT OF JET ON VANES**
Determine the impact of jet on vanes	
Expt. 10	**PERFORMANCE TEST ON PELTON WHEEL TURBINE.**
To carryout performance test on pelton wheel turbine	
Expt. 11	**PERFORMANCE TEST ON FRANCIS TURBINE**
To carryout performance test on francis turbine	
Expt. 12	**EFFICIENCY TEST ON CENTRIFUGAL PUMP.**
Determine the efficiency of centrifugal pump	

Reference Books

1. V.T.Chow"OpenChannelflow", Mc. GrawHill Book Company.
2. Ranga Raju "Elements of Open channel flow", TataMc. GrawHill, Publications.
3. A.K.Jain"Fluid Mechanics", Khanna Publishers, Delhi

Web References

1. https://nptel.ac.in/courses/112103249/
2. https://nptel.ac.in/courses/112105182/
3. https://nptel.ac.in/courses/105103096/

Course Home Page

SOFTWARE AND HARDWARE REQUIREMENTS FOR A BATCH OF 36 STUDENTS

SOFTWARE:NIL

HARDWARE: Venture meter, Orificemeter, Friction factor of pipes apparatus, Impact of jet on vane apparatus, pelton wheel turbine, francis turbine, Kaplan turbine, single stage centrifugal pump, multi stage centrifugal pump, reciprocating pump

Course Outcome

At the end of the course student will be able to

1. Determine the coefficient of discharge using venturimeter
2. Determine the coefficient of discharge using orificemeter
3. Determine the loss of head in pipes
4. Determine the impact of jets on vanes
5. Carryout performance test on pelton and francis turbine
6. Find out the efficiency of centrifugal pump
2. Solve various boundary value problems using Fourier transforms
3. Evaluate the multiple integrals and apply the concept to find areas and volumes
4. Evaluate the line, surface and volume integrals and converting them

ENVIRONMENTAL ENGINEERING LAB

B.Tech IV Semester – Civil Engineering								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
18CE406	**Core**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		-	-	2	1	25	50	75
Contact Classes: Nil	**Tutorial Classes: Nil**		**Practical Classes: 36**			**Total Classes: 36**		

OBJECTIVES

The course should enable the students to

I. Gain knowledge on various test conducted on water to find out parameters

II. Impart knowledge on test procedures conducted on water samples

III. Work with chemicals with safe practices

LIST OF EXPERIMENTS

Expt. 1	**DETERMINATION OF pH AND ELECTRICAL CONDUCTIVITY**

Determine the pH and Electrical conductivity of given water sample

Expt. 2	**DETERMINATION AND ESTIMATION OF TOTAL HARDNESS**

Estimate the total hardness of given water sample

Expt. 3	**DETERMINATION OF CALCIUM AND MAGNESIUM HARDNESS**

Determine calcium and magnesium hardness of water sample

Expt. 4	**DETERMINATION OF ALKALINITY**

Determine the alkalinity of water sample

Expt. 5	**DETERMINATION OF ACIDITY**
Determine the acidity of given water sample	
Expt. 6	**DETERMINATION OF CHLORIDES IN WATER AND SOIL.**
Find out the chlorides in water and soil sample	
Expt.7	**DETERMINATION AND ESTIMATION OF TO TAL SOLIDS, DISSOLVED SOLIDS**
Estimate the total solids and dissolved solids in water sample	
Expt. 8	**DETERMINATION OF IRON**
Determine the Iron content in given water sample	
Expt. 9	**DETERMINATION OF DISSOLVED OXYGEN WITH D.O METER &WINKLER'S METHOD**
Determine the dissolved oxygen by Winkler's Method	
Expt.10	**PHYSICAL PARAMETERS-TEMPERATURE, TURBIDITY**
Find out the turbidity and temperature of water sample	
Expt. 11	**DETERMINATION OF B.O.D/COD**
Determine the B.O.D and C.O.D	
Expt. 12	**DETERMINATION OF CHLORINE DEMAND**
Estimate the chlorine demand	

Reference Books

1. https://www.scribd.com/doc/236422623/Environmental-Lab-Manual
2. www.atri.edu.in/images/pdf/publications/EE%20LAB%20MANUAL. pdf

3. cee. engr.uconn. edu/ wp-content/uploads / 2018/06/Syllabus _ ENVE3200_f17. pdf

Web References

1. https://nptel.ac.in/syllabus/105104032/
2. https://nptel.ac.in/courses/103107084/
3. https://nptel.ac.in/syllabus/105104032/

Course Home Page

SOFTWARE AND HARDWARE REQUIREMENTS FOR A BATCH OF 36 STUDENTS:

SOFTWARE: NIL

HARDWARE: Digital pH meter, Digital Conductivity meter, Nephelo meter/turbidity meter, Digital Colony counter, Hot air oven, water bath, distilled water still, B.O.D Incubator, C.O.D digestor, Jar test apparatus, Burettes, Pipettes, Flasks, measuring jars, conical flasks

Course Outcome

At the end of the course student will be able to

1. Perform common environmental experiments relating to water and wastewater quality
2. Select which tests are appropriate for given environmental problems
3. Apply lab results to problem identification, quantification and environmental solutions.
4. Understand the water and wastewater sampling procedures and sample preservations
5. Obtain the necessary background for subsequent courses in environmental engineering.
6. Carry out various tests on water samples to assess its properties

SURVEYING LAB – II

B.Tech IV Semester – Civil Engineering								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
18CE407	**Core**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		-	-	2	1	25	50	75
Contact Classes: Nil	**Tutorial Classes: Nil**	**Practical Classes: 36**				**Total Classes: 36**		

OBJECTIVES

The course should enable the students to

I. Impart knowledge on the procedures of determining angles and distances

II. Work with theodolite and total station

III. Gain knowledge on tacheometric and trigonometric surveying

LIST OF EXPERIMENTS

Expt. 1	**STUDY OF THEODOLITE - MEASUREMENT OF HORIZONTAL AND VERTICAL ANGLES.**

1. Study the theodolite and its parts
2. Determine horizontal angle between two points
3. Determine Vertical angle between two points

Expt. 2	**MEASUREMENT OF HORIZONTAL ANGLES BY METHOD OF REPETITION AND METHOD OF REITERATION.**

1. Determine horizontal angle by method of repetition
2. Determine horizontal angle by method of reiteration

Expt. 3	**FINDING OUT DISTANCE BETWEEN TWO IN ACCESSIBLE POINTS**

Determine the distance between inaccessible points using theodolite

Expt. 4	**TRIGONOMETRIC LEVELING - MEASUREMENT OF HEIGHTS AND DISTANCES (TWO EXERCISES)**
Determine the RL and distance by using trigonometric principles	
Expt. 5	**TACHEOMETRIC SURVEYING - MEASUREMENT OF HEIGHTS AND DISTANCES (TWO EXERCISES)**
Determine the RL and distance by using tacheometric surveying	
Expt. 6	**SETTING OUT A CIRCULAR CURVE BY RANKINE'-S METHOD OF TANGENTIAL ANGLES**
Set out a simple circular curve by Rankine's method	
Expt.7	**SETTING OUT CIRCULAR CURVE BY TWO THEODOLITEMETHOD.**
Set out a simple circular curve by two theodolite method	
Expt. 8	**STUDY OF TOTAL STATION - MEASUREMENT OF HORIZONTAL ANGLES, VERTICAL ANGLES AND DISTANCES**
1. Study of total station and its parts 2. Determine horizontal angle using total station 3. Determine Vertical angle using total station 4. Determine Distances using total station	
Expt. 9	**DETERMINATION OF AREA USING TOTAL STATION.**
Determine the area enclosed in given boundary using a total station	

Reference Books

1. www.aust.edu/civil/lab_manual/ce_104.pdf
2. https://www.scribd.com/doc/58539742/Surveying-II-lab-manual

3. www.citchennai.edu.in/wp-content/uploads/2015/02/surveying-II-lab-manual.pdf

Web References

1. https://sites.google.com/a/mitr.iitm.ac.in/iitmcivil/ce2080/surveying-practical
2. https://nptel.ac.in/courses/105107122/1
3. https://nptel.ac.in/courses/105104100/

Course Home Page

SOFTWARE AND HARDWARE REQUIREMENTS FOR A BATCH OF 36 STUDENTS:

SOFTWARE:NIL

HARDWARE: Theodolite with tripod, plumb bobs, ranging rods, tapes, tacheometer, levelling staff, pegs, arrows, total station and its accessories,

Course Outcome

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

1. Determine horizontal and vertical angles using theodolite
2. Determine elevations and horizontal distances
3. Set out a simple circular curve
4. Use total station to find angles, distances and area
5. Understand the working of total station
6. Understand trigonometric and tacheometric surveying

TECHNICAL SEMINAR

B.Tech IV Semester – Civil Engineering								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
18CE408	**Core**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		-	2	0	1	50	-	50
Contact Classes: Nil	**Tutorial Classes: 25**	**Practical Classes: -**				**Total Classes: 25**		

OBJECTIVES

The course should enable the students to:

I. Distinguish the multiple senses of a text (literal and beyond the literal).

II. Identify and understand assumptions, theses & arguments that exist in the work of authors.

III. Evaluate and synthesize evidence in order to draw conclusions consistent with the text.

There shall be a Technical seminar presentation in B.Tech IV Semester. A Technical Seminar shall have two components, one chosen by the student from the course work as an extension and approved by the faculty supervisor. The other component is suggested by the supervisor and can be a reproduction of the concept in any standard research paper or an extension of concept from earlier course work. A hard copy of the information on seminar topic in the form of a report is to be submitted for evaluation along with presentation. The presentation of the seminar topics shall be made before a committee consisting of Head of the department, seminar supervisor and a senior faculty member. Each Technical Seminar shall be evaluated for 50 marks. Technical Seminar component-I for 25 marks and component-II for 25 marks making total 50 marks. (**Distribution of marks for 25:** 5 marks for report, 5 marks for subject content, 10 marks for presentation and 5 marks for queries).

PROFESSIONAL SOCIETY ACTIVITIES-II

B.Tech IV Semester: Common to CE, EEE, ME, ECE & CSE								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
18AS401	-	2	0	0	0	-	-	-
Contact Classes: 12	**Tutorial Classes: Nil**	**Practical Classes: Nil**				**Total Classes: 12**		

OBJECTIVES

The course should enable the students to

1. Improve communication skills
2. Develop leadership qualities

Professional Society Activities (PSA) course is aimed at enhancing the self-learning, communication, managerial skills of the students by engaging them in various Co & Extra Curricular activities during their course of study. Activities in each of the department shall be designed and conducted by the Professional Society Executive Committee whose composition is:

1. Faculty Mentors- 2 No.
2. Student Chairman: 1 No.- Final year Student
3. Student General Secretary: 1 No.- Third year Student
4. Treasurer: 1 No.- Third year Student

Student Members: 2 No's from each class

PSA related activities would be of the following nature but not limited to:

Activity#1	Just A Minute
Activity#2	Technical Quiz
Activity#3	Open House- Lab Demo

Activity#4	Technical Paper Presentation- Preliminary
Activity#5	Technical Paper Presentation- Final
Activity#6	Poster Presentation
Activity#7	Collage- A theme based event
Activity#8	Debate Competition
Activity#9	Group Discussion Competition
Activity#10	Mock Interviews
Activity#11	Model Exhibition
Activity#12	Valedictory Function

COMMUNICATION SKILLS PRACTICE

B.Tech IV Semester: Common to CE, EEE, ME, ECE & CSE								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
18AS402	**Core**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		-	-	2	-	-	-	-
Contact Classes: Nil	**Tutorial Classes: Nil**		**Practical Classes: 28**			**Total Classes: 28**		

OBJECTIVES

To convey or communicate the exact thought to express effectively with maximum efficiency

LIST OF ACTIVITIES

Activity. 1	**Development of Proficiency in Concepts of effective communication**

Practice on Oral and spoken communication skill & testing– Communication process and

voice & accent, voice clarity, handling them voice modulation & intonation,

KISS (Keep it short and sweet) in word stress etc.

Composing Feedback and questioning effective messages.

Non–Verbal Communication: Objectiveness in Argument its importance and nuances:

Development etiquettes and Facial Expression,

Posture, manners Gesture , Eye contact, appearance Study of different pictorial (dress code).

Activity. 2	**Art of Speaking**

Introduction – What makes communication important? – Defining communication – special

feature of communication – communication process – channels of communication – Formal

communications network – Informal communications network (Grapevine Communication) –

Importance of Communication – Barriers to communication – Tips for effective communication

– conversation tips – what is presentation? – Tips for powerful presentation – Art of public

speaking – Importance of public speaking – Benefits of public speaking – Public speaking tips –

overcoming fear of public speaking.

Activity : Conservation; Presentation; Pubic Speaking

Activity. 3	**Art of Writing**

Introduction – Importance of Writing – Writing tips – Drawbacks of written communications

Activity. 4	**Art of Writing E-Mail**

Introduction – The Mail Magic – use appropriate salutations – Make the subject matter

significant – keep a dictionary close by – use commas – use smileys – when I doubt, preface –

include previous message – shorten the file attachments – Reread before pressing 'Send' button –Be polite, and reciprocate good deeds – Anticipate, empathize, understand – what netiquette?

Activity. 5	**Etiquette and Manners**

Etiquette

Introduction – Modern etiquette – Benefits of etiquette – classification of etiquette –

accompanying women – Taboo topics – proposing the toast.

Manners

Introduction – Poor Manners noticed in youth – why should you practice good manners ? –

Practicing good manners – Manners at the wheel driving – Manners in the flight – Respecting the sacred – visiting holy places – Dealing with the challenged – Attending the funeral – Professional

manners – social skills (manners) – getting along with people – Manners to get respect from

others – To sum up : corporate grooming tips – Mind your mobile manners – Annoying office

habits.

Activity : 1. Test your Etiquette; 2. Test your Manners

Activity. 6	**Preparing CV / Resume**

Introduction – Meaning – Differences among Bio-data, CV and Resume – The terms – The

purpose of CV writing – Types of Resumes – Interesting facts about Resumes – CV writing tips

– CV/Resume preparation – the do's – Resume checkup – Electronic Resume tips – References

– Power words – Common Resume builders – Key skills that can be mentioned in the Resume –

Cover letters – Cover letter tips

Expression of non-verbal communication and its analysis

Activity. 7	**Written Communication Skill**

Practice for:

- Correction of errors

- Making of Sentences
- Paragraph Writing
- Leave Application and simple letter writing

Activity. 8	Presentation Skill practice

- Preparing in presentation
- Delivery of presentation

Activity. 9	Telecommunication Skills

- Tele – etiquette
- Receiving Calls
- Transferring calls
- Taking Message/ Voice Mails
- Making Outgoing Calls

Activity. 10	Computer and Internet operational

- Key boarding skills
- Practice on computer using MS office XP
- Practice on sending & receiving e-mail

Text Books

1 . Soft skills Training – A workbook to develop ski lls for employment by Fredrick H. Wentz

2. Personality Development and Soft skills, Oxford University Press by Barun K. Mitra 3.

The Time Trap : the Classic book on Time Management by R. Alec Mackenzine

Reference Books

1. Ajmani, J. C. Good English: Getting it Right. New Delhi: Rupa Pubications, 2012.

Reference Books

1. Ajmani, J. C. Good English: Getting it Right. New Delhi: Rupa Pubications, 2012.
2. Bovee, Courtland L, John V. Thill & Barbara E. Schatzman. Business Communication Today: Tenth Edition. New Jersey: Prentice Hall, 2010.

Web References

1. http://networketiquette.net/
2. https://public.wsu.edu/~brians/errors/

Outcomes

1. Students will demonstrate competency in communication skills related to production and presentation of messages in multiple formats.
2. Students will demonstrate competency in critical thinking skills related to the analysis, interpretation, and criticism of messages.
3. Students will demonstrate competency in skills related to the construction and analysis of argumentation and persuasive discourse.
4. Students will demonstrate an understanding of multiple theoretical perspectives and diverse intellectual traditions in Communication.
5. Students will demonstrate competency in human relational interaction.
6. Students will demonstrate competency in the analysis and practice of ethical communication.
7. Students will demonstrate an understanding of the importance of free expression and the responsibilities it entails.
8. Students will demonstrate competency in effective communication with diverse others and an understanding of the impact of culture on communication.