DEPARTMENT OF CE

ACADEMIC REGULATIONS, COURSE STRUCTURE

AND SYLLABUS OF First & Second Year

ACADEMIC REGULATIONS - 2016 FOR B.TECH (REGULAR)
(Effective for the students admitted into I year from the Academic Year 2016-17 and onwards)

1. QUALIFICATION FOR ADMISSION

The selection for category A & B seats shall be as per Govt. of Andhra Pradesh rules.

2. AWARD OF B.TECH. DEGREE

A student will be declared eligible for the award of the B.Tech. Degree if he fulfills the following academic requirements.

(a) Pursue a course of study for not less than four academic years and not more than eight academic years counted from the academic year of admission.
(b) The candidate registers for 180 credits and secures all the 180 credits.

3. COURSES OF STUDY

The following courses of study are offered at present as specializations in the B.Tech. courses with English as medium of instruction.

S. No.	Branch Code-Abbreviation	Branch
01	01-CE	Civil Engineering
02	02-EEE	Electrical and Electronics Engineering
03	03-ME	Mechanical Engineering
04	04-ECE	Electronics and Communication Engineering
05	05-CSE	Computer Science and Engineering

And any other course as approved by the authorities from time to time.

4. STRUCTURE OF THE PROGRAM

Program comprises of 4 academic years and each year has 2 semesters.
Each course is normally assigned a certain number of credits as follows:
  - 3 credits for 3 lecture periods and 1 tutorial per week.
  - 3 credits for 4 lecture periods per week
  - 2 credits for 3 laboratory periods per week.
  - 3 credits for 1 lecture and 4 practice periods for drawing subjects per week.
  - 1 or 2 credits for Mini Project.
  - 3 credits for Practical Training/ Internship.
  - 10 credits for Project Work.

5. DISTRIBUTION AND WEIGHTAGE OF MARKS

The performance of a student in each semester shall be evaluated subject – wise with a maximum of 100 marks for Theory, Practical Training / Internship and 75 marks for Practical Subject / Mini Project. The Project Work shall be evaluated for 200 marks.

5.1 THEORY

For all theory subjects consisting of 6 units in each subject, the assessment shall be for 40 marks through internal evaluation and 60 marks through external end semester examination of 3 hours duration.

5. 1a. INTERNAL EVALUATION

The internal evaluation will be based on two cycle tests conducted in each semester. The 40 internal marks will be awarded as sum of 75% of the best cycle and 25% of the least cycle examinations, where each cycle of examination contain

Descriptive test   - 20 Marks
Objective test   - 10 Marks
Assignment test   -10 Marks

Each descriptive test question paper contains 3 questions one from each unit covering syllabus from 3 units (first 3 units for first cycle and remaining 3 units for second cycle). The student has to answer all the 3 questions (3X10M=30M). The 30 marks will be scaled down to 20 marks. The descriptive examination will be conducted for 1½ hour duration.

Each Objective type test question paper shall contain 10 objective questions (Covering Multiple choice / Fill in the blanks / True or False / Matching etc.,) for 10 marks covering syllabus from 3 units, which are considered for descriptive type test (10X1M = 10M). The Objective Examination will be conducted for 15 minutes duration along with descriptive test.

In Assignment Tests, 5 or 6 questions will be declared in the class room at least one week in advance. In the test, one question will be given at random to each student and the student has to answer it.

The Assignment Test-1 will be conducted for 10 marks covering the syllabus of 1st unit. The Assignment Test-2 will be conducted for 10 marks covering the syllabus of 2nd unit. The internal marks for Assignment Test (10 Marks) for cycle-I shall be computed as best of two Assignment Tests-1 & 2 conducted. The Assignment Test-3 will be conducted for 10 marks covering the syllabus of 4th unit. The Assignment Test-4 will be conducted for 10 marks covering the syllabus of 5th unit. The internal marks for Assignment Test (10 Marks) for cycle-II shall be computed as best of two Assignment Tests-3 & 4 conducted.

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5.1b. EXTERNAL EVALUATION

The question paper comprises of two parts i.e. Part-A and Part-B. Part-A is compulsory and consists six questions covering all the units with equal marks. This question carries 12 marks. Part-B consists of 6 questions, one from each unit and the student has to answer four questions, each question carries 12 marks. The examination duration is 3 hours.

5.2 PRACTICALS

For practical subjects there shall be continuous evaluation during the semester.

5.2a. INTERNAL EVALUATION

There shall be continuous evaluation during the semester for 25 internal marks. The internal marks shall be awarded as follows:

Record - 10 Marks
Internal Lab Test - 10 Marks
Day to day performance - 5 Marks

5.2b. EXTERNAL EVALUATION

For practical subjects there shall be an external examination at the end of the semester for 50 marks in the presence of external examiner. The examination duration is 3 hours.

5.3 DRAWING SUBJECTS

For the subject having design and / or drawing, (such as Engineering Graphics, Engineering Drawing, Machine Drawing etc.,) and estimation, the distribution shall be 40 marks for Internal Evaluation and 60 marks for End Examination.
The 40 internal marks will be evaluated as follows:

Internal Tests - 20 marks. (1½ hour duration)
Day – to – day work - 20 marks (evaluation of charts)

In the internal test, 3 questions will be given to the student and he has to answer all the three questions (3x10M = 30M scaled down to 20 marks)

There shall be two internal tests in a semester. The sum of 75% of the best and 25% of the least of two internal tests shall be considered for the award of internal marks.

The syllabus for the subject "**Machine drawing using Auto CAD**" consists of two major portions:

1. Unit I to III –Conventional drawing pattern.
2. Unit IV to VI-Computer lab pattern using any drafting packages

The distribution of internal and external marks is 40 and 60 marks respectively.

Internal Evaluation: Max Marks: 40

The total internal evaluation marks are distributed in the following two components:

1. Day-to-day work : 20 Marks (Evaluation of Charts)
2. Descriptive Test : 20 Marks

Cycle–I Examination – Conventional drawing pattern

In Cycle-I examination the 40 marks will be awarded as follows:

Day-to-day evaluation - 20 Marks

Descriptive Test - 20 Marks

In the Descriptive Test of duration 2 hours, 3 questions will be given to the student and he has to answer all the three questions (3x10M = 30M scaled down to 20 marks).

Cycle–II Examination – Computer lab pattern using any drafting packages for duration of 2 hours.

In Cycle-II examination the 40 marks will be awarded as follows:

Record -10 Marks

Execution -15 Marks

Paper Work -15 Marks

Of two cycle examinations conducted during the semester, sum of 75% of the best and 25% of the least of two cycle examinations shall be considered for the award of internal marks.

End semester Examination (Total Duration: 4 hours, Max, marks: 60)

Conventional drawing pattern (Duration: 2 Hours, Marks: 30)

Computer lab pattern using any drafting packages (Duration: 2 Hours,Max:30)

(Note: Both Conventional drawing pattern and Computer lab pattern using any drafting packages are compulsory and are to be conducted in separate sessions)

5.4 MANDATORY NON-CREDIT COURSES

A student is required to take up Non-Credit/mandatory courses, viz. Advanced Communication Skills, Quantitative Aptitude, Verbal Ability, Reasoning, NSS / Sports & Games and MOOCs (Massive Open Online Courses) etc., as and when the courses are offered. The B.Tech degree shall only be awarded if a student gets satisfactory grade in each of the mandatory non-credit courses besides acquiring 180 credits.

a. PRACTICAL TRAINING / INTERNSHIP

Practical training / Internship will be evaluated for 100 marks. Out of 100 marks 40 marks will be awarded at Industry / Training Agency by the concerned authority for day-to-day work / performance. And the remaining 60 marks will be awarded at the college by a committee constituted by the authorities consisting of concerned department HOD, senior faculties and an external examiner as follows:

Report Submission - 20 marks

Presentation - 20 marks

Viva-voce - 20 marks

5.6 MINI PROJECT

Mini Project shall be evaluated for a total of 75 marks. Out of a total of 75 marks, 25 marks shall be for internal evaluation consisting of day-to-day work, reviews, the assessment of the project report and 50 marks for the external evaluation. The external evaluation shall be conducted by the committee. The committee consists of an External Examiner, Head of the Department and Supervisor of the Project. The evaluation of mini project work shall be conducted as and when offered.

5.7 PROJECT WORK

Out of a total of 200 marks for the project work, 80 marks shall be for Internal Evaluation consisting of day-to-day work, reviews, the assessment of the project report and 120 marks for the external evaluation. The external evaluation shall be conducted by the committee. The committee consists of an External Examiner, Head of the Department and Supervisor of the Project. The evaluation of project work shall be conducted at the end of the IV year II semester.

6. PASS MARK CRITERIA

A student shall be deemed to have satisfied the pass mark, if he secures not less than 35% of marks in the end examinations and a minimum of 40% of marks in the sum total of the internal evaluation and end examination taken together as detailed below:

S. No.	Category of Subject	Max. Marks	Internal Marks	External Marks	External pass %	External pass mark	Over all pass %	Over all pass mark
1	Theory/Drawing/ Practical Training/ Internship	100	40	60	35	21	40	40
2	Practical	75	25	50	35	18	40	30
3	Mini Project	75	25	50	35	18	40	30
4	Project work	200	80	120	35	42	40	80

7. PROMOTION POLICY

7.1. ATTENDANCE REQUIREMENTS

(1) A student shall be eligible to appear for the end examinations if he acquires a minimum of 75% of attendance in aggregate of all the subjects.

(2) Condonation of shortage of attendance in aggregate up to 10% (65% and above and below 75%) in each semester for genuine medical reasons and shall be approved by a committee duly appointed by the college. A fee stipulated by the college shall be payable towards condonation of shortage of attendance. However the number of condonations are restricted to four for the entire course.

(3) A student who is short of attendance in a semester may seek re-admission into that semester when offered next time within 4 weeks from the date of commencement of class work.

(4) If any candidate fulfills the attendance requirement in the present semester, he shall not be eligible for re-admission into the same semester.

7.2. CREDIT REQUIREMENTS

The following academic requirements have to be satisfied in addition to the attendance requirements mentioned above.

(1) A student shall be promoted from I to II year, if he put up the minimum attendance requirement in I year II semester, irrespective of credits earned.

(2) A student shall be promoted from II year to III year, only if he fulfills the academic requirement of 50% of the credits up to II year II semester from all the examinations, irrespective of whether the candidate takes the examination or not.

(3) A student shall be promoted from III to IV year, only if he fulfills the academic requirements of 50% of the credits up to III year II semester from all the examinations, irrespective of whether the candidate takes the examination or not.

(4) A candidate, who is not promoted either to III year or IV year due to lack of required credits can seek admission into III / IV year in subsequent years after obtaining the required credits as stipulated above.

(5) A student shall register and put up minimum attendance in all 180 credits and earn all 180 credits. Marks obtained in the all 180 credits shall be considered for the calculation of grade points/division.

(6) The registrations in audit courses/ mandatory courses i.e. Advanced Communication skills, Quantitative Aptitude, Verbal Ability, Reasoning, NSS / Sports & Games and MOOCs etc., is compulsory and student should get a satisfactory report.

8. COURSE PATTERN

(1) The entire course of study is of four academic years and each year will have TWO Semesters (Total EIGHT Semesters).

(2) A student is eligible to appear for the end examination in a subject, but absent for it or has failed in the end examinations may appear for that subject in supplementary examinations, when conducted next.

(3) When a student is detained due to lack of credits / shortage of attendance, he may be re-admitted in to the same semester / year in which he has been detained.

9. METHOD FOR AWARDING OF GRADE POINTS FOR A SUBJECT:

Theory/ Drawing / Laboratory / Practical Training / Internship / Mini Project / Project (% of marks in a subject)	Corresponding Grade Points	Letter Grade
91 - 100	10	O (Outstanding)
81 - 90	9	E (Excellent)
71 - 80	8	A (Very Good)
61 - 70	7	B (Good)
51 - 60	6	C (Satisfactory)
40 - 50	5	P (Pass)
<40	0	F (Fail)

10. CRITERIA FOR AWARD OF GRADES/DIVISION

10.1 Calculation of Semester Grade Point Average (SGPA)* for semester

The performance of each student at the end of each semester is indicated in terms of SGPA. The SGPA is calculated as given below:

$$SGPA = \frac{\sum(CR \times GP)}{\sum CR}$$

Where CR = Credits of a subject
GP = Grade Points awarded for a subject

*SGPA is calculated for a candidate who passed all the subjects in that semester.

10.2 Calculation of Cumulative Grade Point Average (CGPA) for Entire Program:

The CGPA is calculated as given below:

$$CGPA = \frac{\sum(CR \times GP)}{\sum CR}$$

Where CR= Credits of a subject
GP = Grade Points awarded for a subject

- The SGPA and CGPA shall be rounded off to 2 decimal point and reported in the transcripts.
- Equivalent percentage = (CGPA – 0.75) x 10

10.3 Award of Division:

After satisfying the requirements prescribed for the completion of the program, the student shall be eligible for the award of B.Tech Degree and shall be placed in one of the following classes:

CGPA	Class
≥ 7.75	First Class with Distinction (with no subject failures)
≥ 6.75	First Class (with subject failures)
≥ 5.75 & < 6.75	Second Class
< 5.75	Pass Class

10.4 CONSOLIDATED GRADE MEMO

A Consolidated Grade Memo containing credits and grades obtained by the candidate will be issued after completion of the four year B.Tech program.

11. RECOUNTING /REVALUATION

1. Student can submit the application for recounting / revaluation, along with the prescribed fee for recounting / revaluation of his answer script(s) of theory subject(s) as per the notification issued by the Controller of Examinations.

2. The Controller of Examinations shall arrange for recounting / revaluation of such answer script(s).

3. An External examiner, other than the first examiner shall recount / revaluate the answer script(s).

12. MINIMUM INSTRUCTION DAYS

The minimum instruction days for each semester shall be 90 working days.

13. There shall be no branch transfer after the completion of admission process.

14. WITHHOLDING OF RESULTS

If the student has not paid the dues, if any, to the college or if any case of indiscipline is pending against him, the result of such student will be kept withheld. His degree will be withheld in such cases.

15. TRANSITORY REGULATIONS

Discontinued or detained candidates are eligible for readmission as and when next offered. A candidate, who is detained or discontinued in a semester, on readmission shall be required to do all the subjects 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 subjects in the earlier semester(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.

15.1 A student who is following JNTUK curriculum and detained due to shortage of attendance at the end of the first semester of first year shall join the autonomous batch of first year first semester. Such students shall study all the subjects 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.

15.2 A student who is following JNTUK curriculum, detained due to lack of credits or shortage of attendance at the end of the second semester of first 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 subjects 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 subjects of the semester(s) of the batch which he had passed earlier and substitute subjects will be offered in place of them as decided by the Board of Studies. The student has to clear all his backlog subjects up to previous semester by appearing for the supplementary examinations conducted by JNTUK for the award of degree will be sum of the credits up to previous semester under JNTUK 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.

15.3 Transfer candidates (from non-autonomous college affiliated to JNTUK)

A student who is following JNTUK curriculum, transferred from other college to this college in second year first semester or subsequent semesters shall join with the autonomous batch in the appropriate semester. Such candidates shall be required to pass in all the subjects 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 subjects 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 student has to clear all his backlog subjects up to previous semester by appearing for the supplementary examinations conducted by JNTUK 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 up to previous semester under JNTUK regulations and the credits prescribed for the semester in which a candidate joined after transfer and subsequent semesters under the autonomous stream. The class will be awarded based on the academic performance of a student in the autonomous pattern.

15.4 Transfer candidates (from an autonomous college affiliated to JNTUK)

A student who has secured the required credits up to previous semester as per the regulations of other autonomous institutions shall also be permitted to be transferred to this college.
A student who is transferred from the other autonomous colleges to this college in second year first semester or subsequent semesters shall join with the autonomous batch in the appropriate semester. Such candidates shall be required to pass in all the subjects 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 subjects 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 up to previous semester as per the regulations of the college from which he has transferred and the credits prescribed for the semester in which a candidate joined after transfer and subsequent semesters under the autonomous stream. The class will be awarded based on the academic performance of a student in the autonomous pattern.

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Academic Regulations (16) for B. Tech. (Lateral Entry Scheme)

(Effective for the students getting admitted into II year from the Academic Year 2017- 18 and onwards)

1. AWARD OF B. TECH. DEGREE

A student will be declared eligible for the award of the B. Tech. Degree if he fulfills the following academic regulations.

(a) Pursue a course of study for not less than three academic years and not more than six academic years counted from the academic year of admission.

(b) The candidate registers for 132 credits and secures all the 132 credits.

2.
The attendance regulations of B.Tech (Regular) shall be applicable to B.Tech(LES), whereas the number of condonations are restricted to 3.

3. PROMOTION RULE:

(a) Attendance requirement is same as regular course.

(b) A lateral entry student will be promoted from II to III year if he puts up the minimum required attendance in II year II semester irrespective of credits earned.

(c) A student shall be promoted from III to IV year only if he fulfills the academic requirements of 50% of the credits up to III Year II semester from all the examinations, whether the candidate takes the examinations or not.

4. TRANSITORY REGULATIONS:

4.1 A student who is following JNTUK curriculum and detained due to shortage of attendance at the end of the first semester of second year shall join the autonomous batch of second year first semester. Such students shall study all the subjects 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.

4.2 A student who is following JNTUK 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 subjects 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 subjects of the semester(s) of the batch of them as decided by the Board of Studies.

The student has to clear all his backlog subjects up to previous semester by appearing for the supplementary examinations conducted by JNTUK 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 JNTUK 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.

5. All the other regulations as applicable for B. Tech. Four- year degree course (Regular) will be applicable for B. Tech. (Lateral Entry Scheme).

MALPRACTICES RULES

DISCIPLINARY ACTION FOR / IMPROPER CONDUCT INEXAMINATIONS

➢ The Principal shall refer the cases of Malpractices in Internal Assessment Test and Semester end examinations to a malpractice prevention committee constituted by him for the purpose. Such committee shall follow the approved levels of punishment. The Principal shall take necessary action against the students based on the recommendations of the committee.

➢ Any action by the candidate trying to get undue advantage in the performance or trying to help another, or derive the same through unfair means is punishable according to the provisions contained hereunder:

	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.
1(b)	Gives assistance or guidance or receives it from any other candidate orally or by any other body language methods or communicates through cell phones with any candidate or persons in or outside the exam hall in respect of any matter.	Expulsion from the examination hall and cancellation of the performance in that subject only of all the candidates involved. In case of an outsider, he will be handed over to the police and a case is registered against him.
2.	Has copied in the examination hall from any paper, book, programmable calculators, palm computers or any other form of material relevant to the subject of the examination (theory or practical) in which the candidate is appearing.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted to appear for the remaining examinations of the subjects of that Semester/year. The Hall Ticket of the candidate is to be cancelled and sent to the college.
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 to 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 college 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 college examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
5.	Uses objectionable, abusive or offensive language in the answer paper or in letters to the examiners or writes to the examiner requesting him to award pass marks.	Cancellation of the performance in that subject.
6.	Refuses to obey the orders of the Chief Superintendent/Assistant – Superintendent /any officer on duty or misbehaves or creates disturbance of any kind in and around the examination hall or organizes a walk out or instigates others to walk out, or threatens the officer-in charge or any person on duty in or outside the examination hall of any injury to his person or to any of his relations whether by words, either spoken or written or by signs or by visible representation, assaults the officer-in-charge, or any person on duty in or outside the examination hall or any of his relations, or indulges in any other act of misconduct or mischief which result in damage to or destruction of property in the examination hall or any part of the college campus or engages in any other act which in the opinion of the officer on duty amounts	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.

	to use of unfair means or misconduct or has the tendency to disrupt the orderly conduct of the examination.	
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 college 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 6to 8.	Student of the college 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 college for further action to award suitable punishment.	

OTHER MATTERS:

1. Physically challenged candidates who have availed additional examination time and a scribe during their intermediate / EAMCET examinations will be given similar concessions on production of relevant proof / documents.

2. The Principal shall deal in an appropriate manner with any academic problem which is not covered under these rules and regulations, in consultation with the Heads of the departments and subsequently such actions shall be placed before the Academic Council for ratification. Any emergency modification of regulation, approved in the meetings of the Heads of the departments shall be reported to the Academic Council for ratification.

GENERAL:

1. The academic council may, from time to time, revise, amend or change the regulations, schemes of examinations and / or syllabi.

2. Where ever the words ''he'' ''him'' ''his'', occur in the regulations, they include ''she'', ''her'', ''hers''.

3. The academic regulation should be read as a whole for the purpose of any interpretation.

4. In the case of any doubt or ambiguity in the interpretation of the above rules, the decision of the principal is final.

NARASARAOPETA ENGINEERING COLLEGE : : NARASARAOPET (AUTONOMOUS)

DEPARTMENT OF CIVIL ENGINEERING

COURSE STRUCTURE

I B. Tech. - I SEMESTER

S.No	Subject Name	Cat. Code	L	T	P	Internal Marks	External Marks	Total Marks	Credits
1	Functional English	HS	4	-	-	40	60	100	3
2	Engineering Mathematics	BS	3	1	-	40	60	100	3
3	Mathematical Methods	BS	3	1	-	40	60	100	3
4	Engineering Chemistry	BS	3	1	-	40	60	100	3
5	Programming with C	ES	3	1	-	40	60	100	3
6	Professional Ethics, Values & Patents	HS	4	-	-	40	60	100	3
7	Basic Communication Skills Lab	HS	-	-	3	25	50	75	2
8	Engineering Chemistry Lab	BS	-	-	3	25	50	75	2
9	Computer Programming Lab	ES	-	-	3	25	50	75	2
	TOTAL		20	4	9	315	510	825	24

HS: Humanities and Social Sciences

ES: Engineering Sciences

BS: Basic Sciences

PC: Professional Course

PE: Professional Elective

OE: Open Elective

PW: Project Work

MC: Mandatory Course (No Credits)

L: Lecture

T: Tutorial

P: Practical

I B. Tech. - II SEMESTER

S.No	Subject Name	Cat. Code	L	T	P	Internal Marks	External Marks	Total Marks	Credits
1	Interactive English	HS	4	-	-	40	60	100	3
2	Engineering Physics	BS	3	1	-	40	60	100	3
3	Integral Transforms & Vector Calculus	BS	3	1	-	40	60	100	3
4	Engineering Mechanics	ES	3	1	-	40	60	100	3
5	Engineering Drawing	ES	1	-	4	40	60	100	3
6	Environmental Studies	ES	4	-	-	40	60	100	3
7	Enhancing Communication Skills Lab	BS	-	-	3	25	50	75	2
8	Engineering Physics Lab	BS	-	-	3	25	50	75	2
9	Engg Work Shop	ES	-	-	3	25	50	75	2
	TOTAL		**18**	**3**	**13**	**315**	**510**	**825**	**24**

I B.TECH I SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	4	0	0	40	60	100	3
	FUNCTIONAL ENGLISH **(Common to All Branches)**						

Course Objectives:

- To enable the engineering students develop their basic communication skills in English for academic and social purposes.
- To equip the students with appropriate oral and written communication skills.
- To inculcate the skills of listening, reading and critical thinking.
- To integrate English Language learning with employability skills and training.
- To enhance the students' proficiency in reading skills enabling them meet the academic demands of their course

Course Outcomes:

Learners are able to

- Speak clearly, effortlessly, confidently and appropriately.
- Write coherently with acceptable accuracy, organizing ideas logically.
- Listen and read to comprehend different discourses and different genres of texts.
- The learner will be able to read and infer, analyze, predict, interpret and draw conclusions any printed text.

Teaching Methodology:

The methodology of teaching will be chalk and talk, PPT, audio-visual and activity based

UNIT-I:
Hours of Instruction per unit: 8
HUMOUR: An Astrologer's Day

Objective: To criticize the superstitious beliefs of the people in the contemporary society.
To make the learners understand that an astrologer is not trustworthy as he deceives the people by bewitching them in order to get some money. So we should not believe anyone by means of outward appearance.

Outcome: To students will develop rational thinking instead of believing blindly everything without reason.

a. Vocabulary : Prefixes, Suffixes

(www.englishhints.com, www.enchantedlearning.com,

www.learnenglish.de/grammar/prefixtext.html)

b. Grammar : Nouns, Pronouns, Articles

c. Writing : Sentences structures

UNIT-II:
Hours of Instruction per unit: 8
INSPIRATION: Building a New State

Objective: To make the students know the value of natural resources that are abundantly available in our country.

Outcome: Learner will understand the importance of the natural resources that are valuable in nature in order to develop our nation.

    a. Vocabulary : Homophones, Homographs, Homonyms Synonyms & Antonyms and Commonly confused words
          (http://www.magickeys.com/books/riddles/words.html)
    b. Grammar   : Finite verbs, Non-finite verbs & question tags
    c. Listening   : Main points & sub-points
    d. Writing   : Paragraphs, Note making, Expansion of Proverbs

UNIT-III
Hours of Instruction per unit: 8
SUSTAINABLE DEVELOPMENT: Water: The Elixir of Life

Objective: To inform the learner how precious the water is, as well as the advantages and the characteristics of water.

Outcome: The learner will understand that water is the elixir of life and it should not be wasted but should be utilized in a proper way.

    a. Vocabulary : One Word Substitutes,
          (http://www.pinnacle.edu.in/campusfiles/1826_campusFile_1.pdf)
    b. Grammar   : Tenses
    c. Listening   : Listening for the theme and gist
    d. Writing   : Official letters, Curricula vitae, Covering Letters

UNIT-IV
Hours of Instruction per unit: 8
RELATIONSHIPS: The Wood rose

Objective: To enlighten the learner the value of human relationships as we are social animals and the need to maintain good relationship with elders and senior citizens.

Outcome: The learner will come to know that the old people are not to be ignored but it is the duty of the children to consider the wishes, feelings, emotions, ideas and thoughts of the older generation.

    a. Vocabulary : Phrasal verbs & idioms
    b. Grammar   : Subject verb agreement, Active and Passive voice, Prepositions
    c. Listening : Listening for specific detail and information.
    d. Writing   : Official reports (Fundamentals of technical communication Pg.No. (119- 153)

UNIT-V

Hours of Instruction per unit: 8
SCIENCE AND HUMANISIM: Progress

Objective:
- To enable the learner grasp the negative aspect of scientific inventions which are responsible for the anti-social activities of the present day.

Outcome:
- Understand that Science and Technology is a double edged knife and must be used with discrimination
    a. Vocabulary : Collocations, Technical vocabulary, common errors in vocabulary
    b. Grammar   : Conditional sentences, conjunctions, common errors in grammar
    c. Listening   : Listening for opinions and attitude.
    d. Writing   : Events and essays

UNIT-VI

Hours of Instruction per unit: 8
READING

Objectives:
- To understand types and sub-skills of reading and apply techniques to improve reading speed.

Outcomes:
- Demonstrate reading speed and comprehend the gist of passage.
- Intensive reading, Extensive reading, predicting the content, skimming, scanning, Inferring meanings: lexical and contextual.

TEXTBOOK:
1. Using English – Orient Black Swan Pvt.Ltd.Publishers

REFERENCES:
1. Meenakshi raman, Sangeeta, Sharma *Fundamentals of technical communication*, Pg: 119-153 Oxford University Press, 2015
2. Rutherford, Andrea. J, *Basic Communication Skills for Technology.* Pearson, New Delhi. 2001
3. Raymond Murphy, *Murphy's English Grammar,* Cambridge University Press 2004
4. Meenakshi Raman, Sangeeta Sharma, *Technical Communication: English Skills for Engineers*, Oxford University Press, 2009
5. Michael Swan, *Practical English Usage,* Oxford University Press, 1996

Online Sources:
1. www.englishhints.com, www.enchantedlearning.com,
2. www.learnenglish.de/grammar/prefixtext.html
3. http://www.magickeys.com/books/riddles/words.html

I B.TECH I SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	3	1	0	40	60	100	3
ENGINEERING MATHEMATICS **(Common to All Branches)**							

Course Objectives:
- The course is designed to equip the students with the necessary mathematical skills and techniques that are essential for an engineering course
- The skills derived from the course will help the student from a necessary base to develop analytic and design concepts.

Course Outcomes:
Upon successful completion of the course, the students should be able to
- Solve ordinary differential equations of first, second and higher order.
- Learn basic concept of partial differentiation.

UNIT- I: ORDINARY DIFFERENTIAL EQUATIONS
Linear equations of first order, Bernoulli differential equation, exact equations, equations reducible to exact equations. Newton's Law of cooling, natural growth and decay, orthogonal trajectories.

UNIT-II: LINEAR DIFFERENTIAL EQUATIONS OF HIGHER ORDER
Definitions, Operator D, Rules for finding the complementary functions, Inverse operator, Rules for finding the particular integrals, Method of variation of parameters, Equations reducible to linear equations with constant coefficients. R-L-C circuits, Simple Harmonic motion.

UNIT – III: MEAN VALUE THEOREMS
Review on limits and continuity, Mean Value theorems (without proofs) Rolle's theorem, Lagrange's theorem, Cauchy's theorem, increasing and decreasing functions, Maxima and minima of function of single variable.

UNIT- IV: PARTIAL DIFFERENTION:
Function of two or more variables, Partial derivatives, Total derivatives, change of variables, Jacobian - functional dependence, Tailor's for Two variables. Maxima and Minima of functions of two variables, Lagrange method of undetermined multipliers.

UNIT- V: FIRST ORDER PARTIAL DIFFERENTIAL EQUATIONS
Formation of partial differential equation by elimination of arbitrary constants and arbitrary functions, solutions of first order linear (Lagrange's) equations.

UNIT- VI: HIGHER ORDER PARTIAL DIFFERENTIAL EQUATIONS
Solutions of Linear Partial differential equations with constant coefficients, Method of separations of Variables, One dimensional wave equation, One Heat equations.

TEXT BOOK:
1. Dr. B.S. Grewal "*Higher Engineering Mathematics*", 42nd Edition, Khanna Publishers, 2012.

REFERENCES:

1. N.P. Bali, Bhavanari Satyanarayana, Indrani Promod Kelkar, "*Engineering Mathematics*", University Science Press, (An Imprint of Lakshmi Publications Pvt., Ltd) New Delhi, 2012
2. Keryszig E, "*Advanced Engineering Mathematics*", 8th Edition, John Wiley, Singapore, 2001.
3. Ravish R Singh, Mukul Bhatt, "*Engineering Mathematics*" Fourth reprint, McGraw Hill Education Pvt., Lim.,
4. Greenberg M D, "*Advanced Engineering Mathematics*", 2nd Edition, Pearson Education, Singapore, Indian Print, 2003.
5. Peter V. O'Neil, *"Advanced Engineering Mathematics"*, 7th Edition, Cengage Learning, 2011.
6. Srimanta Pal and Suboth C. bhunia, *"Engineering Mathematics"*, oxford University Press, 2015.

I B.TECH-I-SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	3	1	0	40	60	100	3
MATHEMATICAL METHODS (Common to All Branches)							

Course Objectives:

- The course is designed to equip the students with the necessary mathematical skills and techniques that are essential for an engineering student.
- The skills derived from the course will help the student from a necessary base to develop analytic and design concepts.

Course Outcomes:

Upon successful completion of the course, the students should be able to

- Solve simultaneous linear equations using matrix methods.
- Calculate Eigen values and Eigen vectors of matrices that are essential for vibration / design analysis.
- Understand the concept of Double and Triple integrals and their applications to calculations of areas, volumes.
- Understand the most basic numerical methods to solve simultaneous linear equations.

UNIT-I: LINEAR SYSTEMS OF EQUATIONS

Rank of a matrix - Echelon form, Normal form, Solution of linear systems, Direct Methods, Gauss elimination, Gauss Jordon and Gauss Seidal Methods. Solutions of linear simultaneous equations: LU decomposition.

Application: Finding the current in a electrical circuit

UNIT – II: EIGENVALUES AND EIGENVECTORS

Eigenvalues, Eigenvectors, Properties, Cayley - Hamilton Theorem, Quadratic forms, Reduction of quadratic form to canonical form, Rank, Positive negative definite, semi definite, index, signature.

Application: Finding powers and inverse of a square matrix using Cayley – Hamilton's Theorem.

UNIT-III: APPLICATION OF INTEGRATION AND MULTIPLE INTEGRALS:

Applications of Integration to Lengths, Volumes and Surface areas of revolution in Cartesian and Polar Coordinates. Multiple Integrals- double and triple integrals, Change of Variables, Change of order of Integration.

UNIT – IV: SOLUTION OF TRANSCENDENTAL EQUATIONS:

Introduction - Bisection Method – Method of False Position – Iteration Method – Newton-Raphson Method (One variable and Simultaneous Equations), Secant method.

UNIT – V: INTERPOLATION:

Introduction – Errors in Polynomial Interpolation – Finite differences – Forward Differences – central differences – Symbolic relations and separation of symbols. Differences of Polynomial – Newton's formulae for Interpolation – Interpolation with unevenly spaced points – Lagrange's Interpolation formula – Newton's Divided difference formula.

UNIT-VI: NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS

Solution by Taylor's series, Euler's Method, modified Euler's Method, Runge – kutta Method (fourth order only), R-K method for simultaneous differential equations, Trepezoidal rule, Simpon's $(1/3)^{rd}$ rule, Simpons's $(3/8)^{th}$ rule.

TEXT BOOK:

1. B.S.Grewal, Higher Engineering Mathematics, 42nd Edition, Khanna Publisher.

REFERENCES:

1. N.P. Bali, Bhavanari Satyanarayana, Indrani Promod Kelkar, "Engineering Mathematics", University Science Press, (An Imprint of Lakshmi Publications Pvt., Ltd) New Delhi, 2012.

2. V. Ravindranath and P. Vijayalaxmi, Mathematical Methods, Himalaya Publishing House.

3. Dean G Duffy, advanced Engineering Mathematics with MATLAB, CRC Press.

4. Erwyn Kreyszig, Advanced Engineering Mathematics, 9th Edition, wiley-India.

5. Srimanta Pal and Suboth C. bhunia, *"Engineering Mathematics"*, oxford University Press, 2015.

6. Steven C.Chapra, Raymond P.Canale "Numerical Methods for Engineers" Tata Mc-Graw Hill.

I B.TECH I SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	3	1	0	40	60	100	3
ENGINEERING CHEMISTRY **(Common to All Branches)**							

Course Objectives:

- For prospective engineers knowledge about water used in industries and for drinking purpose is useful; hence chemistry of hard water, boiler troubles and modern methods of softening hard water are introduced.
- Polymer chemistry may be one of the most relevant of the sub-disciplines of chemistry for the modern citizen. Very few consumer goods are made without a significant contribution from the spectacular applications of polymers. Modern materials depend on large variety of properties available from polymers. Not only is polymer chemistry eminently practical, it is also fascinating from an academic view point.
- With the increase in demand, a wild variety of materials coming up. Some of them have excellent engineering properties and a few of these materials are introduced.
- The basics for the construction of galvanic cells as well as some of the sensors used in instruments are introduced. Also if corrosion is to be controlled, one has to understand the mechanism of corrosion which itself is explained by electrochemical theory.
- Fuels as a source of energy are a basic need in industry, particularly industries like thermal power stations, steel industry, fertilizer industry etc., and hence they are introduced.
- Photochemistry is to understand the basic principles and types of photochemical reactions. To ensure that students have a good knowledge about photo energy. To be aware with the significant applications of photochemistry in many life areas.

Course Outcomes

- Water Technology deals with the processes and mechanisms that are required to manage the human water cycle. Its function is to provide continuous and sufficient quantities of safe palatable drinking water for both domestic and industrial consumers and dispose of the used water to prevent environmental damage and to protect public health.
- The advantages and limitations of plastic materials and their use in design would be understood.
- The students would be now aware of materials like nanomaterial, fullerenes and their uses. Similarly liquid crystals, solar cells and cement are understood. The importance of green synthesis is well understood and how they are different form conventional methods is also explained.
- Able to apply operating principles and the reaction mechanisms of electrochemistry knowledge to analysis and design of batteries and fuel cells. Able to get knowledge on corrosion in order to protect the metals from the environment.
- To be able to understand and perform the various characterization techniques of fuels and fuels which are used commonly and their economics, advantages and limitations are discussed.

- To understand the basics of photochemistry, Law of absorption of light, limitation/deviation and applications of Lambert Beer's law, photochemical law, Jablonski's diagram, applications of photochemistry.

UNIT-I: WATER AND ITS INDUSTRIAL APPLICATIONS
Sources of water–Impurities of water–Hardness, types of hardness and its units–Estimation of hardness by EDTA method–Boiler troubles (Sludge and Scale, Priming and Foaming, Caustic embrittlement, Boiler corrosion)–Softening of water–Internal treatment methods– External treatment methods–(Lime–Soda, Zeolite and Ion exchange process)–Desalination of brackish water (Reverse osmosis and Electrodialysis)–Municipal water treatment methods–Problems on hardness and lime-soda process.

UNIT-II: POLYMER SCIENCE AND TECHNOLOGY
Introduction-Classification of polymers–Polymerization, types and mechanism of polymerization–Stereo regular polymers–Plastics–Thermoplastics and thermosetting plastics–Compounding of plastics–Preparation, properties and applications of Polyethylene, PVC, Bakelite and Polycarbonates–Rubbers and elastomers–Natural rubber, vulcanization–Synthetic rubbers (Buna–N, Buna–S, Thiokol rubber)–Applications–Fiber reinforced plastics, Conducting polymers and Biodegradable polymers.

UNIT-III: CHEMISTRY OF ADVANCED MATERIALS
Nanomaterials : Types–Preparation of carbon nanotubes and fullerenes–Properties and engineering applications
Liquid crystals : Types and engineering applications
Green Chemistry : Principles–Methods for green synthesis and applications
Cement : Preparation of Portland cement–Setting and hardening of cement
Solar Cells : Solar heaters–Photovoltaic cells–Solar reflectors

UNIT-IV: ELECTROCHEMICAL CELLS AND CORROSION
Galvanic cells–Single electrode potential–Reference electrodes–Electrochemical series–Batteries (primary, secondary and fuel cells)
Corrosion: Causes and effects of corrosion–Theories of corrosion (dry, chemical and electrochemical corrosion)–Factors effecting corrosion–Corrosion control methods–Cathode protection–Sacrificial anodic, Impressed current methods–Surface coatings–Methods of application on metals (Hot dipping, Galvanizing, Tinning, Cladding, Electroplating, Electroless plating)–Organic surface coatings–Paints–Constituents and their functions.

UNIT-V: FUELS AND COMBUSTION
Fuels–Introduction–Classification–Calorific value–HCV and LCV–Bomb calorimeter–Problems on calorific value (Theoretical and Experimental)–Coal–Proximate and ultimate analysis–Problems on analysis of coal–Petroleum–Refining–Cracking–knocking–Petrol–Synthetic petrol–Gaseous fuels–Natural gas–LPG, CNG–Junker's gas calorimeter–Combustion–Problems on air requirements–Rocket fuels.

UNIT-VI: PHOTOCHEMISTRY

Photo-excitation of organic molecules–Jablonski Diagram–Laws of Photochemistry and quantum yield–Calorimetric analysis–Photochemical equilibrium–Photosensitization–Some examples of photochemical reactions–Chemistry of vision and other applications of photochemistry.

TEXT BOOKS:
1. Engineering Chemistry, P.C. Jain and M. Jain, Dhanpat Rai & Sons, Delhi.
2. A Textbook of Engineering Chemistry, Shashi Chawla, Dhanpat Rai & Sons, Delhi.
3. A Textbook of Engineering Chemistry, S.S. Dara, S. Chand & Co. New Delhi.
4. A Text Book of Engineering Chemistry, N.Y.S. Murthy, V. Anuradha, K. Rama Rao, Maruthi Publications.
5. Engineering Chemistry, B. Sivasankar, (**2010**), McGraw-Hill companies

REFERENCES
1. Engineering Chemistry, K. Sesha Maheswaramma and Mridula Chugh (**2013**), Pearson Publications.
2. A Textbook of Engineering Chemistry, Dr. Y. Bharati Kumari and Dr. Jyotsna Cherukuri, VGS Publications.
3. Text Book of Engineering Chemistry, R. Gopalan, D. Venkatappayya, Sulochana Nagarajan (**2011**), Vikas Publications.
4. Text Book of Engineering Chemistry, C. Parameswara Murthy, C.V. Agarwal, Adhra Naidu (**2006**) B.S. Publications.

I B.TECH I SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	3	1	0	40	60	100	3
PROGRAMMING WITH C **(Common to ECE,EEE,CIVIL and Mechanical)**							

Course Objectives:
- To gain experience about structured programming
- To help students to understand the implementation of C language
- To understand various features in C

Course Outcomes:
- Study and Understand basics of computer Hardware and Software.
- Study, Analyze and Understand logical structure of computer programming and different constructs to develop programs in C language.
- Understand and Analyze simple data structures and use of pointers and dynamic memory allocation technique.
- Create files and apply file I/O operations.

UNIT I:
INTRODUCTION: Computer systems, Hardware and Software Concepts,

Problem Solving: Algorithm / Pseudo code, flowchart, program development steps, computer languages: machine, symbolic and high-level languages, Creating and Running Programs: Writing, Editing (vi/emacs editor), Compiling (gcc), Linking and Executing in under Linux.

BASICS OF C: Structure of a C program, identifiers, basic data types and sizes. Constants, Variables, Arthmetic , relational and logical operators, increment and decrement operators, conditional operator, assignment operator, expressions, type conversions, Conditional Expressions, precedence and order of evaluation, Sample Programs.

UNIT II:
SELECTION – MAKING DECISION: TWO WAY SELECTION: if-else, null else, nested if, examples, Multi-way selection: switch, else-if, examples.

ITERATIVE: loops- while, do-while and for statements, break, continue, initialization and updating, event and counter controlled loops, Looping applications: Summation, powers, smallest and largest.

ARRAYS: Arrays- concepts, declaration, definition, accessing elements, storing elements, Strings and String Manipulations, 1-D arrays, 2-D arrays and character arrays, string manipulations, Multidimensional arrays, array applications: Matrix operations, checking the symmetricity of a Matrix.

STRINGS: concepts, c strings.

UNIT III:
FUNCTIONS- MODULAR PROGRAMMING: functions, basics, parameter passing, storage classes extern, auto, register, static, scope rules, block structure, user defined functions, standard library functions, recursive functions, Recursive solutions for fibonacci series, towers of Hanoi, header files, C Preprocessor, example c programs, Passing 1-D arrays, 2-D arrays to functions.

UNIT IV:
POINTERS: pointers- concepts, initialization of pointer variables, pointers and function arguments, passing by address- dangling memory, address arithmetic, character pointers and functions, pointers to pointers, pointers and multi-dimensional arrays, dynamic memory management functions, command line arguments

UNIT V:
ENUMERATED, STRUCTURE AND UNION TYPES: Derived types- structures-declaration, definition and initialization of structures, accessing structures, nested structures, arrays of structures, structures and functions, pointers to structures, self-referential structures, unions, typedef, bit-fields, program applications

UNIT VI:
FILE HANDLING: Input and output- concept of a file, text files and binary files, Formatted I/O, File I/O operations, example programs

TEXT BOOKS:
1. Programming in C, Reema Thareja, OXFORD.
2. The C programming Language by Dennis Richie and Brian Kernighan 2nd ed..

REFERENCE BOOKS:
1. Programming in ANSI C, Dr.E.Balaguruswamy, Tata McGraw-Hill Education.
2. Problem Solving and Program Design in C, Hanly, Koffman, 7th ed, PEARSON.
3. C Programming, A Problem Solving Approach, Forouzan, Gilberg, Prasad, CENGAGE.
4. Programming in C, Second Edition by Ashok N.Kamthane, Pearson.

I B.TECH I SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	4	-	-	40	60	100	3
PROFESSIONAL ETHICS, VALUES AND PATENTS **(Common to All Branches)**							

Course Objectives:

- To equip the student with the basic knowledge relating to the ethical behaviour in engineering discipline.
- To make the students understand the rules and regulation relating to intellectual property rights (Patents, copyrights, trademarks etc.,)

Course Outcomes:

Upon successful completion of the course, the students should be able to

- The outcome of this program is that the student learns necessary behavioural skills relating to the Ethics at industrial sector and to gain fundamental knowledge relating to IPR's

UNIT-I: HUMAN VALUES

Ethics, Morals, Values, Integrity, Work Ethics- Service Learning – Civic Virtue- Respect for Others- Living Peacefully- Caring- Sharing- Honesty- Courage- Value Time- Cooperation- Commitment – Empathy- Self-Confidence- Spirituality- Character.

UNIT-II: ENGINEERING ETHICS

Professional roles to be played by Engineer- Engineers role as managers, consultants and Leaders- Ethical theories and its uses.

UNIT-III: ENGINEERS RESPONSIBILITIES AND RIGHTS

Professional Rights And Responsibilities, Whistle Blowing, Cross Cultural Issues And Occupational Crimes- Industrial Espionage.

UNIT-IV: INTRODUCTION TO INTELLECTUAL PROPERTY LAW

The Evolutionary Past - The IPR Tool Kit- Legal Tasks in Intellectual Property Law – Ethical obligations in Intellectual Property Law - Introduction to Cyber Law – Innovations and Inventions Trade related Intellectual Property Right.

UNIT-V: INTELLECTUAL PROPERTY RIGHTS

Basics, Types of Intellectual Property- Copy Rights – Principles- Subject Matter of Copy Rights- Copy Right Formalities and Registration- Patent Law – Rights and Limitations – Patent Requirements – Patent Registration Process.

UNIT-VI: TRADEMARK

Trademark Registration Process- Post Registration Process – Transfer of Rights- Trade Secrets – Maintaining Trade Secrets- Physical Security- Employee Confidentiality Agreement- Cyber Law and Cybercrimes.

TEXT BOOK:
1. "Professional Ethics and Morals by Prof. A.R.Arasri, Dharanikota Suyodhana-Maruthi Publications.

REFERENCES:
1. Deborah e. Bouchoux: "Intellectual property". Cengage learning, New Delhi.
2. Kompal Bansal & Parishit Bansal" Fundamentals of IPR for Engineers BS Publications.
3. Cyber Law. Texts & Cases, South- western's special topics collections.
4. M. Ashok kumar and mohd. Iqbal Ali: "Intellectual property right" serials pub.
5. "Engineering Ethics and Human Values" by M. Govindarajan, S. Natarajan and V.S. Senthil kumar- PHI Learning PVT. Ltd-2009

I B.TECH I SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	-	-	3	25	50	75	2

BASIC COMMUNICATION SKILLS LAB
(Common to All Branches)

Course objectives:
- To build confidence in the students to communicate effectively in English.
- To strengthen the oral communication to enable them to interact with the people in various social situations.
- To enable the learners develop better pronunciation through emphasis on word accent, intonation and Rhythm

Course Outcomes:

Learners should be able to
- Improve their basic communication skills to interact with peers and others in various social situations
- Speak English effortlessly with good pronunciation
- Take part in various conversations/discourses using the formal and informal expressions they have learned.

UNIT-1
a. Greeting, Introducing and Taking leave
b. Pure Vowels

UNIT-2
a. Giving information and Asking for information
b. Diphthongs

UNIT-3
a. Inviting, Accepting and Declining Invitations
b. Consonants

UNIT-4
a. Commands, Instructions and Requests
b. Accent and Rhythm

UNIT-5
a. Suggestions and Opinions
b. Intonation

TEXT BOOK:
1. Strengthen Your Communication Skills – Maruthi Publications, 2013

REFERENCE BOOKS:
1. Personality Development and Soft Skills (Oxford University Press, New Delhi)
2. J.D.O Conner, Better English Pronunciation, Cambridge University Press 1980
3. T.Balasubramanian, A Text Book of English Phonetics for Indian Students, Macmillan, 1981
4. Sanjay Kumar, Pusph Latha, Communication skills, Oxford University Press 2005

I B.TECH I SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	-	-	3	25	50	75	2
ENGINEERING CHEMISTRY LAB **(Common to All Branches)**							

Course Objectives:

- To provide students with practical knowledge of quantitative analysis of materials by classical and instrumental methods for developing experimental skills in building technical competence.

Course Outcomes:

- On completion of this course, students will have the knowledge in, Carrying out different types of titrations for estimation of concerned in materials using comparatively more quantities of materials involved for good results, and
- Handling different types of instruments for analysis of materials using small quantities of materials involved for quick and accurate results.

LIST OF EXPERIMENTS

Introduction to chemistry laboratory–Molarity, Normality, Primary, Secondary standard solutions, Volumetric titrations, Quantitative analysis, Qualitative analysis etc.

VOLUMETRIC ANALYSIS

1. Estimation of NaOH using standard HCl solution
2. Estimation of Mohr's salt using potassium dichromate ($K_2Cr_2O_7$) solution
3. Estimation of $CuSO_4$ using sodium thiosulphate ($Na_2S_2O_3$) solution.

WATER ANALYSIS

4. Determination of hardness of water sample by EDTA method
5. Determination of alkalinity of water sample
6. Determination of free chlorine in bleaching powder
7. Determination of turbidity of water sample

CONDUCTOMETRIC TITRATIONS

8. Conductometric titration between strong acid and strong base (HCl + NaOH)
9. Conductometric titration between mixture of acids and strong base (HCl and CH_3COOH + NaOH)

FOOD ANALYSIS

10. Estimation of Vitamin-C

PREPARATION OF POLYMERIC RESINS

11. Preparation of phenol formaldehyde resin
12. Preparation of urea formaldehyde resin

TEXT BOOKS:

1. Practical Engineering Chemistry by K. Mukkanti, etal, B.S. Publications, Hyderabad.
2. A text book on experiments and calculation Engg. S.S. Dara.
3. Instrumental methods of chemical analysis, Chatwal, Anand, Himalaya Publications
4. Chemistry Practical Manual, Lorven Publications
5. Inorganic quantitative analysis, Vogel.

I B.TECH I SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	-	-	3	25	50	75	2

COMPUTER PROGRAMMING LAB
(Common to ECE,EEE,CIVIL and Mechanical)

Course Objective:

- The purpose of this course is to introduce to students to the field of language. The students will be able to enhance their analyzing and problem solving skills and use the same for writing programs in C.

Course Outcomes:

After completion of this C Programming Lab, students should be able to:

- Study, analyse and understand logical structure of computer programming and different constructs to develop programs in C Language.
- Know how to write, compile and debug programs in C Language.
- Understand and analyse data types, typecasting and operator precedence.
- Analyse the use of conditional and looping statements to solve problems associated with conditions and repetitions.
- Explain and analyse simple data structures, use of pointers and dynamic memory allocation techniques.
- Summarize the role of functions involving the idea of modularity, know how to create files and apply file I/O operations.

Exercise l

a) Write an Algorithm, Flowchart and Program to calculate the area of triangle using the formula Area = (s (s-a) (s-b) (s-c)) 1/2 where s= (a+b+c)/2.
b) Write an Algorithm, Flowchart and Program to find the largest of three numbers using ternary operator.
c) Write an Algorithm, Flowchart and Program to swap two numbers without using a temporary variable.

Exercise 2

a) Write a C program to find the roots of a quadratic equation.
b) Write a C program, which takes two integer operands and one operator form the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, % and use Switch Statement).

Exercise 3

a) Write a C program to find the sum of individual digits of a positive integer and find the reverse of the given number.
b) Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.

Exercise 4

   a) Write a C Program to print the multiplication table of a given number n up to a given value, where n is entered by the user.
   b) Write a C Program to enter a decimal number, and calculate and display the binary equivalent of that number.
   c) Write a C Program to check whether the given number is Armstrong number or not.

Exercise 5

   a) Write a C program to interchange the largest and smallest numbers in the array.
   b) Write a C program to input two m x n matrices, check the compatibility and perform addition and multiplication of them.

Exercise 6

   a) Write a C Program to find both the largest and smallest number of an array of integers
   b) Write a C Program to find transpose of a matrix.

Exercise 7

Write C programs that use both recursive and non-recursive functions for the following
   a) To find the factorial of a given integer.
   b) To find the GCD (greatest common divisor) of two given integers.

Exercise 8

Write a C Program for the following.
   a) To find Fibonacci sequence
   b) Write C programs illustrating call by value and call by reference concepts.

Exercise 9

Write C Programs for the following string operations without using the built in functions - to concatenate two strings
   a) To append a string to another string
   b) To compare two strings

Exercise 10

Write C Programs for the following string operations without using the built in functions
   a) To find the length of a string
   b) To find whether a given string is palindrome or not

Exercise 11

Write a C program that uses functions to perform the following operations:
   a) To insert a sub-string in to given main string from a given position.
   b) To delete n Characters from a given position in a given string.
   c) To replace a character of string either from beginning or ending or at a specified location

Exercise 12

    a) Write a C program to implement a linear search.
    b) Write a C program to implement binary search
    c) Write a C program to implement sorting of an array of elements.

Exercise 13

    a) Write C Program to reverse a string using pointers
    b) Write a C Program to compare two arrays using pointers
    c) Write a C program to swap two numbers using pointers

Exercise 14

Examples which explores the use of structures, union and other user defined variables

Exercise 15

    a) Write a C program which copies one file to another.
    b) Write a C program to count the number of characters and number of lines in a file.
    c) Write a C Program to merge two files into a third file. The names of the files must be entered using command line arguments.

TEXT BOOKS:
1. Programming in C, Reema Thareja, OXFORD
2. The C programming Language by Dennis Richie and Brian Kernighan 2nd ed..

REFERENCE BOOKS:
1. Programming in ANSI C, Dr.E.Balaguruswamy, Tata McGraw-Hill Education.
2. Problem Solving and Program Design in C, Hanly, Koffman, 7th ed, PEARSON.
3. C Programming, A Problem Solving Approach, Forouzan, Gilberg, Prasad, CENGAGE.
4. Programming in C, Second Edition by Ashok N.Kamthane, Pearson.

I B.TECH II SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	4	-	-	40	60	100	3

INTERACTIVE ENGLISH
(Common to All Branches)

Course objectives:
- To enable the engineering students develop their basic communication skills in English for academic and social purposes.
- To equip the students with appropriate oral and written communication skills.
- To enhance the skills of listening, reading and critical thinking.
- To integrate English Language learning with training for employability skills.

Course Outcomes:
Learners are able to
- Speak clearly, effortlessly, confidently and effectively.
- Write coherently and flawlessly, organizing ideas logically.
- Listen and read to comprehend different discourses and different genres of texts.

Teaching Methodology:
The methodology of teaching will be chalk and talk, PPT, audio-visual, and activity based

PART-I

COMMUNICATION SKILLS

Hours of Instruction per week: 8
PART-I Objectives:
1. Understand the significance of using formal language in communication and Identify different language patterns in communication.
2. Understand the importance of clarity and conciseness of writing.
3. To enhance word power and usage of lexicons among the learners.

PART-I Outcomes:
1. Apply Formal and Informal Language in office correspondence and real life situations.
2. Apply the Clarity, Conciseness and Formal language in E-mail writing, letter writing, report writing, paragraph writing and essay writing.
3. Use words in different contexts while speaking and decipher meaning of the words contextually while reading.

1. **Effective communication**
   a. Role and significance of communication
   b. Features of Human Communication
   c. Process of Communication
   d. Types of Communication, barriers to communication

2. Oral Communication
a. Importance of Listening for effective communication
b. Interpersonal communication
c. Models of Interpersonal relationship development
d. Styles of communication
e. Persuasion techniques
f. Telephone and Cell phone etiquette

3. Written Communication
a. Paragraph writing b. Summaries c. Expansion of Proverbs d. Essay writing
e. Report writing f. The scientific paper g. Letter writing h. Letters of Complaint
i. Request to complaint j. letters of inquiry and responses k. Resume writing
l. Visumes m. statement of purpose n. E-mail
(Fundamentals of technical communication Pg. No. 119 - 153)

Remedial English
a. Importance of vocabulary and grammar,
b. Homonyms, Homophone and Homographs
c. Synonyms and antonyms
d. One word substitutes
e. Idioms
f. Words often confused
g. Subject-Verb agreement
h. active and passive voice
i. direct and indirect speech
j. Articles
k. Adjectives
l. Prepositions
m. Tense and aspect
n. Suffixes
o. Question tags
p. Prefixes
q. Punctuation
r. Common Errors
s. Correction of common errors

PART-2

READING FOR ENRICHMENT

PART-II Objectives:
To inspire the learners by giving the success stories of the various fields and teach them that achievement comes only after burning the midnight oil.

PART-II Outcomes:
The students will emulate the achievers and develop perseverance, determination, dedication and industry
1. APJ Abdul Kalam
2. An Interview with Microsoft CEO Satya Nadella
3. Azim Premji
4. Sachin Tendulkar
5. Sam Pitroda: The Knowledge Revolution
6. Indra Nooyi: http://www.thefamouspeople.com/profiles/indra-nooyi-6440.php

TEXT BOOK:
1. E Suresh Kumar, *Engineering English* –Orient Black Swan Pvt.Ltd.Publishers

REFERENCE BOOKS:
1. Raman, Meenakshi & Sangeetha Sharma. Technical Communication: *Principles and Practice.* Oxford University Press, New Delhi. 2011
2. Rutherford, Andrea. J *Basic Communication Skills for Technology*. Pearson, New Delhi. 2001
3. Raymong Murphy, *Murphy's English Grammar,* Cabridge University Press 2004
4. Meenakshi Raman, Sangeeta Sharma. *Technical Communication: English Skills for Engineers,* Oxford University Press, 2009
5. Meenakshi raman, Sangeeta Sharma, *Fundamentals of technical communication,* Oxford University Press, 2015

I B.TECH II SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	3	1	0	40	60	100	3

ENGINEERING PHYSICS
(Common to All Branches)

Course objectives:

- Physics is the foundation subject to all engineering and through the study in engineering physics the main aim is blending a strong physics component with relevant engineering backgrounds that are usually necessary to work in areas such as semiconductor, optical technologies, mechanical, electrical, and civil engineering. The students will get their traditional undergraduate engineering education that has a broad foundation in mathematics, engineering sciences and technology. This program emphasizes problem solving skills and an understanding of engineering design to address the needs and challenges of the technology age and allow students to take a broad range of engineering careers.

Course Outcomes:
Students will be able to

- Understand the difference between classical and quantum mechanics
- Analyze and understand semiconductor technology and various types of lasers & optical fibers.
- Knows the applications of ultrasonic's in engineering and medicine
- Will recognize the experimental evidence of wave nature of light and interference in thin films, Diffraction grating and polarizer's in various fields.
- Recognize the importance of lasers in various fields.
- Learn the crystal structures and XRD techniques.
- Realize about the various applications of semiconductors in engineering & technology.

UNIT-I
Interference: Introduction – Coherent Sources -Interference in thin films by reflection – Newton's rings – Principle – construction- determination of radius of curvature of plano convex lens.
Diffraction : Introduction – Fraunhofer diffraction - Fraunhofer diffraction at single slit- double slit (qualitative) – Diffraction grating – Grating spectrum
Polarization: Introduction – Types of Polarization – Double refraction – Quarter wave plate ad Half Wave plate

UNIT-II
Lasers: Introduction – Characteristics of lasers – Spontaneous and Stimulated emission of radiation – Einstein's coefficients – Population inversion – Ruby laser – Helium Neon laser-Applications
Fiber Optics: Introduction- Principle of optical fiber - Acceptance angle – cone - Numerical Aperture-Applications

UNIT-III
Crystallography : Introduction – Space lattice – Basis – Unit Cell – Lattice parameters – Bravais lattices – Crystal systems – Structures and packing fractions of SC,BCC and FCC.
X-Ray Diffraction Techniques: Directions and planes in crystals – Miller indices – Separation between successive (h k l) planes – Bragg's law.

UNIT – IV
Ultrasonic: Introduction – properties - Production of Ultrasonic waves –Piezo electric effect, Magnetostriction methods -Applications.
Acoustics: Introduction-Sound absorption-absorption coefficient-Reverberation Time-Sabine's formula-Eyring's formula

UNIT – V
Free electron theory: Classical free electron theory – Quantum free electron theory – Fermi dirac (analytical) and its dependence on temperature-Fermi energy-Density of states.
Quantum Mechanics: Introduction – Matter waves – Physical significance of wave function - Schrodinger Time Independent wave equations – Particle in a one dimensional potential box.

UNIT – VI
Band Theory of Solids: Bloch theorem (qualitative) – Kronig-Penny model - boundary conditions-origin of energy band formation in solids- concept of effective mass of electron and hole-classification of materials into conductors, semiconductors and insulators.
Semiconductor Physics: Introduction –Intrinsic, Extrinsic semiconductor and carrier concentrations – Fermi level in intrinsic and extrinsic semiconductors- Hall Effect.

TEXT BOOKS:
1. Solid state Physics by A.J. Dekker (Mc Millan India Ltd)
2. A text book of Engineering Physics by M.N. Avadhanulu & P.G. Kshirasagar (S. Chand publications)
3. Engineering Physics by Palanisamy (Scitech Publishers)
4. Engineering Physics by M.R. Srinivasan (New Age international publishers)

REFERENCE BOOKS
1. Introduction to solid state physics by Charles Kittle (Willey India Pvt.Ltd)
2. Applied Physics by T. Bhimasenkaram (BSP BH Publications)
3. Applied Physics by M.Arumugam (Anuradha Agencies)
4. Engineering Physics by D.K.Bhattacharya (Oxford University press)
5. Engineering Physics by Mani Naidu S (Pearson Publications)
6. Engineering Physics by Sanjay D Jain and Girish G Sahasrabudhe (University Press)
7. Engineering Physics by B.K.Pandey & S. Chaturvedi (Cengage Learning)

I B.TECH-I-SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	3	1	0	40	60	100	3

INTEGRAL TRANSFORMS AND VECTOR CALCULUS
(Common to All Branches)

Course Objectives:
- The course is designed to equip the students with the necessary mathematical skills and techniques that are essential for an engineering student.
- The skills derived from the course will help the student from a necessary base to develop analytic and design concepts.

Course Outcomes:
Upon successful completion of the course, the students should be able to
- Learn the technique of Laplace transform and apply it to solve differential equations.
- Learn the technique of Z-transform and apply it to solve difference equations.
- Extend the concept of integration to vector functions, understand the significance of the operators, gradient, divergence and curl.
- Understand Fourier series, integral, transforms and they are provided with practice in their application and interpretation in a range of situations.
- Find surface areas and Volumes of certain solids using Green, Stokes and Gauss divergence theorems.

UNIT –I: LAPLACE TRANSFORMATIONS
Laplace transform and its properties, Unit step function and unit impulse function, Transform of periodic functions, Transform of derivatives and integrals, Multiplication by t^n, division by t, evolutions of integrals by Laplace Transforms. Inverse Laplace Transformations. Introduction, Finding inverse transforms by the method of partial fractions, other methods of finding inverse Laplace Transforms, Convolution theorem(without proof), Solutions Initial and Boundary Value Problems.

UNIT –II: Z – TRANSFORMS
Introduction, properties, Damping rule, Shifting rule, Initial and Final value theorems, Inverse z-transform, Convolution theorem, Solutions of difference equations.

UNIT-111: VECTOR DIFFERENTIATION
Gradient, Divergence, Curl, Laplacian and second order operators, vector identities, Equation of continuity, potential surfaces.

UNIT-IV: VECTOR INTEGRATION
Line integral, work done, potential function, area surface and volume integrals, vector integral theorems: Green's, Stoke's and Gauss Divergence theorems (without proof) and related Problems.

UNIT–V: FOURIER SERIES

Introduction, Euler's Formulae, Conditions for a Fourier expansion, Functions having points of Discontinuity, change of interval, even and odd functions, Half – range sine and cosine series.

UNIT–VI: FOURIER TRANSFORMS

Introduction, Definition, Fourier Integrals, Fourier Sine and Cosine Integral, Fourier Transforms, Fourier sine and cosine transforms, Finite Fourier transforms.

TEXT BOOK:
1. B.S.Grewal, Higher Engineering Mathematics, 42nd Edition, Khanna Publisher.

REFERENCES:
1. N.P. Bali, Bhavanari Satyanarayana, Indrani Promod Kelkar, "Engineering Mathematics", University Science Press, (An Imprint of Lakshmi Publications Pvt., Ltd) New Delhi, 2012.
2. B.V. Ramana, Higher Engineering Mathematics, Tata McGrawhill.
3. ErwynKreyszig, Advanced Engineering Mathematics, 9thEditiwiley-India.
4. Peter V. O'Neil, "Advanced Engineering Mathematics", 7th Edition, Cengage Learning, 2011.
5. Srimanta Pal and Suboth C. bhunia, *"Engineering Mathematics"*, oxford University Press, 2015.

I B.TECH-II-SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	3	1	0	40	60	100	3
ENGINEERING MECHANICS **(Common to ME,CE STUDENTS)**							

Course Objectives:
The course is mainly intended
- To impart the basic concepts and fundamentals of Engineering Mechanics and the principles of various force systems under static and dynamic conditions
- To develop the problem solving skills of engineering mechanics essential for mechanical engineering

Course Outcomes:
At the end of this course student will acquire ability to
- Determine the resultant of the given force systems.
- Construct free body diagrams and develop equilibrium equations.
- Understand the concepts of friction and to apply in real life problems.
- Determine the centroid, center of gravity and Moment of Inertia of areas, bodies and composite sections.
- Understand the dynamic analysis of rigid body motion and analyze the dynamic equilibrium of moving bodies
- Apply the work-energy principle to particles and connected systems

UNIT-I
Introduction to Engineering Mechanics-Basic concepts
Resultant of Coplanar concurrent force system: Parallelogram law, Graphical method, Method of resolution.
Equilibrium of force systems: Free body diagrams, Equations of Equilibrium for coplanar concurrent force system, Lami's theorem.
Moments: Moment of Force and its Applications, Principle of moments – Couples and Resultant of Force Systems.

UNIT-II
FRICTION: Introduction, Classification of friction, Laws of Friction, Coeffecient of Friction, Angle of Friction, Angle of Repose, Frictional Forces on moving bodies, Wedge friction, Ladder friction.
UNIT-III
Centroid: Centroids of simple figures (from basic principles)-Centroids of composite figures, Centre of Gravity: Centre of Gravity of simple body (from basic principles), Centre of gravity of composite bodies, pappus theorem.
UNIT-IV
Area Moments of Inertia: Definition, Radius of gyration, Parallel axis theorem, perpendicular axis theorem, Moments of Inertia of composite figures, polar moment of Inertia.

UNIT-V
Mass Moment of Inertia: Moment of Inertia of Rigid body-Moment of Inertia from basic principles-Slender bar, Rectangular Plate, Circular Plate, Moment of Inertia of 3D Bodies-Cone, Solid Cylinder, Solid Sphere.

UNIT-VI
Kinetics: Analysis as a particle**,** Newton's laws of motion, D'Alembert's principle –simple applications- analysis as a rigid body in translation-fixed axis rotation-Simple applications.

Work-Energy method: Equations for Translation, work-Energy applications to particle motion, connected system-Impulse momentum method-simple applications.

TEXT BOOKS:
1. Engg. Mechanics by S.Timoshenko & D.H.Young., 4th Edn - ,Mc Graw Hill publications.
2. Engg. Mechanics by S.S. Bhavikatti-New age publications

REFERENCES:
1. Engineering Mechanics by Fedinand . L. Singer , Harper – Collins.
2. Engineering Mechanics by A.K.Tayal-Umesh Publications.

I B.TECH-II-SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	1	0	4	40	60	100	4
ENGINEERING DRAWING **(COMMON TO ME, CE STUDENTS)** **(NOTE: USE IST ANGLE PROJECTION ONLY)**							

Course objectives:

The course is mainly intended to

- Impart basic knowledge and skills required to prepare engineering drawing which is an universal language of engineers for communication, designing and production
- Get enhanced imagination capacity, visualize and communicate geometrical elements
- Understand the fundamentals of geometry like engineering curves, planes, solids, sections, developments & isometric views and its applications in design and manufacturing of various engineering components

Course Outcomes:

At the end of this course student will acquire ability to

- Apply principles of drawing to represent dimensions of an object and use the different types of scales for drawing of various sizes of engineering curves
- Draw various polygons and conic sections of Ellipse, Parabola and Hyperbola
- Draw different orientations of points, lines, planes and solids with reference to principal planes.
- Understand Development of surfaces and their representation
- Draw orthographic views (2D) from the given isometric view (3D) and vice versa

UNIT-I

Introduction to engineering drawing: Importance, construction of regular polygons.
Conic sections: Construction of Ellipse, parabola & Hyperbola by general Method, ellipse by others methods- Arcs of circles Method, Concentric Circles Method and Oblong Method.
Scales: Representation fraction-Construction of plain, diagonal and vernier scale.

UNIT-II

Orthographic projections: Principle of orthographic projections, projections, of points.
Projection of Straight lines: parallel to both the planes, parallel to one plane and inclined to the other plane.

UNIT-III

Projection of Straight lines inclined to both the planes, determination of true length, angles of inclination and Traces.

UNIT-IV

Projections of planes: regular planes perpendicular/parallel to one plane and inclined to the other reference plane; inclined to both the reference planes.

UNIT-V

Projections of solids-prisms, pyramids, cones and cylinders with the axis inclined to one of the planes
Development of surfaces of right regular solids- Prisms, Cylinder, Pyramids, Cone.

UNIT-VI

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

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TEXT BOOKS:
1. Engineering Drawing by N.D. Butt, Chariot Publications
2. Engineering Drawing by K.L.Narayana & P. Kannaiah, Scitech Publishers.
3. Engineering Graphics by PI Varghese, McGrawHill Publishers

REFERENCE BOOKS:
1. Engineering Graphics for Degree by K.C. John, PHI Publishers
2. Engineering Drawing by Agarwal & Agarwal, Tata McGraw Hill Publisher

I B.TECH II SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	4	0	0	40	60	100	3
ENVIRONMENTAL STUDIES **(Common to All Branches)**							

Course Objectives

- To make the students aware about the environment and it's inter–disciplinary, Basic understanding of the ecosystem and its diversity.
- Human development and societal development is inevitable. This development is entirely depends on science and Technological advancement through using resource assets of nature. In order to reduce the impacts of the technological development, the environmental studies creating awareness among the engineering graduates. So that we can have a healthy environment present and future.
- Acquaintance on various environmental challenges induced due to unplanned anthropogenic activities.
- The course covers the aspects like general awareness, Resources, Utilization and conservation, Healthy sustenance of life, pollution control, social aspects, etc. All these areas will provide and habituate the students towards conservation and sustainable development.
- Overall understanding of the natural resources.

Course Outcomes

- The concepts of the ecosystem and its function in the environment. The need for protecting the producers and consumers in various ecosystems and their role in the food web.
- The knowledge about environmental studies is applicable as and when required like implementing any developmental activity can overcome the hurdles? In relation to environmental aspects.
- Students can develop eco-friendly technologies for a healthy growth, and development of anation which can prevent the environmental hazards by appropriate decisions and alternate remedies.
- To make the students understand the adverse effects of environmental pollution, its causes and measures to control it.
- The biodiversity of India and the threats to biodiversity and conservation practices to protect the biodiversity.
- About environmental assessment and the stages involved in EIA and the environmental audit.

UNIT–I: MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES

Definition, Scope and importance–Need for public awareness–Institutions and people in environment.

Ecosystems: Definitions and concepts–Characteristics of ecosystem–Structural and functional features–Producers, consumers, decomposers and food webs–Types of ecosystems–Forests, grassland, desert, crop land, pond, lake, river and marine ecosystems– Energy flow in the ecosystem–Ecological pyramids–Ecological successions.

UNIT–II: NATURAL RESOURCES:

Forest resources: Use and over–exploitation–Deforestation–Water resources–Use and over utilization of surface and natural resourced ground water–Floods and droughts–Conflicts over water–Dams, benefits and problems on tribal population & Environment.

Mineral resources: Use and exploitation–Environmental effects of extracting and using mineral resources.

Food resources: World food problems–Changes caused by agriculture and overgrazing– Effects of modern agriculture–Fertilizer and pesticide problems–Water logging, salinity– Concept of sustainable agricultural methods.

Land resources: Land as a resource–Land degradation, man induced landslides–Soil erosion and desertification.

UNIT–III: BIODIVERSITY AND ITS CONSERVATION

Levels and Values of biodiversity–India as a mega diversity nation–Hotspots–Threat and conservation of biodiversity–Assessment of biodiversity and its impact on Environment.

UNIT–IV: ENVIRONMENTAL POLLUTION AND CONTROL

Definition, Cause, effects and control measures of
a. Air pollution
b. Water pollution
c. Soil pollution
d. Noise pollution

UNIT–V: GLOBAL ENVIRONMENTAL PROBLEMS AND GLOBAL EFFORTS

Climate change–Global warming–Acid rain–Ozone layer depletion–Nuclear accidents and holocaust–Rain water harvesting–Traditional and modern techniques–Environmental legislation–Wasteland reclamation–Consumerism and waste products.

UNIT–VI: ENVIRONMENTAL MANAGEMENT

Impact Assessment and its significance–various stages of EIA–Preparation of EMP and EIS– Environmental audit–Ecotourism. The student should submit a report individually on any issues related to environmental studies course and make a power point presentation.

TEXT BOOKS:
1. An Introduction to Environmental Studies by B. Sudhakara Reddy, T. Sivaji Rao, U. Tataji & K. Purushottam Reddy, Maruti Publications.
2. Anubha Kaushik & C.P. Kaushik. 2014, Environmental Studies, Fourth edition, New Age International (P) Ltd., New Delhi.

REFERENCES:

1. Text Book of Environmental Studies by Deekshita Dave & P. Udaya Bhaskar, Cengage Learning.
2. Environmental Studies by K.V.S.G. Murali Krishna, VGS Publishers, Vijayawada.
3. Text Book of Environmental Sciences and Technology by M. Anji Reddy, BS Publications.
4. Bharucha, E. **2005**, Text book of Environmental Studies, First edition, Universities Press (India) Pvt., Ltd., Hyderabad.
5. Dr. S. Keerthinarayana & Dr. C. Daniel Yesudian. **2004**, *Principles of Environmental Scienceand Engineering, First edition*, Anuradha Publications (P) Ltd., Kumbakonam.
6. P. Anandan & R. Kumaravelan. **2010**, *Environmental Science & Engineering, Sixth reprint*, Scitech Publications (India) (P) Ltd., Chennai.
7. Dr. Surinder Deswal & Dr. Anupama Deswal. **2008-09**, A *Basic Course in Environmental Studies, Second revised edition*, Dhanpat Rai & Co (P) Ltd., New Delhi.

I B.TECH-II-SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	-	-	3	25	50	75	2
ENHANCING COMMUNICATION SKILLS LAB **(Common to All Branches)**							

Course objectives:
1. To train the students to use language effectively in professional situations like group discussions, public speaking, presentations and interviews.
2. To make the students understand the importance of body language.
3. To develop positive attitude and soft skills to improve their employability quotient.
4. To expose the students to variety of a self-instructional, learner friendly, electronic media and stimulate intellectual faculties/resources

Course Outcomes:
Learners are able to
1. Give presentations and attend job interviews confidently.
2. Speak confidently in challenging situations.
3. Know the importance of Non-verbal communication and interpret nonverbal symbols
4. Face computer based competitive exams like GRE, TOFEL, and IELTS.
5. Unit-1: Body Language
6. Unit-2: Dialogues
7. Unit-3: Presentation Skills
8. Unit-4: Group Discussion
9. Unit-5: Interviews and Telephonic Interviews
10. Unit-6: Debates

TEXT BOOK:
Strengthen your Communication Skills by Maruthi Publications, 2013

REFERENCE BOOKS:
1. *Personality Development and Soft Skills* (Oxford University Press, New Delhi)
2. M Ashraf Rizvi, *Effective Technical Communication skills*, McGraw-Hill, 2005
3. Barun K Mitra, *Personality Development and Soft Skills,* Oxford University Press, 2011
4. Konar N, *Communication Skills for Professionals,* PHI Learning Private Limited, 2011

I B.TECH-II-SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	-	-	3	25	50	75	2
ENGINEERING PHYSICS LAB **(Common to All Branches)**							

Course objective:
- The main aim of the course is to acquaint the students with basic concepts in Engineering Physics using the following illustrative list of experiments.

Course out comes:
- These experiments in the laboratory are helpful in understanding important concepts of physics through involvement in the experiments by applying theoretical knowledge.
- It helps to recognize where the ideas of students agree with those accepted by physics and where they do not.

List of Experiments
1. Newton's rings –Radius of Curvature of Plano Convex Lens.
2. Determination of thickness of thin wire- Air wedge method
3. Determination of wavelength of a source-Diffraction Grating-Normal incidence
4. Determination of wavelength of Laser Source-single slit diffraction.
5. Determine the Numerical aperture of an optical fiber.
6. Determination of velocity of ultrasonic waves in liquids-ultrasonic interferometer.
7. Melde's experiment – Transverse and Longitudinal modes.
8. Determination of velocity of sound-Volume resonator
9. Verification of laws of vibrations in stretched strings -Sonometer.
10. Hall effect in semiconductors
11. Energy Band gap of a Semiconductor p - n junction.
12. Characteristics of Thermistor- Temperature coefficient

REFERENCES:
1. Engineering Physics Lab Manual by Dr.Y. Aparna & Dr.K.Venkateswarao (V.G.S.Book links).
2. Physics Practical Manual, Lorven Publications.

I B.TECH-I-SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	0	0	3	25	50	75	2
ENIGINEERING WORKSHOP **(Common to ME,CE STUDENTS)**							

Course Objectives
- To impart knowledge to students to develop their technical skill sets for creating entities from raw material.
- To give hands on training and practice to students for use of various tools, devices, machines.
- To develop ability of students to understand, plan and implement various processes and operations to be performed on the raw material to create object of desired shape and size.

Course Outcomes

- Thorough knowledge of various tools, machines, devices used in engineering practice for creating objects from material.
- Thorough knowledge of carrying out various operations in basic engineering shops.
- Ability of interpretation of job drawing, application of processes and operations to produce basic components from raw material.

LIST OF EXPERIMENTS:
TRADES FOR EXERCISE:
❖ **CARPENTRY**
  ➢ Cross-Lap joint
  ➢ Dove tail joint
  ➢ Mortise & Tenon joint

❖ **FITTING**
  ➢ V-fit
  ➢ Square fit
  ➢ Dovetail fit
❖ **TINSMITHY**
  ➢ Funnel
  ➢ Square box without lid
  ➢ Tapper tray
❖ **HOUSE WIRING**
  ➢ Two lamps series connection & parallel connection
  ➢ Fluorescent Tube Wiring
  ➢ Stair Case Wiring

TRADES FOR DEMONSTRATION
- ❖ **BLACK SMITHY**
  - ➢ S-Hook
  - ➢ Round rod to square rod
- ❖ **WELDING**
  - ➢ Lap Joint
  - ➢ Butt Joint

TEXT BOOKS:
1. K.C. John, "Mechanical Workshop" 2nd Edn., PHI,2010.
2. Kannaiah P. & Narayana K. C., "Manual on Work Shop Practice", Scitech Publications, Chennai,1999.

REFERENCE BOOKS:
1. Hajra Choudary, "Elements of Workshop Technology-Vol. 1, Asian Publishers, 6th Edn., 1993.
2. G.S. Sawhney, "Mechanical Experiments and Workshop Practice", I.K.International Publishing House, New Delhi, 2009.

NARASARAOPETA ENGINEERING COLLEGE::NARASARAOPETA (AUTONOMOUS)
DEPARTMENT OF CIVIL ENGINEERING

COURSE STRUCTURE

AND SYLLABUS

FOR II B.TECH- I SEM AND II SEM PROGRAMME

(2016 ADMITTED BATCH)

II B.TECH - I SEMESTER

S.No	Subject Name	Cat. Code	L	T	P	Internal Marks	External Marks	Total Marks	Credits
1	Probability& statistics	BS	3	1	-	40	60	100	3
2	Building materials and construction	PC	4	-	-	40	60	100	3
3	Building planning and drawing	PC	1	-	4	40	60	100	3
4	Surveying –I	PC	3	1	-	40	60	100	3
5	Fluid mechanics	ES	3	1	-	40	60	100	3
6	Mechanics of solids	ES	3	1	-	40	60	100	3
7	Surveying Laboratory-I	PC	-	-	3	25	50	75	2
8	Mechanic of solids Laboratory	ES	-	-	3	25	50	75	2
9	Verbal Ability (Mandatory Non Credit Course)	MDC	3	-	-	-	-	-	-
	TOTAL		20	4	10	290	460	750	22

II B.TECH - II SEMESTER

S.No	Subject Name	Cat. Code	L	T	P	Internal Marks	External Marks	Total Marks	Credits
1	Structural analysis-1	PC	3	1	-	40	60	100	3
2	Hydraulics and hydraulic machinery	PC	3	1	-	40	60	100	3
3	Engineering geology	PC	4	-	-	40	60	100	3
4	Surveying-II	PC	3	1	-	40	60	100	3
5	Hydrology & Irrigation Engineering	PC	3	1	-	40	60	100	3
6	Surveying Laboratory-II	PC	-	-	3	25	50	75	2
7	FM&HM Laboratory	ES	-	-	3	25	50	75	2
8	Engineering geology Laboratory	PC	-	-	3	25	50	75	2
9	Mini Project on surveying field work	PRC	-	-	3	25	50	75	1
10	Quantitative Aptitude and Reasoning	MDC	3	-	-	-	-	-	-
	TOTAL		**19**	**4**	**12**	**300**	**500**	**800**	**22**

II B.TECH I-SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	3	1	-	40	60	100	3
PROBABILITY AND STATISTICS							

Course Objectives:
- To acquaint students with the fundamental concepts of probability and statistics and to develop an understanding of the role of statistics in engineering.

Course Outcomes:
Upon Successful completion of the course, the students are able to
- Calculate fundamental concepts such as expectations, and distributions of random variables, distributions, momentum generating function.
- Apply this knowledge to identify, maximum error and determination of sample size, Interval Estimation (Large sample and small sample), Bayesian Estimation, Tests of Hypothesis.
- Fitting a straight line, second degree curve, exponential curve, power curve by method of least squares. Types of correlation, coefficient of correlation, rank correlation. Regression- regression equations.
- Analyze the mathematical methods in physical or other terms for preparing control charts

UNIT-I: PROBABILITY, RANDOM VARIABLES AND DISTRIBUTIONS:
Review of basic concepts in Probability and Discrete Random variables, Continuous Random variables - Probability density, Distribution. Calculating probabilities from probability density, Determining Mean and Variance using Probability density, Normal Distribution-Density and Properties. Calculating Normal Probabilities, Normal Approximation to Binomial Distribution, Uniform Distribution, Gamma Distribution, Weibull Distribution.

UNIT-II: Discrete and Continuous Distributions:
Introduction, Mathematical expectation and properties, Moment generating function, Moments of standard distributions (Binomial, Poisson and Normal distributions), properties.

UNIT-III: SAMPLING DISTRIBUTIONS:
Population and sample, Sampling distribution of the mean(s known), Central Limit theorem (without Proof) and Problems, Sampling distribution of the mean(s unknown), Point Estimation, Maximum error and determination of sample size, Interval Estimation (Large sample and small sample), Bayesian Estimation, Sampling distribution of sums and differences.

UNIT-IV: TESTS OF HYPOTHESIS:

Tests of Hypotheses (Introduction), Null hypotheses, Alternative hypotheses, Type –I, II errors, Level of significance, Hypotheses concerning one mean (Large and Small samples), Inference concerning two means (Large and Small samples), Paired t-test. Estimation of Variances (point and Interval estimation), Hypotheses concerning one variance, Hypotheses concerning two variance, Estimation of Proportions, Hypotheses concerning one Proportion, Hypotheses concerning several Proportions.

UNIT-V: CURVE FITTING, CORRELATION AND REGRESSION:

Introduction, Fitting a straight line, second degree curve, exponential curve, power curve by method of least squares. Types of correlation, coefficient of correlation, rank correlation. Regression- regression equations.

UNIT-VI: STATISTICAL QUALITY CONTROL METHODS:

Introduction – parts and types of control charts, Methods for preparing control charts, Problems using X-bar, P, R, sigma (σ) charts and attributes charts.

TEXT BOOKS:

1. B.S.Grewal, "*Higher Engineering Mathematics*", 42nd Edition, Khanna Publishers, 2012.
2. Miller and John E.Freund, *"Probability and Statistics for Engineers",* Seventh edition, Pearson education, Prentice Hall of India, 2005.

REFERENCES:

1. Kreyszig E, *"Advanced Engineering Mathematics"*, 8th Edition. John Wiley, Singapore, 2001.
2. S.C. Gupta and V.K. Kapoor, *"Fundamentals of Mathematical Statistics"*, Ninth Revised Edition, Sultan Chand & Sons Educational Publishers, 2007.

II B.TECH I-SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	4	0	0	40	60	100	3
BUILDING MATERIALS & CONSTRUCTION							

Course Objectives:
- In recognizing the good materials to be used for the construction work.
- In supervision of different types of masonry.
- In selection of materials, design and supervision of suitable type of floor and roof.
- In Select suitable materials for buildings and adopt suitable construction techniques
- In Effectively deals with the types of form work and rehabilitation work of building.
- In investigation of soil condition, Deciding and design of suitable foundation for different structures

Course Outcomes:
After successful completion of the course, the student will able to:
- Students will be able to get knowledge about various building materials.
- Students can select required masonry work and bond for the construction.
- Students will gain knowledge regarding acoustics of building.
- Students are able to know how to use the form work, scaffolding before and after construction.
- Students will be able to get knowledge about design of suitable foundation for different structures

UNIT-I: STONES, BRICKS AND TILES:
Properties of building stones – relation to their structural requirements, classification of stones – stone quarrying – precautions in blasting, dressing of stone, composition of good brick earth, various methods of manufacturing of bricks. Characteristics of good tile – manufacturing methods, types of tiles. Uses of materials like Aluminium, Gypsum, Glass and Bituminous materials – their quality.

UNIT- II: MASONRY:
Types of masonry, English and Flemish bonds, Rubble and Ashlar Masonry. Cavity and Partionwalls
WOOD: Structure – Properties- Seasoning of timber- Classification of various types of woods used in buildings- Defects in timber. Alternative materials for wood – Galvanized Iron, Fiver – Reinforced Plastics, Steel, Aluminium.

UNIT- III: LIME AND CEMENT:
Various ingredients of lime- constituents of lime stone classification of lime- various methods of manufacture of lime.
Cement: Portland cement- Chemical Composition – Hydration, setting and fineness of cement. Various types of cement and their properties. Various field and laboratory tests for Cement. Various ingredients of cement concrete and their importance – various tests for concrete.

UNIT- IV: BUILDING COMPONENTS:
Lintels, arches, vaults, stair cases – types. Different types of floors – Concrete, Mosaic, Terrazzo floors, Pitched, flat roofs. Lean to roof, Coupled Roofs. Trussed roofs – King and Queen post Trusses. R.C.C Roofs, Madras Terrace and Pre-fabricated roofs.

UNIT-V: FINISHINGS:
Damp Proofing and water proofing materials and uses – Plastering Pointing, white washing and distempering.
Paints: Constituents of paint – Types of paints – Painting of new/old wood- Varnish. Form Works and Scaffoldings.

UNIT- VI: FOUNDATION:
Function and requirements of good foundation, types of foundation, introduction to spread, combined, strap, mat and pile foundation

TEXT BOOKS:
1. S.S. Bhavikatti, "*Building Materials*" , Vices publications House private ltd.
2. S.S. Bhavikatti, "*Building Construction*" Vices publications House private ltd.
3. B.C. Punmia, Laxmi *"Building Materials"* Publications private ltd.
4. B.C. Punmia, Laxmi "*Building Construction*" by Publications (p) ltd Sushil Kumar

REFERENCES:
1. S.K.Duggal, *"Building Materials"* New Age International Publications.
2. P.C.Verghese, *"Building Materials"* PHI learning (P) ltd.
3. M.L.Gambhir, *"Building Materials",* Tata McGraw Hill Publishing Co. Ltd. New Delhi.
4. P.C.Verghese, *"Building construction",* PHI Learning (P) Ltd.

II B.TECH I-SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	1	-	4	40	60	100	3
BUILDING PLANNING & DRAWING							

Course objectives*:*
* To give knowledge about various building elements and their specifications.
* Presents the basics of planning strategies, building bye laws and acoustics of building
* To draw conventional signs, symbols of materials and building services.
* To draw plan, section and elevations of buildings and various building components.

Course outcomes:
By the end of this course students will be able to:
* Plan a building following building rules and bye laws aesthetically
* Various conventional signs, symbols of materials and building services.
* Draw the doors, windows & stair cases
* Drawing plan, section and elevations of buildings and various building components

UNIT-I: BUILDING BYELAWS AND REGULATIONS:
Introduction- terminology- objectives of building byelaws- floor area ratio, floor space index- principles under laying building bye laws- classification of buildings- open space requirements – built up area limitations- height of buildings– lightening and ventilation requirements. Directions and their characteristics.

UNIT- II: RESIDENTIAL BUILDINGS:
Minimum standards for various parts of buildings- requirements of different rooms and their grouping- characteristics of various types residential buildings.

UNIT- III: PUBLIC BUILDINGS:
Planning of educational institutions, Hospital, dispensaries, office buildings, banks, industrial buildings, hotels & motels, buildings for recreation.

UNIT-IV: SIGN CONVENTIONS AND BONDS:
Brick, stone, plaster, sand filling, concrete, glass, steel, cast, iron, copper alloys, aluminium alloys etc., lead, zinc, tin etc., earth, rock, timber and marbles. English bond and Flemish bond- odd and even courses for one, one-half, two and two & half brick walls in thickness at the junction of a corner.

UNIT-V: DOORS, WINDOWS, STAIR CASES AND ROOFS:
Panelled door, panelled and glassed door, glassed windows, panelled windows, dog legged stair case, open well stair case, foundation, steel roof, Sloped and flat roof buildings: drawing Plans, Elevations and Cross sections of given sloped Roof Buildings.

UNIT VI: PLANNING AND DESIGNING OF BUILDINGS:

Drawing the Plan, Elevation and sections of a Residential & Public buildings from the given line diagram.

TEXT BOOKS:
1. Y.S. Sane,"*Planning and Design of buildings*".
2. Gurucharan Singh and Jagadish Singh, "*Planning, designing and scheduling*"
3. M. Chakravarthi , "*Building planning and drawing*".
4. 'A' Series & 'B' Series of JNTU Engineering College, Anantapur.
5. Dr. N. Kumara Swamy & A. Kameswararao, "*Building planning and drawing*", Charotar 7th Edition

REFERENCES:
1. Shah and Kale. "*Building drawing*".

FINAL EXAMINATION PATTERN:

The end examination paper should consist of Part A and Part B. Part A consists of five questions in planning portion out of which three questions are to be answered. Part B should consist of two questions from drawing part out of which one is to be answered in drawing sheet. Weight age for Part – A is 60% and Part- B is 40%.

CIVIL ENGINEERING

II B.TECH I-SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	3	1	0	40	60	100	3
SURVEYING-I							

Course objectives:
This course will enable students to:
- Understand the classifications and its basic principles of surveying.
- Learn the measurement of horizontal distances by chaining/taping and concepts of chain surveying.
- Employ conventional surveying data capturing techniques and process the data for computations.
- Analyze the obtained spatial data for draw contours and preparation of maps.

Course outcomes:
After a successful completion of the course, the student will be able to:
- Possess a sound knowledge of fundamental principles of surveying.
- Measurement of vertical and horizontal distances to arrive at solutions to basic surveying problems.
- Understand the computations of linear and angular dimensions to arrive at basic surveying problems
- Analyze the obtained spatial data to draw contours and preparation of maps by plane table surveying.

UNIT-I: INTRODUCTION:
Definition of Surveying, Classification of Surveys, Uses of Surveying Units of Measurements, Map & Classification, Survey of India topographical Maps and their numbering, Basic principles of surveying, Errors, Classification, Precision and accuracy.
MEASUREMENT OF HORIZONTAL DISTANCES:
Chain and types, Tape and types, EDM devices, Ranging of lines, Direct and Indirect measurement of distances over sloping grounds, Chain and Tape corrections - Numerical problems.

UNIT-II: CHAIN SURVEYING:
Accessories required, Selection of stations and lines, Offsets and types, Setting out of right angles, Working principle and use of optical square, prism square, cross staff, Linear methods of setting out right angles, Booking of chain survey work, Field book, entries, conventional symbols, Obstacles in chain survey, Numerical problems, Errors in chain survey and precautions to be taken.

UNIT-III: INTRODUCTION TO COMPASS SURVEYING:

Meridians and bearings, Principle, working and use of - Prismatic compass, Surveyor's compass, Magnetic bearing, true bearings, WCB and Reduced bearing. Dip and Declination, Accessories required for compass surveying.

Traverse - closed and open traverse, Computation of bearings of legs of closed traverse given the bearing of one of the legs, Computation of included angles given the bearings of legs of a closed traverse. Compass Traversing Local attraction, determination and corrections, Dependent and independent co-ordinates, Checks for closed traverse and determination of closing error and its direction, Bowditch's graphical method of adjustment of closed traverse, Bowditch's rule and transit rule, Omitted measurements (Only Length and corresponding bearing of one line).

UNIT-IV: LEVELLING:

Principles and basic definitions, Fundamental axes and part of a dumpy level, Types of adjustments and objectives, Temporary adjustments of a dumpy level, Sensitiveness of bubble tube, Curvature and refraction correction, Type of levelling, Simple levelling, Reciprocal levelling, Profile levelling, Cross sectioning, Fly levelling, Booking of levels, Rise and fall method and Height of instrument method, comparison Arithmetic checks, Fly back levelling, Errors and precautions.

UNIT-V: CONTOURING:

Contours and their characteristics, Methods of contouring, direct and indirect methods, Interpolation techniques, Uses of contours, Numerical problems on determining inter-visibility, Grade contours and uses.

UNIT-VI: PLANE TABLE SURVEYING:

Plane table and accessories, Advantages and limitations of plane table survey, Orientation and methods of orientation, Methods of plotting – Radiation, Intersection, Traversing, Resection method, Two point and three point problems, Solution to two point problem by graphical method, Solution to three point problem Bessel's graphical method, Errors in plane table survey.

TEXT BOOKS:

1. B.C. Punmia, *"Surveying Vol.1"*, Laxmi Publications pvt. Ltd., New Delhi – 2009.
2. S.K. Duggal, *"Surveying Vol.1"*, Tata McGraw Hill Publishing Co. Ltd. New Delhi. – 2009.
3. K.R. Arora, "*Surveying Vol. 1*" Standard Book House, New Delhi. – 2010

REFERENCES:

1. R Subramanian, *"Surveying and Leveling, Second edition"*, Oxford University Press, New Delhi
2. Kanetkar T P and S V Kulkarni , *"Surveying and Leveling Part I"*, Pune Vidyarthi Griha Prakashan, 1988
3. A. Bannister, S. Raymond , R. Baker, "Surveying", Pearson, 7th ed., New Delhi.

CIVIL ENGINEERING

II B.TECH I-SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	3	1	-	40	60	100	3
FLUID MECHANICS							

Course Objectives:

The objective of this course is to make students to learn:

- The Fundamental properties of fluids and its applications.
- Hydrostatic laws and application to practical problem solving.
- Principles of Kinematics and Hydro-Dynamics for practical applications
- Basic design of pipes and pipe networks considering flow, pressure and its losses.
- The basic flow rate measurements

Course outcomes:

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

- Possess a sound knowledge of fundamental properties of fluids and fluid continuum
- Compute and solve problems on hydrostatics, including practical applications
- Apply principles of mathematics to represent kinematic concepts related to fluid flow
- Apply fundamental laws of fluid mechanics and the Bernoulli's principle for practical applications
- Compute the discharge through pipes and over notches and weirs.

UNIT-I: FLUIDS & THEIR PROPERTIES:

Concept of fluid, Systems of units. Properties of fluid; Mass density, Specific weight, Specific gravity, Specific volume, Viscosity, Cohesion, Adhesion, Surface tension& Capillarity. Fluid as a continuum, Newton's law of viscosity (theory & problems).Capillary rise in a vertical tube and between two plane surfaces (theory & problems). Vapour pressure of liquid, compressibility and bulk modulus, capillarity, surface tension, pressure inside a water droplet, pressure inside a soap bubble and liquid jet. Numerical problems.

UNIT-II: FLUID PRESSURE AND ITS MEASUREMENTS:

Definition of pressure, Pressure at a point, Pascal's law, Variation of pressure with depth. Types of pressure. Measurement of pressure using simple, differential & inclined manometers (theory & problems). Introduction to Mechanical and electronic pressure measuring devices.
HYDROSTATIC FORCES ON SURFACES: Definition, Total pressure, centre of pressure, total pressure on horizontal, vertical and inclined plane surface, total pressure on curved surfaces. Numerical Problems.

UNIT-III: FUNDAMENTALS OF FLUID FLOW (KINEMATICS):

Introduction, methods of describing fluid motion. Velocity and Total acceleration of a fluid particle. Types of fluid flow, Description of flow pattern. Basic principles of fluid flow, three-dimensional continuity equation in Cartesian coordinate system. Derivation for Rotational and irroational motion. Potential function, stream function, orthogonality of streamlines and equipotential lines. Numerical problems on Stream function and velocity potential. Introduction to flow net.

UNIT-IV: FLUID DYNAMICS:

Introduction, forces acting on fluid in motion. Euler's equation of motion along a streamline and Bernoulli's equation. Assumptions and limitations of Bernoulli's equation. Modified Bernoulli's equation. Problems on applications of Bernoulli's equation (with and without losses). Vortex motion; forced vortex, free vortex, problems Momentum equation problems on pipe bends.

Applications: Introduction. Venturimeter, Orificemeter, Pitot tube. Numerical Problems.

UNIT-V: ORIFICE AND MOUTHPIECE:

Introduction, classification, flow through orifice, hydraulic coefficients, Numerical problems. Mouthpiece, classification, Borda's Mouthpiece (No problems).

Notches and Weirs: Introduction. Classification, discharge over rectangular, triangular, trapezoidal notches, Cippoletti notch, broad crested weirs. Numerical problems. Ventilation of weirs, submerged weirs.

UNIT-VI: FLOW THROUGH PIPES:

Introduction, major and minor losses in pipe flow. Darcy-Weisbach equation for head loss due to friction in a pipe. Pipes in series, pipes in parallel, equivalent pipe-problems. Minor losses in pipe flow, equation for head loss due to sudden expansion. Numerical problems. Hydraulic gradient line, energy gradient line. Pipe Networks, Hardy Cross method, Numerical problems.

TEXT BOOKS:

1. Modi & Seth ,*"Fluid Mechanics, Hydraulic and Hydraulic Machines"*, Standard book house.
2. R.K. Bansal, *"A Text book of Fluid Mechanics and Hydraulic Machines",* Laxmi Publications, New Delhi
3. S K SOM and G Biswas, *"Introduction to Fluid Mechanics and Fluid Machines",* Tata McGraw Hill,New Delhi

REFERENCES:

1. K Subramanya, *"Fluid Mechanics and Hydraulic Machines",* Tata McGraw Hill Publishing Co. Ltd.
2. Mohd.Kaleem Khan*, "Fluid Mechanics and Machinery*", Oxford University Press
3. Victor L Streeter, Benjamin Wylie E and Keith W Bedford, "*Fluid Mechanics",* Tata McGraw Hill Publishing Co Ltd., New Delhi, 2008(Ed).

II B.TECH I-SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	3	1	0	40	60	100	3
MECHANICS OF SOLIDS							

Course objectives:

This course will enable students:

- To understand the basic concepts of the stresses and strains for different materials and strength of structural elements.
- To know the development of internal forces and resistance mechanism for one dimensional and two dimensional structural elements.
- To analyze and understand different internal forces and stresses induced due to representative loads on structural elements.
- To analyze and understand principal stresses due to the combination of two dimensional stresses on an element and failure mechanisms in materials.
- To evaluate the behavior of torsional members, columns and struts.

Course outcomes:

After studying this course, students will be able to:

- Evaluate the strength of various structural elements internal forces such as compression, tension, shear, bending and torsion.
- Suggest suitable material from among the available in the field of construction and manufacturing.
- Evaluate the behavior and strength of structural elements under the action of compound stresses and thus understand failure concepts.
- Analyze and design the members subjected to torsion.
- Analyze and design the structural elements such as columns and struts.

UNIT-I: SIMPLE STRESSES AND STRAIN:

Introduction- Definition and concept of stress and strain- Hooke's law- Stress-Strain diagrams for ferrous and non-ferrous materials - factor of safety, Elongation of tapering bars of circular and rectangular cross sections, Elongation due to self-weight. Saint Venant's principle, Compound bars, Temperature stresses, Compound section subjected to temperature stresses, state of simple shear, Elastic constants and their relationship.

UNIT-II: COMPOUND STRESSES:

Introduction, state of stress at a point, General two dimensional stress system, Principal stresses and principal planes. Mohr's circle of stresses

THEORIES OF FAILURE: Introduction, maximum principal stress theory (Rankine's theory), Maximum shearing stress theory (Tresca's theory), Strain energy theory (Beltrami and Haigh), and maximum strain theory (St. Venant's theory).

UNIT-III: SHEAR FORCE AND BENDING MOMENT IN BEAMS:
Introduction to types of beams, supports and loadings. Definition of bending moment and shear force, Sign conventions, relationship between load intensity, bending moment and shear force. Shear force and bending moment diagrams for statically determinate beams subjected to points load, uniformly distributed loads, uniformly varying loads, couple and their combinations.

UNIT-IV: BENDING AND SHEAR STRESSES IN BEAMS:
Introduction, pure bending theory, Assumptions, derivation of bending equation, modulus of rupture, section modulus, flexural rigidity. Expression for transverse shear stress in beams, Bending and shear stress distribution diagrams for circular, rectangular, 'I', and 'T' sections.

UNIT-V: COLUMNS AND STRUTS:
Introduction, short and long columns. Euler's theory; Assumptions, Derivation for Euler's Buckling load for different end conditions, Limitations of Euler's theory. Rankine-Gordon's formula for columns.

UNIT-VI: TORSION IN CIRCULAR SHAFT:
Introduction, pure torsion, Assumptions, derivation of torsion equation for circular shafts, torsional rigidity and polar modulus Power transmitted by a shaft, combined bending and torsion.
THIN CYLINDERS: Introduction, Thin cylinders subjected to internal pressure; Hoop stresses, longitudinal stress and change in volume.

TEXT BOOKS:
1. R.K.Rajput , **"Strength of Materials",** S. Chand Publishing (6th Edition) (2015)
2. R K Bansal, "A Textbook of Strength of Materials", 4th Edition, Laxmi Publications, 2010
3. S.S. Rattan "Strength of Materials" McGraw Hill Education (India) Pvt. Ltd., 2nd Edition (Sixth reprint 2013).

REFERENCES:
1. Ferdinand P. Beer, E. Russell Johnston and Jr.John T. DeWolf "Mechanics of Materials", Tata McGraw-Hill, Third Edition, SI Units
2. D.H. Young, S.P. Timoshenko "Elements of Strength of Materials" East West Press Pvt. Ltd., 5th Edition (Reprint 2014).
3. Egor P. Popov, "Mechanics of Material" Pearson; 2 edition (7 April 1976)

II B.TECH I-SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	0	0	3	25	50	75	2
SURVEYING LABORATORY-I							

Course objectives:
This course will enable students to:
- Apply the basic principles of engineering surveying and measurements
- Follow effectively field procedures required for a professional surveyor
- Use techniques, skills and conventional surveying instruments necessary for engineering practice.

Course outcomes:
After a successful completion of the course, the student will be able to:
- Apply the basic principles of engineering surveying and for linear and angular measurements.
- Comprehend effectively field procedures required for a professional surveyor.
- Use techniques, skills and conventional surveying instruments necessary for engineering practice.

LIST OF EXPERIMENTS:

1. a) To measure distance between two points by direct ranging
   b) To set out perpendiculars at various points on given line using cross staff, optical Square and tape - Setting out building plan
2. Setting out of rectangle, hexagon using tape/chain and other accessories.
3. Measurement of bearing of sides of a closed traverse and adjustment of closing error by Bowditch method and Transit method.
4. To determine the distance between two inaccessible points using chain/tape and compass.
5. To locate points using radiation and intersection method of plane table.
6. To solve 3-point problem in plane using Bessel's graphical solution.
7. To determine difference in elevation between two points using fly levelling technique and to conduct fly back levelling by Height of Instrument method and Rise and Fall methods.
8. To determine difference in elevation between two points using reciprocal levelling and determine the collimation error.
9. To conduct profile levelling for water supply / sewage line and to draw the longitudinal section to determine the depth of cut and depth of filling for a given formation level.

TEXT BOOKS:
1. B.C. Punmia, *"Surveying Vol.1"*, Laxmi Publications pvt. Ltd., New Delhi – 2009.
2. Kanetkar T P and S V Kulkarni, *Surveying and Levelling Part I*, Pune VidyarthiGrihaPrakashan, 1988.

REFERENCES:
1. S.K. Duggal, *"Surveying Vol.1"*, Tata McGraw Hill Publishing Co. Ltd. New Delhi. – 2009.
2. K.R. Arora, *"Surveying Vol. 1"* Standard Book House, New Delhi. – 2010.

II B.TECH I-SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	-	-	3	25	50	75	2
MECHANICS OF SOLIDS LABORATORY							

Course Objectives:

The objective of this course is to make students to gain:

- Ability to apply knowledge of mathematics and engineering in calculating the mechanical properties of structural materials.
- Ability to function on multi-disciplinary teams in the area of materials testing.
- Ability to use the techniques, skills and modern engineering tools necessary for engineering.
- Understanding of professional and ethical responsibility in the areas of material testing.
- Ability to communicate effectively the mechanical properties of materials.

Course outcomes:

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

- Reproduce the basic knowledge of mathematics and engineering in finding the strength in tension, compression, shear and torsion.
- Identify, formulate and solve engineering problems of structural elements subjected to flexure.
- Evaluate the impact of engineering solutions on the society and also will be aware of contemporary issues regarding failure of structures due to unsuitable materials.

LIST OF EXPERIMENTS:

1. Tension test on mild steel and HYSD bars.
2. Compression test on mild steel, Brick and wood.
3. Torsion test on mild steel of circular sections.
4. Bending Test on Wood Under two point loading
5. Shear Test on Mild steel- single and double shear.
6. Impact test on Mild Steel (Charpy).
7. Impact test on Mild Steel (Izod).
8. Hardness tests on ferrous and non-ferrous metals – Brinell's, Rockwell and Vicker's.
9. To determined young's modulus of elasticity of material by
   i) simply supported beam and ii) Cantilever beam.
10. Verification of Maxwell's Reciprocal theorem on beams.

REFERENCES:

1. Suryanarayana A K, *"Testing of Metallic Materials"*, Prentice Hall of India Pvt. Ltd. New Delhi.
2. Fenner, *"Mechanical Testing of Materials"*, George Newnes Ltd. London.
3. Relevant IS Codes

II B.TECH I-SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	3	0	0	-	-	-	-
VERBAL ABILITY							

Course objectives:
- To make students understand the usage of words, relationships; the alternatives and their meanings.
- To give fair idea about understanding and comprehension skills
- To make students understand arguments, draw conclusions and to deal in critical manner
- To teach students-ways to overcome the confusions related to Grammar and Vocabulary

Course outcomes:
At the end of the course students will be able to
- Use appropriate words effectively in their communication
- Identify and correct Grammar and vocabulary related errors
- Construct the sentences effectively using appropriate verbal reasoning abilities
- Demonstrate understanding and comprehensive skills

UNIT – I:
Synonyms1, Synonyms2, Antonyms1, Antonyms2, One-Word Substitution, Phrasal Verbs, Idioms & Phrases, Word Family Operation, Commonly Confused words, Odd man out

UNIT – II:
Tenses, Voice, Parts of speech, Direct & Indirect Speech, Sentence Completion & Correction, Reconstruction of Sentences, Sentence Improvement, Choosing the Incorrect Sentences, Transformation

UNIT – III:
Common Errors1, Common Errors2, Common Errors3, Common Errors4, Common Errors5, Indianisms1, Indianisms2

UNIT - IV:
Direct / simple Analogy, Completing the analogous pair, choosing the Analogous pair, Double Analogy, Choosing a similar word, Detecting Analogies, Multiple-word Analogy.

UNIT – V:

Reading Comprehension1, Reading Comprehension2, Reading Comprehension3, Reading Comprehension4, Cloze Passage1, Cloze Passage2, Cloze Passage3, Cloze Passage4.

UNIT – VI:

Hidden Assumptions, Fallacies, Induction & Deduction Methods, Arguments, Truth, Validity, Soundness.

TEXT BOOKS:

1. 30 Days to a More Powerful Vocabulary by Funk.
2. Practical English Usage by Michael Swan
3. Practice & Pass Professional: Verbal Reasoning Tests: Practice Questions and Expert Coaching to Help You Pass by Alan Redman
4. Kaplan MCAT Verbal Reasoning and Writing Review
5. The Verbal Reasoning Test Workbook: Unbeatable Practice for Verbal Ability by Mike Bryon
6. Understanding and Using English Grammar by Betty Schrampfer Azar

REFERENCES:

1. http://www.verbalreasoningtest.org/
2. https://www.bond11plus.co.uk/verbal-reasoning
3. http://www.studyguidezone.com/mcat_verbalreasoning.htm
4. http://www.varsitytutors.com/mcat_verbal-practice-tests
5. https://www.khanacademy.org/test-prep/mcat .

II B.TECH II-SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	3	1	-	40	60	100	3
STRUCTURAL ANALYSIS-I							

Course objectives:

This course will enable students to

- Apply knowledge of mathematics and engineering in calculating slope and deflections
- Identify, formulate and solve engineering problems
- Analyse structural systems and interpret data
- Engage in lifelong learning with the advances in Structural Engineering

Course outcomes:

After studying this course, students will be able to:

- Evaluate the forces in determinate trusses by method of joints and sections.
- Evaluate the deflection of cantilever, simply supported and overhanging beams by different methods
- Understand the energy principles and energy theorems and its applications to determine the deflections of trusses and bent frames.
- Determine the stress resultants in arches and cables.
- Draw influence lines and construct the ILD diagram for the moving loads.

UNIT-I: INTRODUCTION AND ANALYSIS OF TRUSSES:

Introduction and Analysis of Plane Trusses Structural forms - Conditions of equilibrium, Compatibility conditions, Degree of freedom, Linear and non-linear analysis - Static and kinematic indeterminacies of structural systems, Types of trusses, Assumptions in analysis, Analysis of determinate trusses by method of joints and method of sections.

UNIT-II: DOUBLE INTEGRATION AND MACAULAY'S METHOD:

Deflection of Beams Definition of slope - Deflection and curvature - Sign conventions, Derivation of moment-curvature equation. Double integration method and Macaulay's method: Slope and deflection for standard loading cases and for determinate prismatic beams subjected to point loads, UDL, UVL and couple.

UNIT-III: MOMENT AREA AND CONJUGATE BEAM METHOD:

Moment area method: Derivation, Mohr's theorems, Sign conventions, Application of moment area method for determinate prismatic beams. Conjugate beam method: Real beam and conjugate beam, conjugate beam theorems, Application of conjugate beam method of determinate beams.

UNIT-IV: ENERGY METHODS:

Energy Principles and Energy Theorems Principle of virtual displacements, Principle of virtual forces, Strain energy and complimentary energy, Strain energy due to axial force, bending, shear and torsion, Deflection of determinate beams and trusses using total strain energy, Deflection at the point of application of single load, Castigliano's theorems and its application to estimate the deflections of trusses, beams, Special applications-Dummy unit load method.

UNIT-V: ARCHES AND CABLES:

Arches and Cable Structures Three hinged parabolic arches with supports at the same and different levels. Determination of normal thrust, radial shear and bending moment. Analysis of cables under point loads and UDL. Length of cables for supports at same and at different levels- Stiffening trusses for suspension cables.

UNIT-VI: INFLUENCE LINES:

Influence Lines and Moving Loads Concepts of influence lines-ILD for reactions, SF and BM for determinate beams-ILD for axial forces in determinate trusses Reactions, BM and SF in determinate beams using rolling loads concepts.

TEXT BOOKS:
1. Reddy C S, "*Basic Structural Analysis*", Tata McGraw Hill, New Delhi.
2. Muthu K U. etal, *"Basic Structural Analysis"*, 2nd edition, IK International Pvt. Ltd., New Delhi,2015.
3. Bhavikatti, *"Structural Analysis"*, Vikas Publishing House Pvt. Ltd, New Delhi, 2002.

REFERENCES:
1. Hibbeler R C, *"Structural Analysis"*, Prentice Hall, 9th edition, 2014
2. Devadoss Menon, *"Structural Analysis"*, Narosa Publishing House, New Delhi, 2008.

II B.TECH II-SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	3	1	-	40	60	100	3
HYDRAULICS AND HYDRAULIC MACHINERY							

Course objectives:

• To get knowledge about open channel hydraulic and the working of hydraulic machinery.

Course outcomes:

At the end of course the student will have:

• Knowledge regarding various theories dealing with the flow phenomenon of fluid in an open channel.

• Understanding of basics of the hydro-machinery and the components, function and use of different types of turbines and pumps.

• Ability to use dimensional analysis in solving fluid problems and plan hydraulic similitude studies.

UNIT – I: OPEN CHANNEL FLOW:

Types of flows - Type of channels – Velocity distribution – Energy and momentum correction factors – Chezy's, Manning's; and Bazin formulae for uniform flow – Most Economical sections. Critical flow: Specific energy-critical depth – computation of critical depth – critical

sub-critical and super critical flows.

UNIT-II: HYDRAULIC SIMILITUDE:

Dimensional analysis-Rayleigh's method and Buckingham's pi theorem-study of Hydraulic models – Geometric, kinematic and dynamic similarities-dimensionless numbers – model and Prototype relations.

UNIT- III: BASIC OF TURBO MACHINERY:

Hydrodynamic force of jets on stationary and moving flat, inclined and curved vanes, jet striking centrally and at tip, velocity triangles at inlet and outlet, expressions for work done and efficiency-Angular momentum principle, Applications to radial flow turbines.

UNIT-IV: HYDRAULIC TURBINES:

Layout of a typical Hydropower installation – Heads and efficiencies-classification of turbines-pelton wheel-Francis turbine-Kaplan turbine-working, working proportions, velocity diagram, work done and efficiency, hydraulic design, draft tube – theory and function efficiency.

Governing of turbines-surge tanks-unit and specific turbines-unit speed-unit quantity-unit power-specific speed performance characteristics-geometric similarity-cavitation.

UNIT-V: CENTRIFUGAL – PUMPS:

pump installation details-classification-work done- Manometric head-minimum starting speed-losses and efficiencies-specific speed multistage pumps-pumps in parallel-performance of pumps- characteristic curves- NPSH- Cavitation.

UNIT- VI: HYDROPOWER ENGINEERING:

Classification of Hydropower plants – Definition of terms – load factor, utilization factor, capacity factor, estimation of hydropower potential.- Case studies.

TEXT BOOKS:

1. Modi & Seth *,"Fluid Mechanics, Hydraulic and Hydraulic Machines"*, Standard book house
2. K,Subramanya , "*Open Channel flow",* Tata Mc.Grawhill Publishers..
3. Narayana pillai ,"Fluid Mechanics & Fluid machines", Universities press.

REFERENCES:

1. Dr. R.K. Bansal , *" Fluid mechanics and hydraulic machines"* - Laxmi Publications (P) ltd., New Delhi
2. Ranga Raju, "*Elements of Open channel flow*" by Tata Mc.Graw Hill, Publications.
3. Rajput, S.Chand &Co*., "Fluid mechanics and fluid machines*"
 4. V.T.Chow, "Open Channel flow" Mc.Graw Hill book company.

II B.TECH II-SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	4	-	-	40	60	100	3
ENGINEERING GEOLOGY							

Course Learning Objectives:

The objective of this course is:

- To introduce the Engineering Geology as a subject in Civil Engineering.
- To enable the student to use subject in civil engineering applications.

Course Outcomes:

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

- Identify and classify the geological minerals.
- Measure the rock strengths of various rocks.
- Classify and measure the earthquake prone areas to practice the hazard zonation.
- Classify, monitor and measure the Landslides and subsidence.
- Prepares, analyses and interpret the Engineering Geologic maps
- Analyses the ground conditions through geophysical surveys.
- Test the geological material and ground to check the suitability of civil engineering project construction.
- Investigate the project site for mega/mini civil engineering projects.Site selection for mega engineering projects like Dams, Tunnels, disposal sites etc…

UNIT-I: INTRODUCTION:

Branches of Geology, Importance of Geology in Civil Engineering with case studies. Weathering: Weathering of rocks, Geological agents, weathering process of Rock, River process and their development.

UNIT-II: MINERALOGY AND PETROLOGY:

Definitions of mineral and rock, Different methods of study of mineral and rock, The study of physical properties of minerals and rocks for megascopic study for the following minerals and rocks, Common rock forming minerals are Feldspar, Quartz Group, Olivine, Augite, Hornblende, Mica Group, Asbestos, Talc, Chlorite, Kyanite, Garnet, Calcite and other ore forming minerals are Pyrite, Hematite, Magnetite, Chlorite, Galena, Pyrolusite, Graphite, Chromite, Magnetite And Bauxite. Classification, structures, textures and forms of Igneous rocks, Sedimentary rocks, metamorphic rocks, and their megascopic study of granite varieties, (pink, gray, green). Pegmatite, Dolerite, Basalt etc., Shale, Sand Stone, Lime Stone, Laterite, Quartzite, Gneiss, Schist, Marble, Khondalite and Slate.

UNIT-III: STRUCTURAL GEOLOGY:

Strike , Dip and Outcrop study of common geological structures associating with the rocks such as Folds, Faults, Joints and Unconformities- parts, types, mechanism and their importance in Civil Engineering.

UNIT-IV: GROUND WATER:

Water table, Cone of depression, Geological controls of Ground Water Movement, Ground Water Exploration Techniques. Earthquakes And Land Slides: Terminology, Classification, causes and effects, Shield areas and Seismic bells, Richter scale intensity, Precautions of building constructions in seismic areas. Classification of Landslides, Causes and Effects, measures to be taken prevent their occurrence at Landslides.

UNIT-V: GEOPHYSICS:

Importance of Geophysical methods, Classification, Principles of Geophysical study by Gravity method, Magnetic method, Electrical methods, Seismic methods, Radiometric method and Electrical resistivity, Seismic refraction methods and Engineering properties of rocks.

UNIT-VI: GEOLOGY OF DAMS, RESERVOIRS AND TUNNELS:

Types and purpose of Dams, Geological considerations in the selection of a Dam site. Life of Reservoirs Purpose of Tunnelling, effects, Lining of Tunnels. Influence of Geology for successful Tunnelling – Case studies

TEXT BOOKS:

1. Subinoy Gangopadhay*, 'Engineering Geology'* Oxford University press.
2. D. Venkat Reddy, *'Engineering Geology'* Vikas Publishing House pvt. Ltd, 2013.
3. N. Chenn Kesavulu, *'Engineering Geology'* Trinity Press and (Laxmi Publications), 2 Edition, 2014.
4. Vasudev Kanithi, *'Engineering Geology'* University Press.

REFERENCES:

1. P.C. Varghese, '*Engineering Geology for Civil Engineers'* PHI learning pvt. Ltd.
2. Alan E Kehew, *'Geology for Engineers and Environmental Society'* person publications, 3rd edition
3. P.G. Bell, '*Fundamentals of Engineering Geology'* B.S.P. Publications, 2012.
4. V.Parthesarathi *'Engineering Geology'* et al., Wiley Publications
5. K.S. Valdiya, '*Environmental Geology,'* McGraw Hill Publications, 2nd ed.

CIVIL ENGINEERING

II B.TECH II-SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	3	1	-	40	60	100	3
SURVEYING-II							

Course Objectives:
- The students will understand the working of Theodolite
- The students will understand determination of heights and distances by tachometry
- The students will understand the various types of curves used in practice
- The students will have the knowledge of setting out civil engineering works

Course Outcomes:
- Students will have skills of using theodolites, in the construction survey.
- Students will have skills of curve setting and setting out of works
- Students will have knowledge of preparation of contour maps in digital form using total station

UNIT-I: THEODOLITE SURVEYING:

Theodolite - Types - Description - Horizontal and vertical angles - Temporary and permanent adjustments – Heights and distances– Tangential and Stadia Tacheometry – Subtense method - Stadia constants - Anallactic lens.

Transit Vernier theodolite**:** setting, use and temporary adjustments. Use of micro-optic theodolite, Measurement of horizontal angles and bearings by repetition and reiteration methods.

UNIT-II: THEODOLITE TRAVERSING AND COMPUTATIONS:

Traversing by included angles, and bearings, conditions of closed traverse, Gale's traverse table, closing errors and its adjustment, accuracy of traverse. Advantage of plotting traverse by coordinates, omitted measurements in traverse and their computations. Errors in theodolite survey.

MEASUREMENT OF VERTICAL ANGLES: Trigonometrical levelling, calculation of elevations and distances of accessible and inaccessible objects, problems. Trigonometrical levelling, geodetic observations, refraction and curvature corrections, axis signal correction, determination of difference in elevation by single and reciprocal observation, problems.

UNIT-III: CURVES:

Theory of simple curves. Setting out simple curves by linear and instrumental methods. Obstructions in curve ranging. Compound curves. Reverse curves

UNIT-IV: TRANSITIONS AND VERITICAL CURVES:

Transition curves, computations and setting out of transition curves. Vertical curves, computations and setting out of vertical curves.

UNIT-V: TACHOMETRY:

Theory and use of stadia wires in levelling instruments and theodolite. Fixed and movable hair tachometers. Reduction by calculations; tacheometric, tables; use of tacheometric alidade in contouring by plane table. Tangential method of tacheometry, Theory and use of Jeffcott Direct Reading Tacheometer. Use of RD's self-reducing Tacheometer. Principle and use of substance bar and Beaman's stadia arc.

UNIT-VI: HYDROGRAPHIC SURVEY:

Brief introduction, methods and applications
TOTAL STATION: Features, concepts, types and applications.

TEXT BOOKS:

1. B.C. Punmia, *"Surveying Vol.II",* Laxmi Publications pvt. Ltd., New Delhi – 2009.
2. S.K. Duggal, *"Surveying Vol.II",* Tata McGraw Hill Publishing Co. Ltd. New Delhi. – 2009.
3. K.R. Arora, "*Surveying Vol.II*" Standard Book House, New Delhi. – 2010

REFERENCES:

1. R Subramanian, "*Surveying and Leveling, Second edition"*, Oxford University Press, New Delhi
2. Kanetkar T P and S V Kulkarni , *"Surveying and Leveling Part I"*, Pune Vidyarthi Griha Prakashan, 1988
3. A. Bannister, S. Raymond , R. Baker, "Surveying", Pearson, 7th ed., New Delhi.

CIVIL ENGINEERING

II B.TECH II-SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	3	1	-	40	60	100	3
HYDROLOGY AND IRRIGATION ENGINEERING							

Course Learning Objectives:

The course is designed to

- Introduce hydrologic cycle and its relevance to Civil engineering.
- Make the students understand physical processes in hydrology and, Components of the hydrologic cycle.
- Appreciate concepts and theory of physical processes and Interactions.
- Learn measurement and estimation of the components hydrologic Cycle.
- Provide an overview and understanding of Unit Hydrograph theory and its analysis
- Understand flood frequency analysis, design flood, flood routing.
- Introduce the types of irrigation systems
- introduce the concepts of planning and design of irrigation systems
- Discuss the relationships between soil, water and plant and their Significance in planning an irrigation system.
- learn design principles of canal structures

Course Outcomes:

At the end of the course the students shall be able to :

- Have a thorough understanding of the theories and principles governing the hydrologic
  Processes.
- Develop Intensity-Duration-Frequency and Depth-Area Duration Curves to design hydraulic structures
- Develop design storms and carry out frequency analysis.
- estimate irrigation water requirements
- Design irrigation canals and canal network
- Plan an irrigation system

UNIT-I: INTRODUCTION & PRECIPITATION:

Introduction , Hydrologic cycle (Horton's representation). Water budget equation Precipitation: introduction, forms of precipitation, types of precipitation, measurement of precipitation (Simon's gauge & Syphon gauge only), selection of rain gauge station. Adequacy of rain gauges, methods of computing average rainfall, interpolation of missing data, adjustment of missing data by double mass curve method. Hyetograph and mass curve of rainfall,

UNIT-II: LOSSES FROM PRECIPITATION & RUN OFF:

Evaporation: Definition, factors affecting, measurement (ClassA pan). Evapo-transpiration: Definition, factors affecting, measurement, Infiltration: Definition, factors affecting, measurement (doublering infiltrometer), infiltration indices, Horton's equation of infiltration. **RUN OFF :** Definition, factors affecting, empirical formulae, stream gauging, flow mass curve and flow duration curve.

UNIT-III: HYDROGRAPHS:

Definition, components of hydrographs, unit hydrograph and its derivation from simple storm hydrograph, base flow separation, Prepositions of unit hydrograph- problems

ESTIMATION OF FLOOD

Definition of flood, factors affecting flood, methods of estimation (envelope curves, empirical formulae, rational method).

UNIT-IV: INTRODUCTION:

Introduction, need for irrigation, advantages and disadvantages of irrigation, environmental impacts of irrigation, Systems of irrigation: Gravity irrigation, lift irrigation, well irrigation, tubewell irrigation, infiltration galleries, sewage irrigation, supplemental irrigation.

UNIT-V: SOIL-WATER-CROP RELATIONSHIP:

Introduction, soil profile, physical properties of soil, soilclassification. Indian soils, functions of irrigation soils,maintaining soil fertility, soil-water-plant relationship, soil-moisture. Irrigation relationship, frequency of irrigation.

WATER REQUIREMENT OF CROPS:

Introduction, definitions, crop seasons of India, water requirement of a crop, duty, delta, base period. Consumptive use. Irrigation efficiencies. Assessment of irrigation water.

UNIT-VI: CANALS:

Definition, Types of canals, Alignment of canals, Design of canals by Kenedy's and Lacey's methods- Problems

TEXT BOOKS:

1. Subramanya. K,'*Engineering Hydrology'* Tata Mc Graw-Hill Education Pvt. Ltd, (2013), New Delhi.
2. Jayarami Reddy. P, *'Engineering Hydrology',* Laxmi Publications Pvt. Ltd., (2013), New Delhi
3. Chow V.T., D.R Maidment and L.W. Mays, *'Applied hydrology'* Tata McGraw Hill Education Pvt. Ltd., (2011), New Delhi.
4. Ojha C.S.P, R. Berndtsson and P. Bhunya , 'Engineering Hydrology' Oxford University Press, (2010).

REFERENCES:

1. 'Water Resources Engineering', Mays L.W, Wiley India Pvt. Ltd, (2013).
2. 'Hydrology'by Raghunath. H.M., New Age International Publishers, (2010).
3. 'Engineering Hydrology –Principles and Practice'by Ponce V.M., Prentice Hall International, (1994).
4. 'Hydrology and Water Resources Engineering' by Patra K.C., Narosa Publications, (2011).

II B.TECH II-SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	-	-	3	25	50	75	2
SURVEYING LAB-II							

LIST OF EXPERIMENTS:
1. Study of theodolite in detail - practice for measurement of horizontal and vertical angles.
2. Measurement of horizontal angles by method of repetition and reiteration.
3. Trigonometric Levelling - Heights and distance problem (Two Exercises)
4. Heights and distance using Principles of tacheometric surveying (Two Exercises)
5. Curve setting – different methods. (Two Exercises)
6. Setting out works for buildings & pipe lines.
7. Determination of area using total station
8. Traversing using total station
9. Contouring using total station
10. Determination of remote height using total station
11. Stake-out using total station
12. Distance, gradient, Diff, height between two inaccessible points using total stations

LIST OF EQUIPMENT:
1. Theodolites, and levelling staffs.
2. Tachometers.
3. Total station.

II B.TECH II-SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	-	-	3	25	50	75	2
FLUID MECHANICS AND HYDRAULIC MACHINERY LAB							

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

LIST OF EQUIPMENT:
1. Venturimeter setup.
2. Orifice meter setup.
3. Small orifice setup.
4. External mouthpiece setup.
5. Rectangular and Triangular notch setups.
6. Friction factor test setup.
7. Bernoulli's theorem setup.
8. Impact of jets.
9. Hydraulic jump test setup.
10. Pelton wheel and Francis turbines.
11. Centrifugal and Reciprocating pumps.

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	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
II B.TECH II-SEMESTER	-	-	3	25	50	75	2
ENGINEERING GEOLOGY LABORATORY							

Course Learning Objectives:

The objective of this course is:

- To identify the megascopic types of Ore minerals & Rock forming minerals.
- To identify the megascopic types of Igneous, Sedimentary, Metamorphic rocks.
- To identify the topography of the site & material selection

Course Outcomes:

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

- Identify megascopic minerals & their properties.
- Identify megascopic rocks & their properties.
- Identify the site parameters such as contour, slope & aspect for topography.
- Know the occurrence of materials using the strike & dip problems.

LIST OF EXPERIMENTS:

1. Physical properties of minerals: Megascopic identification.
2. a) Rock forming minerals – Quartz group, Feldspar group, Garnet group, Mica group & Talc, Chlorite, Olivine, Kyanite, Asbestos, Tourmelene, Calcite,Gypsum,etc.
   b) Ore forming minerals – Magnetite, Hematite, Pyrite, Pyralusite, Graphite, Chromite, etc.
3. Megascopic description and identification of rocks.
   a) Igneous rocks–Types of Granite, Pegmatite, Gabbro, Dolerite, Syenite, Granite Poryphery, Basalt, etc.
   b) Sedimentary rocks – Sand stone, Ferrugineous sand stone, Lime stone, Shale, Laterite, Conglamorate, etc.
   c) Metamorphic rocks – Biotite – Granite Gneiss, Slate, Muscovite & Biotiteschist, Marble, Khondalite, etc.
4. Interpretation and drawing of sections for geological maps showing tilted beds, faults, unconformities etc.
5. Simple Structural Geology problems.
6. Field work – To identify Minerals, Rocks, Geomorphology& Structural Geology.

LAB EXAMINATION PATTERN:
1. Description and identification of FOUR minerals
2. Description and identification of FOUR (including igneous, sedimentary and metamorphic rocks)
3. ONE Question on Interpretation of a Geological map along with a geological section.
4. TWO Questions on Simple strike and Dip problems.
5. Project report on geology.

REFERENCES:
1. M T Mauthesha Reddy, *'Applied Engineering Geology Practicals'* by New Age International Publishers, 2nd Edition.
2. Tony Waltham, *'Foundations of Engineering Geology'* Spon Press, 3rd edition, 2009.

II B.TECH II-SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	0	0	3	25	50	75	1
MINI PROJECT ON SURVEYING FIELD WORK							

The field work is needed to be done on any of the mentioned works like contour map, profile levelling, reservoir capacity, alignment of roads, canals, water supply lines, sewage lines, layout of a colony etc., and a report is required to be submitted.

II B.TECH II-SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	3	0	0	0	0	0	0
QUANTITATIVE APTITUDE AND REASONING							

Course objectives:

- To train students in analyzing real life scenarios considering all factors
- To educate the students on principles of mathematical problems and problem solving methods
- To train students for campus placements

Course outcomes:

After thorough learning of Quantitative Aptitude and Reasoning, a student:

- Will be able to prepare well for clearing Quantitative Aptitude and Reasoning tests for campus placements
- Will be able to critically evaluate various real life situations by resorting to Analysis of key issues and factors.
- Will be able to demonstrate various principles involved in solving mathematical problems and thereby reducing the time taken for performing job functions.
- Will be able solve complex mathematical problems in the shortest time possible by applying shortcuts.

UNIT - I: SIMPLE EQUATIONS:
Definition of Linear Equations, Formation of simple equations, Problems on Ages, Fractions and Digits, Indeterminate system of equations, Special cases in indeterminate system of equations

RATIO AND PROPORTION: Definition of Ratio, Properties of Ratios, Comparison of Ratios, Problems on Ratios Compound Ratio, Problems on Proportion, Mean proportional and Continued Proportion

VARIATION: Direct variation, Inverse variation, Joint variation, Problems on Variations

UNIT – II: PERCENTAGES:
Introduction, converting a percentage into decimals, Converting a Decimal into a percentage equivalent of fractions, Problems on percentages.

PROFIT AND LOSS: Problems on Profit and Loss percentage, Relation between Cost Price and Selling price, Discount and Marked Price, Two different articles sold at same Cost Price, Two different articles sold at same Selling Price, Gain% / Loss% on Selling Price .

PARTNERSHIP: Introduction, Relation between capitals, Period of investments and Shares
SIMPLE INTEREST: Definitions, Problems on interest and amount, Problems when rate of interest and time period are numerically equal.

COMPOUND INTEREST: Definition and formula for amount in compound interest, Difference between simple interest and compound interest for 2 years on the same, principle and time period.

QUADRATIC EQUATIONS: General form of Quadratic equations, Finding the roots of Quadratic equations, Nature of the roots, Relation between the roots, Maximum and minimum value of Quadratic Expression.

PROGRESSIONS: Arithmetic Progression, Geometric Progression, Harmonic Progression, Arithmetic Mean, Geometric Mean and Harmonic Mean and their relation.

UNIT – III: DEDUCTIONS:

Finding the conclusions using Venn diagram method, Finding the conclusions using syllogism method.

CONNECTIVES: Definition of a simple statement, Definition of compound statement,
+finding the Implications for compound statements, Finding the Negations for compound statements

UNIT – IV: TIME AND DISTANCE:

Relation between speed, distance and time, Converting km/h into m/s and vice versa, Problems on average speed, Problems on relative speed, Problems on trains, Problems on boats and streams, Problems on circular tracks, Problems on races

TIME AND WORK: -Problems on Unitary method, Relation between Men, Days, Hours and Work, Problems on Man-Day-Hours method, Problems on alternate days, Problems on Pipes and Cisterns

UNIT – V: ANALYTICAL REASONING PUZZLES:

Problems on Linear arrangement, Problems on Circular arrangement, Problems on Double line-up, Problems on Selections, Problems on Comparisons

UNIT – VI: CLOCKS:

Finding the angle when the time is given, Finding the time when the angle is known, Relation between Angle, Minutes and Hours, Exceptional cases in clocks

CALENDARS: Definition of a Leap Year, Finding the number of Odd days, framing the year code for centuries, Finding the day of any random calendar date.

BLOOD RELATIONS: Defining the various relations among the members of a family, Solving Blood Relation puzzles, solving the problems on Blood Relations using symbols and notations

TEXT BOOKS:
1. GL Barrons, Mc Graw Hills, Thorpe's verbal reasoning, LSAT Materials
2. R S Agarwal, S.Chand , 'A modern approach to Logical reasoning'
3. R S Agarwal, S Chand, 'Quantitative Aptitude'
4. Quantitative Aptitude - G. L BARRONS
5. Quantitative Aptitude - Abhijit Guha Mc Graw Hills .

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2. www.affairscloud.com/**quantitative**-**aptitude**-questions
3. www.careerafter.com/rs-aggarwal-**quantitative**-**aptitude**-pdf/
4. www.amazon.in/**Quantitative**-**Aptitude**-Competitive-Examinations.../8121924987
5. www.indiabix.com
6. www.practice**aptitude**tests.com/numerical-**reasoning**-tests