SWARNANDHRA
COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)
SEETHARAMPURAM, NARSAPUR - 534 280, W.G. Dt., A.P.

COURSE STRUCTURE

CHOICE BASED CREDIT SYSTEM
R19 REGULATIONS

CIVIL ENGINEERING

For

Bachelor of Technology (B.Tech)
For the batches admitted 2019-20

B.Tech. – Regular Four Year Degree Programme
(For batches admitted from the academic year 2019-20)
&
B.Tech. – Lateral Entry Scheme
(For batches admitted from the academic year 2020-21)

ACADEMIC REGULATIONS

1. INTRODUCTION

Swarnandhra College of Engineering & Technology (**Subsequently referred to as SCET**) will be followed the norms of Jawaharlal Nehru Technological University Kakinada and Govt. of Andhra Pradesh.

All Academic Programme rules and regulations are approved by the Academic Council, which is the highest Academic body of the Institute. It is applicable for all Bachelor of Technology (B. Tech) degree programme from academic year 2019-20 admission onwards.

2. ADMISSIONS

2.1 Regular Admission

(Join in first year B. Tech Programme)

Admissions in the Institution are classified into **CATEGORY – A,** through convener, EAMCET and **CATEGORY- B** filled by the college management.

2.2 Lateral Entry Admission

(Join in the Second year/third semester of B. Tech Programme)

Eligibility: B.Sc. Graduate & Diploma holders.

Based on the rank secured by the candidate at Engineering Common Entrance Test (ECET) conducted by the convener ,ECET, and Central counseling by Higher Education, Government of Andhra Pradesh.

2.3 Advance standing Admission

(Transfer from other Colleges/ Re-admission due to dis-continuation)

These may arise in the following cases:

a) When a student seeks transfer from other colleges to SCET and desirous to pursue the study at SCET in an eligible branch of study.
b) When students of SCET get transferred from one regulation to another regulation or from previous syllabus to revised syllabus.

In all such cases for admission, when needed, permissions from the statutory bodies are to be obtained and the Programme of study at SCET will be governed by the transitory regulations.

3. UNDER GRADUATE PROGRAMMES OFFERED

Presently, the College is offering Under Graduate Programmes in the following disciplines:

- Computer Science and Engineering (CSE)
- Electronics and communication Engineering (ECE)
- Electrical and Electronics Engineering (EEE)
- Information Technology (IT)
- Mechanical Engineering (ME)
- Civil Engineering (CE)

3.1 Structure of the Programme:

i) **Preamble:**

It is emphasized in UGC Guidelines on Choice Based Credit System (CBCS), that the important measures taken to enhance academic standards and quality in higher education include innovation and improvements in curriculum, teaching-learning process, examination and evaluation systems, besides governance and other matters. It is adopted grading system in place of conventional system of marks and percentages.

Our CBCS provides flexibility in designing curriculum and assigning credits based on the course content and hours of teaching. The students can register any courses of their choice, learn at their own pace, undergo additional courses and acquire more than the required credits, and adopt an interdisciplinary approach through open electives.

Key words CBCS, such as Course, credit, credit point, CGPA, SGPA, Grade Point, Letter Grades, Foundation Courses (FC), Programme Core Course (PCC) and Elective Courses (EC) as given in the UGC guidelines are used the same definitions.

Each Programme of a Discipline or branch will consist of:

- Foundation courses in Basic Sciences, Engineering Sciences and Humanities.
- Programme core courses to impart broad based knowledge needed in the concerned branch.
- Elective courses from the discipline or interdisciplinary areas / industry related opted by the student based on their interest in specialization.
- Open Elective courses from the interdisciplinary areas opted by the students based on their interest in specialization.

Each Programme designed to have 35-40 theory courses and 20-25 laboratory courses. The categories of courses are indicated in the following table.

TABLE-1 CATEGORY OF COURSES

Course Category
Foundation Courses – Basic Sciences & Humanities
Foundation Courses – Engineering Sciences
Programme Core Courses in the branch of study
Elective Courses
Open Elective

Note: All components prescribed in the curriculum will be conducted and evaluated.

ii) **Contact hours:** Depending on the complexity and volume of the course the number of contact hours per week will be determined.

iii) **Credits:**

TABLE-2 CREDITS BASED ON CONTACT HOURS

Course type	No. of Contact Hours	No. of Credits
Theory	1	1
Laboratory	2	1

TABLE-3 CREDITS FOR DIFFERENT COURSES

Course type	Lecture method			Credits
	L	T	P	C
Theory /Elective	3	1	0	4
	2	1	0	3
	3	0	0	3
	2	0	2	3
	2	0	0	2
Laboratory	0	0	2	1
	0	0	3	1.5
	0	0	4	2

3.2 Curriculum for each Programme:

- The Four year curriculum of any B. Tech Programme of study in any branch of Engineering is formulated based on the guidelines mentioned in 3.1 and will be recommended by the concerned Board of Studies and is approved by the Academic Council.
- In case of students admitted under lateral entry, the respective regular curriculum contents from 3rd semester onwards are to be pursued by them.
- In case of students admitted under advanced standing, the equivalence will be prepared by the concerned Board of Studies and the Academic Council has to approve the same..

4. <u>DURATION OF THE PROGRAMME</u>:

The duration of the B. Tech. Programme is four academic years consisting of eight semesters. Students, who fail to fulfill all the academic requirements for the award of the degree within the prescribed duration as per article 4.1, will forfeit their admission in B. Tech course**.**

4.1 Maximum duration of study.

Maximum duration permitted for any student to successfully complete the four year B. Tech. Programme of study will be:

Regular Admission: Eight academic years in sequence from the year of admission for a student admitted into first year of any Programme.
Lateral Entry Admission: Six academic years in sequence from the year of admission for a student admitted into second year of any Programme.
Advanced standing Admission: The maximum time for completion of Programme of study, will be twice the period in terms of academic years in sequence, stipulated in the Programme curriculum defined at the time of admission.

4.2 Cancellation of Admission :

In case, any student fails to meet the above applicable/eligible conditions for the award of degree, his/her admission stands cancelled.

TABLE- 4 MAXIMUM DURATION OF STUDY

Admitted year of study	Maximum duration
First year	8 academic years in sequence
Second year (Lateral entry)	6 academic years in sequence
Advanced standing	Twice the period in terms of academic years in sequence

5. MEDIUM OF INSTRUCTION :

The medium of instruction and examinations are in English.

6. MINIMUM INSTRUCTION DAYS: Each semester will consist of 22 weeks duration with minimum of 110 working days which includes instruction days, internal tests and End examinations.

7. TRANSITORY REGULATIONS:

For those who admitted under advance standing, these transitory regulations will provide the modus of operandi. At the time of such admission, based on the Programme pursued (case by case)

- Equivalent courses completed by the student are established by the BOS of concerned discipline.
- Marks/Credits are transferred for all such equivalent courses and treated as successfully completed in the Programme of study prescribed by SCET.
- A Programme chart of residual courses not completed will be derived and a Programme of study with duration specified will be prescribed for pursuit at SCET.
- Marks obtained in the previous system, as the case maybe, shall be converted to equivalent grades and CGPA.

All other modalities and regulations governing shall be the same as those applicable to the stream of students with whom; such a candidate is merged with current regulations.

8. DISTRIBUTION AND WEIGHTAGE OF MARKS:

Each semester consists of 4/5/6 theory courses and 2/3/4 Laboratories. However, in the 8th semester there will be only 2 theory courses in addition to the project work.

(a). **Theory Courses:**

- Each course consists of five units.
- All courses will be evaluated with a maximum of 100 marks.
- Marks distribution will be 30 marks for internal evaluation and 70 marks for the end semester examination.
- The internal evaluation of 30 marks consists of two cycles. Each cycle consists of descriptive test (internal test) for 20 marks and two class tests for 10 marks.
- Mid Examination: Each mid examination will be conducted for 20 marks with the duration of 75 Minutes. Internal test paper consists of three questions (8M+8M+4M) from two and half units and all are to be answered.

- Class tests for 10 marks calculation: There will be two class tests conducted in each cycle unit wise. **Best of two** will be considered.
- **Weighted average of two Cycles** performance will be considered, weightage of 80% for the best Cycle performance and 20% for second.
- The **end semester** examination will be conducted for 70 marks which covers full syllabus. In end examination pattern, **Part – A** consists of five short questions from all units (Brainstorming/Thought provoking/Case study) for 10 marks. **Part – B** has **5 questions** with internal choice from each unit and valued for 60 marks.

(b). **Practical Courses:**

- All courses will be evaluated with a maximum of 100 marks.
- Marks distribution will be 30 marks for internal evaluation and 70 marks for the end semester examination.
- End practical examination will be conducted by the internal and external examiner appointed by COE.
- Internal evaluation will be a continuous assessment during the semester for 30 marks with 15 marks for day-to-day work, including record valuation and 15 marks for internal test.

(c). **Design or Engineering Drawing Marks Distribution:**

For the courses of design or drawing such as Engineering Graphics, etc., the distribution will be 30 marks for internal evaluation with 10 marks for day-to-day work, and 20 marks from two internal test (80% of first best + 20% of second best). End examination will be conducted for 70 marks.

(d) **Internship:** It can be carried out with a minimum of two weeks and maximum of four weeks, any time after completion of 4^{th} semester till end of 7^{th} semester. It will be evaluated internally by an internal evaluation committee comprising of Head of the Department and two faculty of the department. A minimum of 50% of maximum marks shall be obtained to earn the corresponding credits

(e) **Mini Project:** The $6^{th}/7^{th}$ Semester Mini Project work will be evaluated for 100 marks. The project work is evaluated for internal assessment for 30 and external examination for 70.

i) Internal Assessment: Internal Assessment will be monitored by Project Review Committee consisting of 1) Head of the Department 2) Supervisor and 3) Senior faculty member on the basis of two seminars and the internal marks will be awarded by Project Supervisor with recommendation of PRC.

ii) External Examination: External Examination will be conducted through presentation / viva - voice by the student by Project external examination committee consisting of 1) Head of the Department 2) Supervisor and 3) External examiner appointed by COE.

(g) Project Work: The 8th Semester main Project Work will be evaluated for 200 marks. The project work is evaluated for internal assessment of 60 and external examination for 140.

i) Internal Assessment: Internal Assessment will be monitored by Project Review Committee consisting of 1) Head of the Department 2) Supervisor and 3) Senior faculty member on the basis of two seminars and the internal marks will be awarded by Project Supervisor with recommendation of PRC.

ii) External Examination: External Examination will be conducted through presentation / viva - voice by the student by Project external examination committee consisting of 1) Head of the Department 2) Supervisor and 3) External examiner appointed by COE.

TABLE- 5 MARKS ALLOCATION

Course type	Marks Allocation			
	Internal		End Semester	Total
	Internal test	Class Test/ Day to day work		
Theory course	20	10	70	100
Laboratory course	15	15	70	100
Design or Drawing course	20	10	70	100

(h) Mandatory Courses: These courses are compulsory with zero credits. They shall be no external examination. However attendance in the mandatory course of minimum attendance (75%) in that particular course.

(i) Open Electives: Students are to choose Open Elective – I during 5th Semester, Open Elective–II during 6th Semester and Open Elective – III and IV during 7th Semester from the list of Open Electives given in the Course Structure. However, students cannot opt for an Open Elective Subject offered by their own (parent) Department, if it is already listed under any category of the courses offered by the parent Department in any Semester.

9. ATTENDANCE REGULATIONS

(i) A student will be eligible to appear for end semester examinations, if he/she acquired a minimum of 75% of attendance in aggregate of all the courses.

(ii) Condonation of shortage of attendance in aggregate up to 10% on medical grounds (Above 65% and below 75%) in any semester may be granted by the College Academic Committee.

(iii) Shortage of Attendance below 65% in aggregate shall not be condoned.

(iv) Students with less than 65% of attendance in any semester are not eligible to take up their end examination of that particular semester and their registration for examination shall be allowed.

(v) Attendance may also be condoned for those who participate in Intercollegiate/university sports, co- and extracurricular activities provided their attendance is in the minimum prescribed range for the purpose (>65%) and recommended by the concerned authority. He/ She shall pay the prescribed condonation fee.

(vi) Prescribed Condonation fee shall be payable by the student to appear for the end examination.

(vii) A Student will not be promoted to the next semester unless he/she satisfies the attendance requirement of the present semester as applicable. They may seek re-admission for that semester as and when offered consecutively by the Department.

(viii) A student will be condoned only four times for regular student and three times for lateral entry students during entire course of study.

TABLE-7 ATTENDANCE REQUIREMENT

Attendance Percentage	Condonation fee	Appear End Exams
Above 75 %	Nil	Eligible
65 % -75%	Yes (on medical grounds)	Eligible
Below 65 %	Nil	Not Eligible (Seek re-admission to that semester when offered)

10. MINIMUM ACADEMIC REQUIREMENTS:

The following academic requirements have to be satisfied in addition to the attendance requirements mentioned in **S.No.9.**

(i) A student will be deemed to have satisfied the minimum academic requirements and earned the credits allotted to each theory or practical or design or drawing subject or project if he/she secures not less than a minimum of 35% of marks exclusively in the end semester examinations in each of the courses, for which the candidate had appeared. However, the candidate should have secured a minimum of 40% marks in both external and internal components put together to declare eligible for pass in the subject.

(ii) A student will be promoted from first semester to second semester, second semester to third and third to fourth semester, if he/she satisfies the minimum attendance requirement.

(iii) A student will be promoted from 4^{th} Semester to 5^{th} Semester, if he/she fulfills the academic requirements of 40% of the credits up to 4^{th} Semester from all the examinations (Regular and supplementary) whether or not the candidate takes the examinations.

(iv) A student will be promoted from 6^{th} to 7^{th} Semester, only if he/she fulfills the academic requirements of 40% of the credits up to 6^{th} Semester from, all the examinations (regular and supply) whether or not the candidate takes the examinations.

(v) There will be supplementary examinations along with the regular semester examinations enabling the students to give a fair chance to appear in the subject if any failed.

TABLE-8 PROMOTION IN TO NEXT HIGHER CLASS

Promotion From	Promotion to	Promotion Criteria
1^{ST} Semester	2^{nd} Semester	Minimum Attendance requirement
2^{nd} Semester	3^{rd} Semester	
3^{rd} Semester	4^{th} Semester	
4^{th} Semester	5^{th} Semester	Minimum Attendance requirement & 40% of credits up to 4^{th} semester for all exams
5^{th} Semester	6^{th} Semester	Minimum Attendance requirement
6^{th} Semester	7^{th} Semester	Minimum Attendance requirement & 40% of credits up to 6^{th} semester for all exams
7^{th} Semester	8^{th} Semester	Minimum Attendance requirement

11. GAP YEAR CONCEPT

Students who wish to pursue entrepreneurship full time can take break of one year study, after the 4th Semester with the due recommendations of the GAP committee and approved by the principal. This may be extended to two years at the most and these two years would not be counted for the time for the maximum time for graduation

12. ELIGIBILITY FOR AWARD OF DEGREE:

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

(i) Pursue the programme of study for a stipulated period of four years and not more than eight years.

(ii) Register for 160 credits and secure the same.

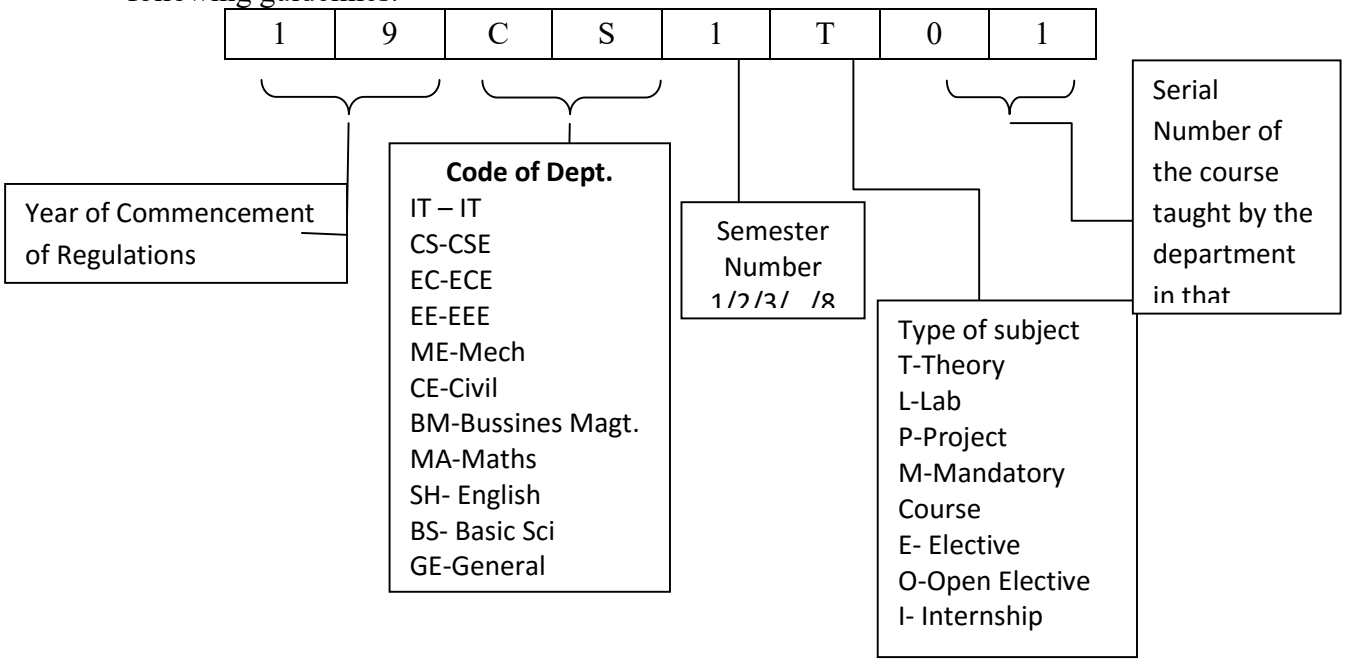
(iii) Registered and successfully completed all the components prescribed in the programme of study in whichhe/she is admitted.

(iv) All mandatory courses must be completed with satisfactory.

(v) Obtained CGPA greater than or equal to 4.75 (minimum requirements for pass).

13. COURSE CODE & COURSE NUMBERING SCHEME:

The subject codes will be given by the department teaching the subject. Each subject code contains 8 characters. The 8 characters for each subject will be filled as per the following guidelines.



14. GRADING SYSTEM:

14.1 Award of Grade:

(i) Grade Point Average (GPA):

a) The Grade Point Average (GPA) will be calculated according to the formula

$$GPA = \frac{\sum C_i G_i}{\sum C_i}$$

Where C_i = number of credits for the subject i

G_i = grade points obtained by the student in the subject.

b) To arrive at Cumulative Grade Point Average (CGPA), the formula is used considering the student's performance in all the courses taken in all the semesters completed up to the particular point of time.

$$CGPA = \frac{\sum C_i G_i}{\sum C_i}$$

Where C_i = number of credits for the subject i

G_i = grade points obtained by the student in the subject.

c) Equivalent percentage = (CGPA-0.75) x 10

(ii) After a student satisfy the requirements prescribed for the award of UG/PG Programme he/she shall be placed in one of the following four grades. The award of the degree is based on CGPA on a grade point scale of 10 and given in Table 9.

Table -9

CGPA	Award of Division
≥7.75*	First Class with Distinction
≥6.75	First Division
≥5.75	Second Division
≥4.75	Pass Division
<4.75	Unsatisfactory

* In addition to the required CGPA of 7.75, the student must have necessarily passed all the courses of every semester in the minimum stipulated period for the programme.

14.2 Award of Grade in Each Semester:

(i) Based on the student performance during a given semester, a final letter grade will be awarded at the end of the semester for each subject. The letter grades and the corresponding grade points are as given in the Table 10.

Table -10

Percentage of Marks Scored	Letter Grade	Level	Grade points
>=90	O	Outstanding	10
80 - 89	S	Excellent	9
70-79	A	Very Good	8
60-69	B	Good	7
50-59	C	Fair	6
40-49	D	Satisfactory	5
<40	F	Fail	0
		Absent	0

(ii) A student earns a minimum of 5 grade points (D grade) in a subject is declared to have successfully completed the subject, and is deemed to have earned the credits assigned to that subject. However, it should be noted that a pass in any

subject/term paper/seminar/project/mini project shall be governed by the rules mentioned in **S.No. 8**.

(iii) Grade Sheet: A grade sheet (memorandum) will be issued to each student indicating his/her performance in all courses taken in that semester and also indicating the grades.

(iv) Transcripts: After successful completion of the programme of study, a Transcript containing performance of all academic years will be issued as a final record. Duplicate transcripts will also be issued up to any point of study to the student on request and by paying stipulated fee in force.

(v) Candidates shall be permitted to apply for revaluation within the stipulated period with payment of prescribed fee.

(vi) The Academic Council has to approve and recommend to the JNTUK, Kakinada for the award of a degree to any student.

15. SUPPLEMENTARY EXAMINATIONS:

In addition to the Regular Final Examinations held at the end of each semester, a Supplementary Examination will be conducted. A student can appear for any number courses of supplementary examinations till he/she clears the courses. However the maximum stipulated period of programme cannot be relaxed under any circumstance.

16. ADVANCED SUPPLEMENTARY EXAMINATIONS:

Candidate who fails the courses in 7^{th} and 8^{th} Semester can appear for Advanced Supplementary Examinations.

17. ACADEMIC REGULATIONS FOR B.TECH (LATERAL ENTRY SCHEME):

i. The students have to acquire 120 credits from 3^{rd} Semester to 8^{th} Semester of B. Tech Programmefor the award of the degree.
ii. All mandatory courses must be completed with satisfactory for award of degree.
iii. Obtained CGPA greater than or equal to 4.75 (minimum requirements for pass).
iv. The same attendance regulations are to be adopted as per the rules mentioned in item No.10.
v. **Rules for Promotion from 6^{th} Semester to 7^{th} Semester**: A student shall be promoted from 6^{th} Semester to 7^{th} Semester only if he/she fulfills the academic requirements of 40% credits up to 6^{th} Semester.
vi. Students, who fail to fulfill the requirement for the award of the degree in six consecutive academic years from the year of admission, shall forfeit their seat.

18. CONDUCT AND DISCIPLINE:

Students admitted in SCET are to be followed the conduct and discipline of the college and which will be updated from time to time.

19. MALPRACTICES:

If any malpractices held in internal assessment tests or Semester-End Examinations, Principal constitute a Malpractice Enquiry Committee to enquire the case. The principal shall take necessary action based on the recommendations of the committee as per stipulated norms.

20. WITHHOLDING OF RESULTS

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

21. GENERAL:

a) Wherever the words “he”, “him”, “his”, occur in the regulations, they include “she”, “her”, “hers”.
b) The academic regulation should be read as a whole for the purpose of any interpretation.
c) In case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Principal is final and which is to be ratified by the Chairman of the Governing Body.
d) The college may change or amend the academic regulations or syllabi at any time and the changes or amendments made shall be applicable to all the students with effect from the dates notified by the college.

CIVIL ENGINEERING
COURSE STRUCTURE – UG
SEMESTER-I

S.No.	Category	Subject Code	Subject Title	L	T	P	C
1	Basic science courses	19MA1T01	Calculus and Linear Algebra	3	1	0	4.0
2	Basic science courses	19BS1T02	Engineering Chemistry	3	0	0	3.0
3	Engineering science courses	19EE1T01	Basic Electrical Engineering	3	0	0	3.0
4	Humanities and Social sciences including Management Courses	19HS1T01	English	3	0	0	3.0
5	Engineering science courses	19CS1L02	IT Workshop	0	0	3	1.5
6	Basic science courses	19BS1L02	Engineering Chemistry Lab	0	0	3	1.5
7	Engineering science courses	19EE1L01	Basic Electrical Engineering Lab	0	0	3	1.5
8	Humanities and Social sciences including Management Courses	19HS1L01	English Proficiency Lab	0	0	3	1.5
Total				12	1	12	19

SEMESTER-II

S.No.	Category	Subject Code	Subject Title	L	T	P	C
1	Basic science courses	19MA2T02	Differential Equations and Vector Calculus	3	0	0	3.0
2	Basic science courses	19BS2T01	Engineering Physics	3	0	0	3.0
3	Engineering science courses	19CS2T01	Problem Solving and Programming Using C	3	0	0	3.0
4	Engineering science courses	19ME2T01	Engineering Graphics	3	0	0	3.0
5	Engineering science courses	19CE2T01	Applied Mechanics	3	0	0	3.0
6	Engineering science courses	19ME2L01	Engineering Workshop	0	0	3	1.5
7	Basic science courses	19BS2L01	Engineering Physics Lab	0	0	3	1.5
8	Engineering science courses	19CS2L01	C Programming Lab	0	0	3	1.5
9	Humanities and Social sciences including Management Courses	19HS2L02	English Communication Skills Lab	0	0	3	1.5
Total				15	0	12	21

L-LECTURE HOURS, T- TUTORIAL HOURS, P-PRACTICAL HOURS, C-CREDITS,
I- INTERNAL MARKS, E- EXTERNAL MARKS, TM- TOTAL MARKS

CIVIL ENGINEERING
COURSE STRUCTURE – UG
SEMESTER-III

S.No.	Category	Subject Code	Subject Title	L	T	P	C
1	Basic science courses	19MA3T05	Probability & Statistics	3	0	0	3
2	Humanities and Social sciences including Management Courses	19BM3T01	Managerial Economics and Financial Analysis	3	0	0	3
3	Professional Core	19CE3T01	Strength of Materials-I	3	0	0	3
4	Professional Core	19CE3T02	Surveying	3	0	0	3
5	Professional Core	19CE3T03	Engineering Geology & Building Materials	3	0	0	3
6	Professional Core	19CE3L01	Surveying Lab	0	0	3	1.5
7	Professional Core	19CE3L02	Engineering Geology Lab	0	0	3	1.5
8	Engineering science courses	19CE3L03	Computer-aided Civil Engineering Drawing Lab	0	0	3	1.5
9	Mandatory course		Indian Culture & Tradition	2	0	0	0
Total				17	0	9	19.5

SEMESTER-IV

S.No.	Category	Subject Code	Subject Title	L	T	P	C
1	Professional Core courses	19CE4T01	Strength of materials-II	3	0	0	3
2	Professional Core courses	19CE4T02	Fluid Mechanics & Hydraulic Machines	3	1	0	4
3	Professional Core courses	19CE4T03	Structural Analysis-I	3	0	0	3
4	Professional Core courses	19CE4T04	Concrete Technology & Building construction	3	0	0	3
5	Professional Core courses	19CE4T05	Building Planning & Drawing	3	0	0	3
6	Professional Core courses	19CE4L01	Strength of Materials Lab	0	0	3	1.5
7	Professional Core courses	19CE4L02	Fluid Mechanics & Hydraulic Machines Lab	0	0	3	1.5
8	Professional Core courses	19CE4L03	Concrete Technology Lab	0	0	3	1.5
9	Mandatory course		Constitution of India	2	0	0	0
Total				17	1	9	20.5

L-LECTURE HOURS, T- TUTORIAL HOURS, P-PRACTICAL HOURS, C-CREDITS,
I- INTERNAL MARKS, E- EXTERNAL MARKS, TM- TOTAL MARKS

CIVIL ENGINEERING
COURSE STRUCTURE – UG
SEMESTER-V

S. No.	Category	Subject Code	Subject Title	L	T	P	C
1	Professional Core courses	19CE5T01	Structural Analysis-II	3	1	0	4
2	Professional Core courses	19CE5T02	Design & Drawing of Reinforced Concrete Structures	3	1	0	4
3	Professional Core courses	19CE5T03	Water Resources Engineering	3	0	0	3
4	Professional Core courses	19CE5T04	Geotechnical Engineering	3	0	0	3
5	Professional Core courses	19CE5T05	Transportation Engineering	3	0	0	3
6	Open Elective courses		open Elective-I	3	0	0	3
7	Open Elective courses	19CE5L01	Geotechnical Engineering Lab	0	0	3	1.5
8	Professional Core courses	19CE5L02	Transportation Engineering Lab	0	0	3	1.5
9	Mandatory courses		Environmental Science	2	0	0	0
				20	2	6	23

SEMESTER-VI

S.No.	Category	Subject Code	Subject Title	L	T	P	C
1	Professional Core courses	19CE6T01	Environmental Engineering	3	0	0	3
2	Professional Core courses	19CE6T02	Remote Sensing & GIS	3	0	0	3
3	Professional Core courses	19CE6T03	Design & Drawing of Steel Structures	3	0	0	3
4	Professional Elective courses		Elective-I	3	0	0	3
5	Professional Elective courses		Elective-II	3	0	0	3
6	Open Elective Courses		open Elective-II	3	0	0	3
7	Professional Core courses	19CE6L01	Environmental Engineering Lab	0	0	3	1.5
8	Professional Core courses	19CE6L02	Remote Sensing & GIS Lab	0	0	3	1.5
9	Mandatory courses		PE & IPR	2	0	0	0
			Total	20	0	6	21

L-LECTURE HOURS, T- TUTORIAL HOURS, P-PRACTICAL HOURS, C-CREDITS,
I- INTERNAL MARKS, E- EXTERNAL MARKS, TM- TOTAL MARKS

CIVIL ENGINEERING
COURSE STRUCTURE – UG
SEMESTER-VII

S.No.	Category	Subject Code	Subject Title	L	T	P	C
1	Professional Core courses	19CE7T01	Estimation, specifications and contracts	3	0	0	3
2	Professional Elective courses		Elective-III	3	0	0	3
3	Professional Elective courses		Elective-IV	3	0	0	3
4	Open Elective Courses		open Elective-III	3	0	0	3
5	Open Elective Courses		open Elective-IV	3	0	0	3
6	Professional Core courses	19CE7L01	Advanced Concrete Technology Lab	0	0	4	2
7	Project	19CE7M01	Mini Project	0	0	4	2
8	Internship	19CE7I01	Internship	0	0	2	1
9	Mandatory Course		Moocs/Certification Course	0	0	0	0
Total				15	0	06	20

SEMESTER-VIII

S.No.	Category	Subject Code	Subject Title	L	T	P	C
1	Professional Elective courses		Elective-V	3	0	0	3
2	Professional Elective courses		Elective-VI	3	0	0	3
3	Project	19CE8P01	Project Work	0	0	20	10
Total				6	0	20	16

L-LECTURE HOURS, T- TUTORIAL HOURS, P-PRACTICAL HOURS, C-CREDITS,
I- INTERNAL MARKS, E- EXTERNAL MARKS, TM- TOTAL MARKS

List of Open electives		
S.No	**Subject Code**	**Subject**
1	19CEOP01	Disaster management
2	19CEOP02	Introduction to Remote Sensing
3	19CEOP03	Water pollution & control
4	19CEOP04	Solid waste Management

Stream	Elective-I			Elective-II		
	S.No	Subject Code	Subject	S.No	Subject Code	Subject
Structural Engineering	1	19CE6E01	Advanced Structural Analysis	1	19CE6E06	Pre stressed Concrete
Geotechnical Engineering	2	19CE6E02	Foundation Engineering	2	19CE6E07	Rock Mechanics
Transportation Engineering	3	19CE6E03	Pavement Materials	3	19CE6E08	Railway, Airport & Harbour Engineering
Water Resources Engineering	4	19CE6E04	Design of Hydraulic Structures	4	19CE6E09	Open channel flow
Environmental Engineering	5	19CE6E05	Air pollution & Control	5	19CE6E10	Solid & Hazardous waste Management

Stream	Elective-III			Elective-IV		
	S.No	Subject Code	Subject	S.No	Subject Code	Subject
Structural Engineering	1	19CE7E01	Repairs & Rehabilitation of structures	1	19CE7E06	Advanced Structural Design
Geotechnical Engineering	2	19CE7E02	Rock Mechanics	2	19CE7E07	Ground Improvement Techniques
Transportation Engineering	3	19CE7E03	Traffic Engineering	3	19CE7E08	Pavement Analysis & Design
Water Resources Engineering	4	19CE7E04	Watershed management	4	19CE7E09	Hydropower Engineering
Environmental Engineering	5	19CE7E05	Environmental Impact Assessment & Management	5	19CE7E10	Waste water Engineering & Management

Stream	Elective- V			Elective-VI		
	S.No	Subject Code	Subject	S.No	Subject Code	Subject
Structural Engineering	1	19CE8E01	Earthquake Engineering	1	19CE8E06	Construction Technology & Management
Geotechnical Engineering	2	19CE8E02	Soil Dynamics & Machine Foundations	2	19CE8E07	Geo Technology
Transportation Engineering	3	19CE8E03	Urban Transportation & Planning	3	19CE8E08	Road Safety Management
Water Resources Engineering	4	19CE8E04	Ground Water Management	4	19CE8E09	River Engineering
Environmental Engineering	5	19CE8E05	Industrial waste Management	5	19CE8E10	Faecal Sludge Management

B Tech I SEMESTER

CALCULUS & LINEAR ALGEBRA

(Common to All Branches)

SYLLABUS (R19)

Course Objectives:

- This course will illuminate the students in the concepts of calculus and linear algebra.
- To equip the students with standard concepts and tools at an intermediate to advanced level mathematics to develop the confidence and ability among the students to handle various real world problems and their applications.

Bridge Course: Limits, continuity, Types of matrices

Unit I: Matrix Operations and Solving Systems of Linear Equations

Rank of a matrix by echelon form, Normal form - solving system of homogeneous and non-homogeneous linear equations- Gauss Elimination, Jacobi and Gauss Seidel methods - Eigen values and Eigen vectors and their properties (without proof).

Learning Outcomes:

At the end of this unit, the student will be able to

solve systems of linear equations, determine the rank, Eigen values and eigenvectors(K2).

Unit II: Cayley-Hamilton theorem and Quadratic forms

Cayley-Hamilton theorem (without proof), Finding inverse and power of a matrix by Cayley-Hamilton theorem - Reduction to diagonal form - Quadratic forms and nature of the quadratic forms, reduction of quadratic form to canonical form by orthogonal transformation.

Learning Outcomes:

At the end of this unit, the student will be able to

- reduce to diagonal form and identify special properties of a matrix, such as positive definite, etc., and use this information to facilitate the calculation of matrix characteristics; (K3)

Unit III: Multivariable calculus

Expansions of functions: Taylor's and Maclaurin's series - Partial derivatives, total derivatives, chain rule, change of variables, Jacobians, maxima and minima of functions of two variables, method of Lagrange multipliers.

Learning Outcomes:

At the end of this unit, the student will be able to

- Expand the given function as series of Taylor's and Maclaurin's (K3)
- Find partial derivatives numerically and symbolically and use them to analyze and interpret the way a function varies. (K3)
- Acquire the Knowledge in maxima and minima of functions of several variables (K1)
- Utilize Jacobian of a coordinate transformation to deal with the problems in change of variables (K3)

Unit IV: Multiple Integrals

Double Integrals: change of order of integration, double integrals in polar coordinates, areas enclosed by plane curves.

Triple Integral: Evaluation of triple integrals, change of variables

Learning Outcomes:
At the end of this unit, the student will be able to

- evaluate double integrals of functions of several variables in two dimensions using Cartesian and polar coordinates (K3)
- apply double integration techniques in evaluating areas bounded by a region (K4)

Unit V: Special Functions
Beta and Gamma functions and their properties, relation between beta and gamma functions.

Learning Outcomes:
At the end of this unit, the student will be able to

- Conclude the use of special functions in multiple integrals (K3)

Textbooks:

1. B. S. Grewal, Higher Engineering Mathematics, 42/e, Khanna Publishers, 2012.

References:

1. Erwin Kreyszig, Advanced Engineering Mathematics, 9/e, John Wiley & Sons, 2013.
2. B.V. RAMANA, Higher Engineering Mathematics, Tata McGraw Hill, 2007.

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

1. develop the use of matrix algebra techniques that is needed by engineers for practical applications (K3)
2. familiarize with functions of several variables which is useful in optimization (K3)
3. learn important tools of calculus in higher dimensions. Students will become familiar with double integral(K3)
4. familiarize with triple integral and also learn the utilization of special functions

B. TECH 1st SEMESTER	L	T	P	C
	3	-	-	3
19BS1T02: ENGINEERING CHEMISTRY				

COURSE OUTCOMES

At the end of semester, the students will be able to

CO1: Explain the impurities present in raw water, problems associated and how to avoid them (K2)
CO2: Explain the advantages of Polymers in daily life (K2)
CO3: Explain the theory of construction of battery and fuel cells and theories of corrosion and
prevention methods. (K2)
CO4: Differentiate conventional and non-conventional energy sources and their advantages and
disadvantages. (K2)
CO5: Identify the usage of advanced materials in day to day life (K2)

UNIT I: WATER TECHNOLOGY

Hardness of water-types of hardness-disadvantages of hard water-determination of hardness by EDTA complexometric method. Portable water and its specifications-steps involved in purification of water-chlorination, break point of chlorination. Boiler troubles: Scale and sludge-priming and foaming-boiler corrosion-caustic embrittlement.

Industrial Water Treatment: Softening methods: zeolite process-ion exchange process.
Brackish water treatment (desalination methods): Reverse osmosis - electro dialysis.

Learning Outcomes: At the end of this unit, the students will be able to Explain
The impurities present in raw water, problems associated with them and how to avoid them

UNIT-II: POLYMERS AND COMPOSITE MATERIALS

Polymers-Introduction-Types of polymers-degree of polymerization-functionality-preparation properties and applications of individual polymers-Bakelite-PVC-Poly styrene.

Plastics: Types (thermosetting and thermoplastic)-compounding of plastics-moulding Process (Any Four) - recycling of e-waste.

Rubbers and elastomers: Introduction-natural rubber-vulcanization of rubber-synthetic rubbers-Buna-N, Buna-S.

Composite materials: Fiber reinforced plastics-biodegradable polymers-biomedical polymers-conducting polymers

Learning Outcomes: At the end of this unit, the students will be able to

- **Outline** the properties of polymers and various additives added and different methods of

forming plastic materials.

- **Explain** the preparation, properties and applications of some plastic materials.
- **Discuss** natural and synthetic rubbers and their applications.

UNIT III: ELECTRO CHEMICAL CELLS AND CORROSION

Electrochemical Cells

Introduction-single electrode potential-electrochemical cell-electrochemical series and applications. Reference electrodes-standard hydrogen electrode and calomel electrode-construction of glass electrode.

Batteries: Construction, working and cell reaction of primary (dry cell) and Secondary (Pb acid, Ni-Cd, Zinc-Air and Li-ion) battery. Fuel cells (H_2-O_2, Methanol-Air cells).

Corrosion

Defination-theories of corrosion (Chemical and Electrochemical corrosion)-types of corrosion (Galvanic, Differential aeration (waterline and pitting corrosion), stress Corrosion). Factors influencing rate of corrosion-nature of metal-nature of corrosive atmosphere.

Corrosion Prevention methods: Cathodic protection-Sacrificial anodic method-Impressed voltage method. Metallic coatings: Galvanization-Tinning-Electro plating-Electro less plating.

Learning Outcomes: At the end of this unit, the students will be able to

- **Explain** the theory of construction of battery and fuel cells.
- **Categorize** the reasons for corrosion and study some methods of corrosion control.

UNIT IV: CONVENTIONAL AND NONCONVENTIONAL ENERGY RESOURCES

Conventional energy sources

Introduction to fuels-classification and characteristics of fuels-solid, Liquid and gaseous fuels-advantages and disadvantages-calorific value-higher and lower calorific values-construction and working of bomb calorimeter-analysis of coal-proximate and ultimate analysis-numerical problems related to bomb calorimeter, Dulong's formula and coal analysis-petroleum refining-cracking-petrol and diesel knocking-octane number and cetane number-gaseous fuels-Natural gas-CNG-LPG

Non-conventional energy sources

Solar energy: Advantages-disadvantages of solar cells-construction and working of photo voltaic cell-Introduction to hydro power-geo thermal power-tidal and wave power.

Learning Outcomes: At the end of this unit, the students will be able to

- **Differentiate** conventional and non conventional energy sources and their advantages and disadvantages.
- **Explains** energy production by different natural sources

UNIT V: CHEMISTRY OF MATERIALS

Nano materials: Introduction-sol-gel method-characterization by BET, SEM and TEM methods-carbon nanotubes and fullerenes: Types, preparation and applications

Semiconductors:Preparation (Distillation, Zone refining, Czochralski crystal pulling epitaxy, diffusion, ion implantation)-semiconductor devices (P-N junction diode as rectifier, junction transistor)

Cement: Constituents of cement-setting and Hardening of cement, Decay of Cement.

Refractories: Definition of refractory-classification and properties of refractoriness-applications of refractories.

Learning Outcomes: At the end of this unit, the students will be able to

- **Outline** the awareness of materials like nanomaterials and fullerenes and their uses.
- **Explain** the techniques that detect and measure the surface properties of materials.
- **Illustrate** the commonly used industrial materials.

Text Books:

T1. N. Y. S. Murthy, V. Anuradha & K. Ramana Rao, A Text Book of Engineering Chemistry - Maruthi Publications. (2018)

T2. K. Sesha Maheswaramma, Mridula Chugh, A Text Book of Engineering Chemistry - Pearson Publications (2018).

Reference Books:

R1. Jain & Jain, Engineering Chemistry – Dhanpat Rai Publishing Company (2017)

R2. Shashi Chawla, Text Book of Engineering Chemistry - Dhanpat Rai & Co. (P) Limited (2017)

R3. Prasanta Rath, Subhendu Chakroborthy, Chemistry –Cengage publications (2018)

B. TECH 1st SEMESTER	L	T	P	C
	3	-	-	3
19EE2T01: BASIC ELECTRICAL ENGINEERING				

COURSE OUTCOMES: ***After successful completion of this course, students should be able to:***

CO1 : Solve simple DC circuit using KVL, KCL and Network Theorems.

CO2 : Understand the fundamental concepts of single-phase and three phase systems analysis for simple AC circuit.

CO3 : Demonstrate the construction, working principles and operating characteristics of DC machines, transformer and AC rotating machines.

CO4 : Understand the basic Concepts of Electrical installations.

SYLLABUS

UNIT-I : DC CIRCUIT ANALYSIS

Electrical Circuit Elements (R, L and C), Voltage and Current Sources, Ohms Laws, Kirchoff's Laws and Star/Delta Conversion, Network Reduction Techniques-Series-Parallel- Series and Parallel (Only Resistor), Superposition, Thevenin's and Norton's Theorems, Problems in Simple Circuits with DC Excitation.

UNIT-II : AC CIRCUIT ANALYSIS

Representation of Sinusoidal Waveforms, Peak and RMS Values, Phasor Representation, Real Power, Reactive Power, Apparent Power, Power Factor, Analysis of Single Phase AC Circuits Consisting of R, L, C, RL, RC and RLC Combinations (Series and Parallel), Resonance, Three Phase Circuits- Voltage and Current Relations in Star/Delta Connections-Simple Problems.

UNIT-III : DC MACHINES & TRANFORMERS

DC MACHINES: Introduction-Construction Details - Principle of Operation - EMF Equation – Classification Based on Excitation - Torque Equation- Characteristics: OCC of DC Shunt Generator-Load Characteristics of DC Shunt Motor, 3-Point Starter – Speed Control by Armature Voltage, Field Control of DC Motors -Simple Problems.

TRANFORMERS: Introduction-Constructional Details - Principle of Operation - EMF Equation – OC and SC Test – Equivalent Circuit, Voltage Regulation, Losses and Efficiency.

UNIT- IV : AC MACHINES

3-Ø INDUCTION MOTOR: Introduction-Construction Details - Principle of Operation-

Generation of Rotating Magnetic Fields, Torque-Slip Characteristic. Losses and Efficiency.

ALTERNATOR: Introduction-Construction Details - Principle of Operation – Definition for Pitch Factor and Distribution Factor-E.M. F Equation - Determination of Voltage Regulation by E.M.F Method.

UNIT-V : ELECTRICAL INSTALLATIONS

Components of LT Switchgear: Switch Fuse Unit (SFU), MCB, ELCB, MCCB, Types of Wires and Cables, Earthing. Types of Batteries, Important Characteristics of Batteries. Elementary Calculations for Energy Consumption, Battery Backup.

TEXT BOOKS:

1. D.P. Kothari and I.J. Nagrath, Basic Electrical Engineering, 3rd edition 2010, Tata McGraw Hill.
2. P. V. Prasad, S. Sivanagaraju, K. R. Varmah, and Chikku Abraham, Basic Electrical Engineering, Cengage, 2019.

REFERENCE BOOKS:

1. D.C. Kulshreshtha-, Basic Electrical Engineering 2009, Tata McGraw Hill.
2. L.S. Bobrow, Fundamentals of Electrical Engineering, Oxford University Press, 2011
3. E. Hughes, Electrical and Electronics Technology,10th Edition, Pearson, 2010.
4. Vincent Deltoro, Electrical Engineering Fundamentals, Second Edition, Prentice Hall India, 1989.
5. V K Mehta & Rohit Mehta, S "Principles of Electrical Engineering and Electronics", Chand Publishers,2019 edition.

B. TECH 1st SEMESTER	L	T	P	C
	3	-	-	3
19HS1T01: ENGLISH				

COURSE OBJECTIVES

1. To improve the language proficiency of technical under graduates in English with emphasis on LSRW Skills.
2. To provide learning environment to practice Listening, Speaking, Reading and Writing Skills within and beyond the classroom environment.
3. To assist students to carry on the tasks and activities through guided instructions and materials.
4. To effectively integrate English language learning with employability skills and training.
5. To design the main course material and exercises with authentic materials drawn from everyday use to cater to everyday needs.
6. To provide hands-on experience through case –studies, mini –projects, group and individual presentations.

COURSE OUTCOMES

A) Reading Skills

- Addressing explicit and implicit meaning of a text.
- Understanding the context.
- Learning new words and phrases.
- Using words and phrases in different contexts.

B) Writing Skills

- Using the basic structure of a sentence.
- Applying relevant writing formats to create paragraphs, essays, letters, e-mails, reports and presentations.
- Retaining a logical flow while writing.
- Planning and executing an assignment creatively.

C) Interactive skills

- Analyzing a topic of discussion and relating to it.
- Participating in discussions and influencing them.
- Communicating ideas effectively.
- Presenting ideas coherently within a stipulated time.

D) Grammar in context

- Enable the skills of grammar using in a situation
- Identifying the needs of apt grammar in life related situation
- Promoting discourse with grammar effectively

Syllabus :

S No	Content
UNIT –I	**Vocabulary Building** **1.1** Video Lesson 1.2.1 Word formation 1.2.2. Root words 1.2.3. Prefixes and Suffixes 1.2.4. Synonyms and Antonyms

	1.3 Parts of Speech **1.4 Note- making, Note-taking**
UNIT -II	**Basic Writing Skills** **2.1** Video Lesson 2.2.1 Basic sentence structure 2.2.2. Clauses and Phrases 2.2.3 Punctuations 2.2.4 Creating coherence 2.2.5 Organizing principles of paragraph documents 2.2.6 Techniques for writing precisely **2.3 Tenses** **2.4 Letter Writing**
UNIT-III	**Identifying Common Errors in Writing** **3.1** Video Lesson 3.2.1 Sub + verb agreement 3.2.2 Noun pronoun agreement 3.2.3 Articles 3.2.4 Preposition 3.2.5 Redundancies 3.2.6 Clichés **3.3.1 Active - Passive Voice** **3.3.2 Reported Speech** **3.4 Resume Writing**
UNIT-IV	**Nature and Style of sensible Writing** **4.1** Video Lesson 4.2.1 Describing 4.2.2 Classifying 4.2.3 Writing Introduction and conclusion **4.3.1 Conditional Sentences** **4.3.2 Degrees of Comparison** **4.4 Email writing**
UNIT-V	**Writing Practice** **5.1** Video Lesson 5.2.1 Comprehension 5.2.2 Precise writing 5.2.3 Essay Writing **5.3 Simple Compound and Complex Sentences** **5.4 Report Writing**

TEXT BOOK: Board of Editors, Building Effective Communication Skills
By Maruti Publications (2019)

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B. TECH 1st SEMESTER	L	T	P	C
	3	-	-	3
19CS1L02: IT WORKSHOP				

COURSE OUTCOMES:

At the end of the Course, Student will be able to:

1. Identify the components of a personal computer and Install Operating System.
2. Send email messages (with or without attachments)
3. Prepare their own Presentation / Documentation using Office Tools
4. Create Interactive Visual Programs Using Scratch.
5. Develop Static web site Applications

WEEK	TOPIC
1	**KNOWING OF COMPUTER** **Identification of peripherals of a PC, Laptop, and Smart Phones:** Prepare a report containing the block diagram along with the configuration of each component and its functionality, Input/ Output devices, I/O ports and interfaces, main memory, cache memory and secondary storage technologies, digital storage basics, networking components and speeds.
2	**OPERATING SYSTEMS** Functions of OS, Types, **OS simple setting** : Changing system date and time, display properties, to add or remove a window component and changing mouse properties **File and Directory Management** : Creating and renaming of files and directories, **MS-DOS Commands**
3	**INTERNET SERVICES** Web Browser usage and **Advanced settings** like LAN, Proxy, Content, Privacy, Security, Cookies, Extensions/ Plug-in, **Antivirus installation,** Configuring a firewall, blocking pop-ups ,**Email** creation and usage.
4	Practice on **Microsoft-Word**
5	Practice on **Microsoft-PowerPoint**
6	Practice on **Microsoft-Excel**
7	Creating pdf documents.
8	**CLOUD BASED COLLABORATION TOOLS** Store, sync, and share files with ease in the cloud using Google Drive Manage event registrations, create quizzes, and analyze responses using Google Forms
9&10	**STATIC WEB PAGE DESIGNING** Basic HTML Tags,Table Tags,List Tags,Image Tags, Forms

B. TECH 1st SEMESTER	L	T	P	C
	-	-	3	1.5
19BS1L02: ENGINEERING CHEMISTRY LAB				

Outcomes: The experiments introduce volumetric analysis: Acid-Base, complexometric, Redox, Conductometric and potentiometric titrations. Then they are exposed to a few instrumental methods of chemical analysis.

Thus at the end of the lab course, the student is exposed and able to

1. Identify the concentration of given solution by different methods of chemical analysis (**K3**)
2. Analyze the water purity by checking hardness, DO and Acidity. (**K4**)
3. Estimate the Cu^{+2}, Fe^{+3}, Ca^{+2}, Mg^{+2} ions and Ascorbic acid present in given solution. (**K4**)
4. Identify the pour and cloud point of lubricants. **(K3)**
5. Understand the principles of conductometric and potentiometric titrations. (**K_2**)

Syllabus:

1. Estimation of HCl using standard Na_2CO_3 through acid-base titration.
2. Estimate the total hardness of water using standardized EDTA solution through complexometric titration.
3. Estimation of $KMnO_4$ using standard $H_2C_2O_4$ through redox titration method.
4. Estimation of Dissolved Oxygen in given water sample by Wrinkler's Method
5. Determination of ferric (Fe^{+3}) ions using standard KCr_2O_7 solution
6. Determination of copper (II) using standard hypo solution.
7. Estimation of strong acid by using strong base through conductometric titration method.
8. Estimation of strong acid by using strong base through potentiometric titration method.
9. Preparation of polymer (Demo).
10. Determination of Vitamin 'C'.
11. Determination of Pour and Cloud Point of lubricating oils

Reference Books

1. Arthur J. Vogel, A Textbook of Quantitative Analysis.

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B. TECH 1st SEMESTER	L	T	P	C
	-	-	3	1.5
19EE2L01: BASIC ELECTRICAL ENGINEERING LAB				

COURSE OUTCOMES: ***After successful completion of this course, students should be able to:***

CO1 : Handle Various Electric Instruments and Solve DC Circuits Using Network Theorems

CO2 : Determine Resonance Frequency and Perform Voltage, Current and Power Measurement On Three Phase Circuit

CO3 : Determine and Predetermine the Performance of DC Machines

CO4 : Determine and Predetermine the Performance of Transformers and AC Machines

LIST OF EXPERIMENTS

1. Practice on Measuring Instruments – Voltmeter, Ammeter, Millimeter, Oscilloscope.
2. Verification of KCL and KVL.
3. Verification of Thevenin's Theorem.
4. Verification Norton's Theorem.
5. Verification Superposition Theorem.
6. Resonance in R-L-C Circuits.
7. Measurement of Voltage and Current using Three Phase Star/Delta Connections.
8. Measurement of Three-Phase Power in Balanced Circuits.
9. Open Circuit Characteristics of DC Shunt Generator.
10. Load Characteristics of DC Shunt Generator.
11. Speed-Torque Characteristic of DC Motor.
12. Open Circuit and Short Circuit Test on a Single Phase Transformers.
13. Regulation of Alternator Using EMF Method.

Note: Any Ten Experiments will conduct from the above experiments

REFERENCE:

1. Department lab manual.

B. TECH 1st SEMESTER	L	T	P	C
	-	-	3	1.5
19HS1L01: ENGLISH PROFICIENCY LAB				

COURSE OBJECTIVES

- To improve the language proficiency of technical under graduates in English with emphasis on LSRW Skills.
- To provide learning environment to practice Listening, Speaking, Reading and Writing Skills within and beyond the classroom environment.
- To assist students to carry on the tasks and activities through guided instructions and materials.
- To effectively integrate English language learning with employability skills and training.
- To design the main course material and exercises with authentic materials drawn from everyday use to cater to everyday needs.
- To provide hands-on experience through case-studies, mini-projects, group and individual presentations.

COURSE OUTCOMES

a) Reading Skills.

- Addressing explicit and implicit meaning of a text.
- Understanding the context.
- Learning new words and phrases.
- Using words and phrases in different contexts.

b) Writing Skills:

- Using the basic structure of a sentence.
- Applying relevant writing formats to create paragraphs, essays, letters, E-Mails, reports and presentations.
- Retaining a logical flow while writing.
- Planning and executing an assignment creatively.

c) Interactive skills:

- Analyzing a topic of discussion and relating to it.
- Participating in discussions and influencing them.
- Communicating ideas effectively.
- Presenting ideas coherently within a stipulated time.

d) Life Skills and Core Skills:

- Examining self-attributes and identifying areas that require improvement self-diagnosis, self-motivation.
- Adopting to a given situation and developing a functional approach to find solutions-adaptability, problem-solving.
- Understanding the importance of helping others-community service, enthusiasm.

COURSE DESCRIPTION

Communicating in a language is also a skill. So a student has to look for an opportunity to practice English language in order to acquire proficiency in English. 'Enrich your interactive Skills: Part - A' is designed to provide opportunities for engineering students to revise and consolidate the basic skills in listening,

speaking, reading and writing in addition to giving ample practice in various communicative functions and Life skills.

PRE REQUISITES

The student is expected to have basic knowledge in English language and must be able to write in English. He is also expected to possess fundamental knowledge of general English grammar and vocabulary.

Syllabus

Unit	TOPIC
1	Vowels, Consonants, Pronunciation, Phonetic transcripts
2	Word stress and syllables
3	Rhythm and Intonation
4	Contrastive Stress –Homographs
5	Word Stress : Weak and Strong forms , Stress in compound words

Text Book:

Board of Editors, "Infotech" by Maruthi Publications (2019)

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B Tech II SEMESTER

DIFFERENTIAL EQUATIONS & VECTOR CALCULUS

(Common to CE, EEE, ME)

SYLLABUS (R19)

Course Objectives:

1. To enlighten the learners in the concept of differential equations and vector calculus.
2. To furnish the learners with basic concepts and techniques at plus two level to lead them into advanced level by handling various real world applications.

Unit I: Ordinary Differential equations of first order and first degree:

Linear differential equations – Bernoulli's equations – Exact equations and equations reducible to exact form.
Applications: Newton's Law of cooling – Law of natural growth and decay – Orthogonal trajectories

Learning Outcomes:
At the end of this unit, the student will be able to

- solve first order differential equations by appropriate method (K3)
- apply to geometrical and real world problems (K3)

Unit II: Linear differential equations of higher order:

Solutions of Non-homogeneous equations of higher order with constant coefficients – with non-homogeneous term of the type e^{ax}, sin ax, cos ax, polynomials in x^n, e^{ax} V(x) and x^nV(x) – Method of Variation of parameters.
Applications: LCR circuit

Learning Outcomes:
At the end of this unit, the student will be able to

- identify the essential characteristics of linear differential equations with constant coefficients (K3)
- solve the linear differential equations with constant coefficients by appropriate method (K3)

Unit –III: Partial Differential Equations of First Order:

Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions – Solutions of first order linear (Lagrange) equation and nonlinear (standard types) equations.

Learning Outcomes:
At the end of this unit, the student will be able to

- apply a range of techniques to find solutions of standard PDEs (K3)
- outline the basic properties of standard PDEs (K2)

Unit IV: Vector differentiation

Scalar and vector point functions, vector operator del, del applied to scalar point functions-Gradient, del applied to vector point functions-Divergence and Curl, physical interpretation of Gradient Div F and Curl F, Del applied twice to point functions Del applied to products of point functions.

Learning Outcomes:
At the end of this unit, the student will be able to

- apply del to Scalar and vector point functions (K3)

- illustrate the physical interpretation of Gradient, Divergence and Curl (K3)

Unit V: Vector integration

Integration of Vectors Line integral-circulation-work done, surface integral-flux, Green's theorem in the plane (without proof), Stoke's theorem (without proof), volume integral, Divergence theorem (without proof).

Learning Outcomes:

At the end of this unit, the student will be able to

- find the work done in moving a particle along the path over a force field (k3)
- evaluate the rate of fluid flow along and across curves (K3)
- apply Green's, Stokes and Divergence theorem in evaluation of double and triple integrals (K3)

Textbooks:

1. B. S. Grewal, Higher Engineering Mathematics, 42/e, Khanna publishers, 2012.

References:

1. Erwin Kreyszig, Advanced Engineering Mathematics, 9/e, John Wiley & Sons, 2013.
2. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, 2008.

Course Outcomes:

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

1. solve the differential equations related to various engineering fields (K3)
2. identify solution methods for partial differential equations that model physical processes (K3)
3. interpret the physical meaning of scalar and vector point functoins different operators such as del,gradient, curl and divergence (K3)
4. estimate the work done against a field, circulation and flux using vector calculus and familiarize vector integral theorems. (K3)

B. TECH 1st SEMESTER	L	T	P	C
	3	-	-	3
19BS1T01: ENGINEERING PHYSICS				

COURSE OUTCOMES

After completion of course student able to:

1. Describe Basic crystal systems and determination of crystal structures
2. Explain Magnetic and Dielectric Materials properties
3. Describe Concept of Magnetic Induction and Super Conducting properties
4. Explain Pure & Doped Semiconductor materials for better utility
5. Describe Optical fibers and Optical properties of materials and their applications

UNIT –I: CRYSTAL STRUCTURE AND X-RAY DIFFRACTION

CRYSTAL STRUCTURE:
Introduction – Space lattice – Basis – Unit Cell – Lattice parameters – Bravais lattices – Crystal systems – Structures and packing fractions of SC, BCC and FCC.

X-RAY DIFFRACTION:
Directions in crystals- planes in crystals- Miller indices and procedure to find Miller indices- Various planes in crystals- Separation between successive (h k l) planes-Bragg's law-Bragg's Spectrometer.

Learning Outcomes: At the end of this unit, the students will be able to

- **Explain** the seven crystal systems
- **Interpret** the crystal structure based on Bragg's law

UNIT – II: MAGNETIC AND DIELECTRIC PROPERTIES

MAGNETIC PROPERTIES: Introduction-Magnetic permeability – Magnetization – Relation between three magnetic vectors - Origin of magnetic moment – Classification of Magnetic materials- Dia, Para, Ferro, Anti-Ferro and Ferri-magnetism – Hysteresis- soft and Hard Magnetic materials.

DIELECTRIC PROPERTIES: Introduction-Dielectric constant- Relation between three electric vectors-Electronic and ionic polarizations (Quantitative) - orientation polarizations (Qualitative) - Internal fields in solids- Clausius - Mossotti equation.

Learning Outcomes: At the end of this unit, the students will be able to

- **Classify** the magnetic materials into dia, para, ferro, anti ferro and ferri
- **Explain** the importance of hysteresis
- **Explain** the concept of polarization in dielectric materials.
- **Summarize** various types of polarization of dielectrics .
- **Interpret** Lorentz field and Claussius- Mosotti relation in dielectrics.

UNIT-III: ELECTROMAGNETIC WAVES AND SUPERCONDUCTIVITY

ELECTROMAGNETIC WAVES: Introduction-Electric flux –magnetic flux- Gauss law in electrostatics- Gauss law in magnetostatics- Ampere's law - Biot-Savart's law-Magnetic Induction due to current carrying circular loop- Faraday's law - Maxwell's equations.

SUPERCONDUCTIVITY: General and Thermal properties –Meissner effect – Type-I and Type-II superconductors – Flux quantization – BCS Theory of Superconductivity - Josephson effects – Applications of Superconductors.

Learning Outcomes: At the end of this unit, the students will be able to

- **Illustrate** the concept of electro magnetism based on fundamental laws of electro magnetism
- **Explain** Maxwell's equations
- **Summarize** various properties and applications of superconductors

UNIT-IV: PHYSICS OF SEMICONDUCTORS:

Classification of solids based on band theory - Intrinsic semiconductors- density of charge carriers- Equation for conductivity – Extrinsic semiconductors- P-type and N-type- density of charge carriers- Drift and diffusion – Einstein's equation – Hall Effect- Hall coefficient – Applications of Hall effect– direct & indirect band gap semiconductors.

Learning Outcomes: At the end of this unit, the students will be able to

- **Summarize** various types of solids based on band theory.
- **Outline** the properties of n-type and p-type semiconductors.
- **Identify** the type of semiconductor using Hall effect

UNIT-V: LASERS AND OPTICAL FIBERS

LASERS: Introduction– Characteristics of lasers – Spontaneous and Stimulated emission of radiation – Einstein's coefficients – Population inversion - Three level and four level laser pumping schemes - Ruby laser – Helium-Neon laser- Applications of Laser.

FIBER OPTICS: Introduction to Optical fibers- Critical angle of propagation- Total internal reflection-Acceptance angle and acceptance cone- Numerical aperture- Classification of optical fibers based on refractive index profile-Classification of optical fibers based on modes- Applications of optical fibers.

Learning Outcomes: At the end of this unit, the students will be able to

- **Design** various types of lasers
- **Explain** the principle and propagation of light through Optical fibers
- **Discuss** the application of lasers and Optical fibers

TEXT BOOK:

M. N. Avadhanulu, P.G. Kshirasagar & TVS Arun Murthy, A text book of "Engineering Physics", S Chand publications, 11th Addition 2019.

REFERENCE BOOKS:

1. Shatendra Sharma and Jyotsna Sharma, Engineering Physics, Pearson Education, 2018.
2. Palanisamy, Engineering Physics, Scitech Publishers-2018.

B. TECH 1st SEMESTER	L	T	P	C
	3	-	-	3
19CS1T01: PROBLEM SOLVING AND PROGRAMMING USING C				

Course Objectives:

- To impart adequate knowledge on the need of programming languages and problem solving techniques and develop programming skills.
- To enable effective usage of Control Structures and Implement different operations on arrays.
- To demonstrate the use of Strings and Functions.
- To impart the knowledge of pointers and understand the principles of dynamic memory allocation.
- To understand structures and unions and illustrate the file concepts and its operations.
- To impart the Knowledge Searching and Sorting Techniques.

UNIT-I

Introduction to Computer Problem Solving: Programs and Algorithms, Computer Problem Solving Requirements, Phases of Problem Solving, Problem Solving Strategies, Top-Down Approach, Algorithm Designing, Program Verification, Improving Efficiency, Algorithm Analysis and Notations.

UNIT-II

Introduction to C Programming: Introduction, Structure of a C Program, Comments, Keywords, Identifiers, Data Types, Variables, Constants, Input/output Statements, Operators, Type Conversion.

Control Flow, Relational Expressions: Conditional Branching Statements: if, if-else, if-else–if, switch. Basic Loop Structures: while, do-while loops, for loop, nested loops, The Break and Continue Statements, goto statement.

UNIT-III

Arrays: Introduction, Operations on Arrays, Arrays as Function Arguments, Two dimensional Arrays, Multi-dimensional arrays.

Pointers: Concept of a Pointer, Declaring and Initializing Pointer Variables, Pointer Expressions and Address Arithmetic, Null Pointers, Generic Pointers, Pointers as Function Arguments, Pointers and Arrays, Pointer to Pointer, Dynamic Memory Allocation, Dangling Pointer, Command Line Arguments.

UNIT-IV

Functions: Introduction, Function Declaration, Function Definition, Function Call, Categories of Functions, Passing Parameters to Functions, Scope of Variables, Variable Storage Classes, Recursion.

Strings: String Fundamentals, String Processing with and without Library Functions, Pointers and Strings.

UNIT-V

Structures, Unions, Bit Fields: Introduction, Nested Structures, Arrays of Structures, Structures and Functions, Self-Referential Structures, Unions, Enumerated Data Type –enum variables, Using Typedef keyword, Bit Fields.

Files: Introduction to Files, Using Files in C, Reading from Text Files, Writing to Text Files, Random File Access.

Course Outcomes:

At the end of the Course, Student will be able to:

- Illustrate the Fundamental concepts of Computers and basics of computer programming.
- Use Control Structures and Arrays in solving complex problems.
- Develop modular program aspects and Strings fundamentals.
- Demonstrate the ideas of pointers usage.
- Solve real world problems using the concept of Structures, Unions and File operations.

Text Books:

1. R. G. Dromey, How to solve it by Computer, Pearson Education.
2. Reema Thareja, Computer Programming, Oxford University Press.

Reference Books:

1. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill.
2. Ajay Mittal, Programming In C A-Practial Approach, Pearson.
3. Forouzan, Gilberg, C Programming – A Problem Solving Approach, Cengage.
4. Dennis Richie And Brian Kernighan, The C Programming Language, Pearson Education.
5. Ashok Kamthane, Programming In C, Second Edition, Pearson Publication.
6. Yaswanth Kanetkar, Let us C, 16th Edition, BPB Publication.

Web Links:

1. http://www.c4learn.com/
2. http://www.geeksforgeeks.org/c/
3. http://nptel.ac.in/courses/122104019/
4. http://www.learn-c.org/
5. https://www.tutorialspoint.com/cprogramming/

B. TECH 1st SEMESTER	L	T	P	C
	3	-	-	3
19ME1T02: ENGINEERING GRAPHICS				

COURSE OBJECTIVE

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

COURSE OUTCOMES: Students will be able to

CO1: Construct polygons, conics, cycloids, involutes. (K3)
CO2: Draw the orthographic projections of points, lines in different positions. (K2)
CO3: Draw the orthographic projections of plane surfaces in different positions.(K2)
CO4: Draw the orthographic projections of solids like prisms, cylinder, pyramids and cone. (K2)
CO5: Convert Isometric views to orthographic views and vice-versa and also visualize 2D & 3D objects using Auto CAD. (K3)

UNIT I

POLYGONS: Constructing regular polygons by general methods, inscribing and describing polygons on circles. Curves: Parabola, Ellipse and Hyperbola by Eccentricity method, Cycloid, Epi-cycloid and Hypo-cycloid and Involutes.

UNIT II

ORTHOGRAPHIC PROJECTIONS: Reference plane, importance of reference lines, projections of points in various quadrants, projections of lines, line parallel to both the planes, line parallel to one plane and inclined to other plane. Projections of straight lines inclined to both the planes, determination of true lengths, and angle of inclination.

UNIT III

PROJECTIONS OF PLANES: regular planes perpendicular and parallel to one reference plane and inclined to the other reference plane; inclined to both the reference planes.

UNIT IV

PROJECTIONS OF SOLIDS: Prisms, Pyramids, Cone and Cylinder, Simple positions of solids and Axis of the Solid parallel to one plane and inclined to other plane.

UNIT V

ISOMETRIC VIEWS:

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

CAD:

FUNDAMENTALS OF AUTOCAD - FOR POLYGONS, CREATING 2D AND 3D DRAWINGS

USING AUTOCAD:

Computer Aided Design, Drawing practice using Auto CAD simple figures like polygons, creating 2D&3D drawings of objects using Auto CAD

Note: In the End Examination there will be no question from CAD.

TEXT BOOKS:

1. N.D. Butt, Engineering Drawing, Chariot Publications 2016
2.K Venugopal & V. Prabhu Raja, Engineering Drawing + AutoCAD, New Age 2010

REFERENCE BOOKS:

1. K.L.Narayana & P. Kannaiah, Engineering Drawing Scitech Publishers 2016.
2. K.C. John, Engineering Graphics for Degree PHI, Publishers 2009.
3. PI Varghese, Engineering Graphics, McGrawHill Publishers 2013.

B. TECH 2nd SEMESTER	L	T	P	C
	3	-	-	3
19CE2T01: APPLIED MECHANICS				

COURSE OUTCOMES

Students will be able to

1. Determine the resultant of the given force systems.
2. Analyze force systems using equations of equilibrium.
3. Determine centroid, center of gravity and moment of inertia of areas and bodies.
4. Describe the principles of various types of friction
5. Distinguish between kinematics and kinetics.

SYLLABUS

UNIT-I

Introduction to Engineering Mechanics- Basic Concepts.

Systems of Forces: Coplanar Concurrent Forces – Components in Space – Resultant – Moment of Force and its Application – Couples and Resultant of Force Systems.

Friction: Introduction, limiting friction and impending motion, coulomb's laws of dry friction, coefficient of friction, cone of friction.

UNIT-II

Equilibrium of Systems of Forces: Free Body Diagrams, Equations of Equilibrium of Coplanar Systems, Spatial Systems for concurrent forces. Lamis Theorem, Graphical method for the equilibrium of coplanar forces, Converse of the law of Triangle of forces, converse of the law of polygon of forces condition of equilibrium, analysis of plane trusses.

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), center of gravity of composite bodies, Pappus theorems.

UNIT-IV

Area moments of Inertia: Definition – Polar Moment of Inertia, Transfer Theorem, Moments of Inertia of Composite Figures, Products of Inertia, Transfer Formula for Product of Inertia.

Mass Moment of Inertia: Moment of Inertia of Masses, Transfer Formula for Mass Moments of Inertia, mass moment of inertia of composite bodies.

UNIT-V

Kinematics: Rectilinear and Curvilinear motions – Velocity and Acceleration – Motion of Rigid Body – Types and their Analysis in Planar Motion.

Kinetics: Analysis as a Particle and Analysis as a Rigid Body in Translation – Central Force Motion – Equations of Plane Motion– Fixed Axis Rotation – Rolling Bodies.

Text/Reference Book

1. S. Timoshenko & D.H. Young ,ENGINEERING MECHANICS -, McGraw Hill
2. A.K.TAYAL ENGINEERING MECHANICS – UMESH Publications

3. BASUDEB BHATTACHARYA ENGINEERING MECHANICS -– Oxford University Press.
4. A. NELSON, ENGINEERING MECHANICS -, McGraw Hill Publications
5. Ferdinand L. Singer, ENGINEERING MECHANICS - Ferdinand L. Singer, Harper Collins Publishers
6. S. S. Bhavikatti,, ENGINEERING MECHANICS - New Age Publishers

B. TECH 2nd SEMESTER	L	T	P	C
	0	0	3	1.5
19ME2L01 - ENGINEERING WORKSHOP				

COURSE OBJECTIVE: To impart hands–on practice on basic Engineering trades and skills.

COURSE OUTCOMES: Students will be able to

CO1: Model and Develop various basic prototypes in Carpentry trade [K3]
CO2: Model and Develop various basic prototypes in Fitting trade [K3]
CO3: Perform Various Forging Operations [K3]
CO4: Perform various House Wiring Techniques. [K3]
CO5: Develop various basic prototypes in the trade of Sheet metal. [K3]

NOTE: At least **Two** Exercises to be done from each trade.

TRADE:

I. CARPENTRY:

1. CROSS LAP JOINT 2. DOVETAIL JOINT 3. MORTISE and TENNON JOINT

II. FITTING:

1. SQUARE FIT 2. V-FIT 3. HALF ROUND FIT

III. FORGING:

1. ROUND ROD TO SQUARE
2. S-HOOK
3. ROUND ROD TO SQUARE HEADED BOLT

IV. HOUSE WIRING:

1. PARALLEL/SERIES CONNECTION OF THREE BULBS
2. STAIRCASE WIRING
3. FLOURESCENT LAMP FITTING

V. SHEET METAL:

1. SQUARE TRAY 2. HOLLOW CYLINDER 3. OPEN SCOOP

MANUAL:

1. Engineering Workshop Practice Lab Manual Prepared by Mechanical Faculty.

B. TECH 1st SEMESTER	L	T	P	C
	-	-	3	1.5
19BS1L01: ENGINEERING PHYSICS LAB				

COURSE OUTCOMES

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

CO1: Demonstrate the basic knowledge to know the frequency of a vibrator, hall coefficient, (K3)

CO2: Attain knowledge to verify some of the properties of physical optics. (K4)

CO3: Develop skills to plot various characteristic curves and to calculate the physical properties of given materials. (K4)

CO4: Calculate some the properties of semiconducting materials. (K2)

STUDENT HAS TO DO ANY TEN OF THE FOLLOWING

1. Determination of wavelength of Laser using diffraction grating.
2. Determination of Numerical Aperture and Acceptance angle of an Optical Fiber.
3. Determination of the charge carrier density by using Hall Effect.
4. Determination of the Band Gap of a Semiconductor using a p-n junction diode.
5. Study of Characteristic curves (l/V) of a Zener diode to determine its Breakdown voltage.
6. Determination of Temperature coefficient of resistance of a Thermistor by using its Characteristic curve.
7. Study the variation of intensity of magnetic field along the axis of a circular current carrying coil by using Stewart and Gee's experiment.
8. Study of Characteristic curves (l/V) of a P-N diode.
9. Determine Frequency of given electrically driven tuning fork in Transverse and Longitudinal modes by using Melde's apparatus
10. Determine frequency of A.C. supply by using Sonometer.
11. Determination of the Time Constant for a C-R Circuit
12. Determination of the Planck's constant by using Photo-Cell
13. Determination of dielectric constant of a given material

B. TECH 2st SEMESTER	L	T	P	C
	-	-	3	1.5
19CS2L01: C PROGRAMMING LAB				

Course Objectives:

- To impart knowledge on various Editors, Raptor.
- To make the students understand the concepts of C programming.
- To nurture the students on Control Structures and develop different operations on arrays.
- To make use of String fundamentals and modular programming constructs.
- To implement programs using dynamic memory allocation.
- To explain the concepts of Structure, Unions and files for solving various problems.

List of Experiments:

1. Introduction to Algorithms and Flowcharts

1.1) Implement Algorithm Development for Exchange the values of Two numbers.

1.2) Given a set of n student's examination marks (in the range 0-100) make a count of the number of students that passed the examination. A Pass is awarded for all of 50 and above.

1.3) Given a set of n numbers design an algorithm that adds these numbers and returns the resultant sum. Assume N is greater than or equal to zero.

2. Introduction to C Programming

2.1) Exposure to Turbo C, Code Blocks IDE, Dev C++, Falcon C++.

2.2) Writing simple programs using printf(), scanf() .

3. Raptor

3.1) Introduction to Raptor.

3.2) Draw a flow chart to find the Sum of 2 numbers.

3.3) Draw a flow chart to find Simple interest.

4. Basic Math

4.1) Write a C Program to convert Celsius to Fahrenheit and vice versa.

4.2) Write a C Program to find largest of three numbers using ternary operator.

4.3) Write a C Program to Calculate area of a Triangle using Heron's formula.

5. Control Flow- I

5.1) Write a C Program to Find Whether the Given Year is a Leap Year or not.

5.2) Write a C program to find the roots of a Quadratic Equation.

5.3) Write a C Program to make a simple Calculator to Add, Subtract, Multiply or Divide Using Switch…case.

6. Control Flow- II

6.1) Write a C Program to Find Whether the Given Number is Prime number or not.

6.2) Write a C Program to Find Whether the Given Number is Armstrong Number or not.

6.3) Write a C program to print Floyd Triangle.

7. Control Flow- III

7.1) Write a C program to find the sum of individual digits of a positive integer.

7.2) Write a C program to check whether given number is palindrome or not.

7.3) Write a C program to read two numbers, x and n, and then compute the sum of the geometric progression $1+x+x^2+x^3+\ldots\ldots\ldots\ldots+x^n$.

Practice Programs:

Write a C program to print all natural numbers from 1 to n. - using while loop

Write a C program to print all natural numbers in reverse (from n to 1). - using while loop

Write a C program to print all alphabets from a to z. - using while loop

Write a C program to print all even numbers between 1 to 100. - using while loop

Write a C program to print sum of all even numbers between 1 to n.

Write a C program to print sum of all odd numbers between 1 to n.

Write a C program to print table of any number.

Write a C program to find first and last digit of any number.

Write a C program to count number of digits in any number.

Write a C program to calculate sum of digits of any number.

Write a C program to calculate product of digits of any number.

Write a C program to swap first and last digits of any number.

Write a C program to enter any number and print its reverse.

Write a C program to enter any number and check whether the number is palindrome or not.

Write a C program to find frequency of each digit in a given integer.

Write a C program to enter any number and print it in words.

Write a C program to print all ASCII character with their values.

Write a C program to enter any number and print all factors of the number.

Write a C program to enter any number and calculate its factorial.

Write a C program to find HCF (GCD) of two numbers.

Write a C program to find LCM of two numbers.

Write a C program to check whether a number is Prime number or not.

Write a C program to check whether a number is Armstrong number or not.

Write a C program to check whether a number is Perfect number or not.

Write a C program to check whether a number is Strong number or not.

Write a C program to print Fibonacci series up to n terms.

8. Arrays

8.1) Write a C program to search an element in the given array (Linear Search).

8.2) Write a C program to perform matrix addition.

8.3) Write a C program to perform matrix multiplication.

Practice Programs:

Write a C program to read and print elements of array.

Write a C program to find sum of all array elements. - using recursion.

Write a C program to find maximum and minimum element in an array. - using recursion.

Write a C program to find second largest element in an array.

Write a C program to copy all elements from an array to another array.

Write a C program to insert an element in an array.

Write a C program to delete an element from an array at specified position.

Write a C program to print all unique elements in the array.

Write a C program to print all negative elements in an array.

Write a C program to count total number of even and odd elements in an array.

Write a C program to count total number of negative elements in an array.

Write a C program to count total number of duplicate elements in an array.

Write a C program to delete all duplicate elements from an array.

Write a C program to count frequency of each element in an array.

Write a C program to merge two array to third array.

Write a C program to find reverse of an array.

Write a C program to convert lowercase string to uppercase.

Write a C program to convert uppercase string to lowercase.

Write a C program to toggle case of each character of a string.

Write a C program to find total number of alphabets, digits or special character in a string.

9. Pointers

9.1) Write a C Program to Perform Addition, Subtraction, Multiplication and Division of two numbers using Command line arguments.

9.2) Write a C program to find sum of n elements entered by user. To perform this program, allocate memory dynamically using malloc () function.

9.3) Write a C program to find sum of n elements entered by user. To perform this program, allocate memory dynamically using calloc () function.

10. Functions, Array & Pointers

10.1) Write a C Program to demonstrate parameter passing in Functions.

10.2) Write a C Program to find Fibonacci, Factorial of a number with Recursion and without recursion.

10.3) Write a C Program to find the sum of given numbers with arrays and pointers.

Practice Programs:

Program to change the value of constant integer using pointers.

Program to print a string using pointer.

Program to count vowels and consonants in a string using pointer.

Program to read array elements and print with addresses.

11. Strings

11.1) Implementation of string manipulation operations with library function:

a) copy
b) concatenate
c) length
d) compare

11.2) Implementation of string manipulation operations without library function:

a) copy
b) concatenate
c) length
d) compare

11.3) Verify whether the given string is a palindrome or not.

12. Structures

12.1) Write a C Program to Store Information of a book Using Structure.

12.2) Write a C Program to Add Two Complex Numbers by Passing Structure to a Function.

13. Files

13.1) Write a C program to open a file and to print the contents of the file on screen.

13.2) Write a C program to copy content of one file to another file.
13.3) Write a C program to merge two files and store content in another file.

14. Application

Creating structures to capture the student's details save them in file in proper record format, search and prints the student details requested by the user.

Note: Draw the flowcharts using Raptor from Experiment 3 to Experiment 6.

Course Outcomes:

- Implement basic programs in C and design flowcharts in Raptor.
- Use Conditional and Iterative statements to solve real time scenarios in C.
- Implement the concept of Arrays and Modularity and Strings.
- Apply the Dynamic Memory Allocation functions using pointers.
- Develop programs using structures, and Files.

Reference Books:

1. Yashwanth Kanetkar, Let Us C,16th edition, BPB Publications.
2. Ajay Mittal, Programming in C A-Practial Approach, Pearson Education.
3. Dennis Richie and Brian Kernighan, The C programming Language, Pearson Education.
4. K Venugopal, Problem solving using C, 3rd Edition, TMG Publication.

Web Links:

1. https://www.hackerrank.com/
2. https://www.codechef.com/
3. https://www.topcoder.com/
4. https://code-cracker.github.io/
5. https://raptor.martincarlisle.com/
6. https://nptel.ac.in/courses/106105085/2

B. TECH 2nd SEMESTER	L	T	P	C
	-	-	3	1.5
19HS2L01: ENGLISH COMMUNICATION SKILLS LAB				

COURSE OBJECTIVES

- To improve the language proficiency of technical under graduates in English with emphasis on LSRW Skills.
- To provide learning environment to practice Listening, Speaking, Reading and Writing Skills within and beyond the classroom environment.
- To assist students to carry on the tasks and activities through guided instructions and materials.
- To effectively integrate English language learning with employability skills and training.
- To design the main course material and exercises with authentic materials drawn from everyday use to cater to everyday needs.
- To provide hands-on experience through case-studies, mini-projects, group and individual presentations.

COURSE OUTCOMES:

a) Reading Skills.

- Addressing explicit and implicit meaning of a text.
- Understanding the context.
- Learning new words and phrases.
- Using words and phrases in different contexts.

b) Writing Skills:

- Using the basic structure of a sentence.
- Applying relevant writing formats to create paragraphs, essays, letters, E-Mails, reports and presentations.
- Retaining a logical flow while writing.
- Planning and executing an assignment creatively.

c) Interactive skills:

- Analyzing a topic of discussion and relating to it.
- Participating in discussions and influencing them.
- Communicating ideas effectively.
- Presenting ideas coherently within a stipulated time.

d) Life Skills and Core Skills:

- Examining self-attributes and identifying areas that require improvement self-diagnosis, self-motivation.
- Adopting to a given situation and developing a functional approach to find solutions-adaptability, problem-solving.
- Understanding the importance of helping others-community service, enthusiasm.

COURSE DESCRIPTION

Communicating in a language is also a skill. So a student has to look for an opportunity to practice the language he is learning in order to acquire communication skills. 'Enrich your interactive Skills: Part - B' is designed to provide opportunities for engineering students to revise and consolidate communication skills in different contexts formal and informal. It prepares the student for facing Interviews, participating in group discussions and making presentations.

PRE REQUISITES

The student is expected to have basic knowledge in English language and must be able to write in English. He is also expected to possess fundamental knowledge of general English grammar and vocabulary.

Syllabus

UNIT	TOPIC
1	Oral Activity : JAM, Hypothetical situations, self / peer profile, Common errors in pronunciation, Neutralizing Accent
2	Oral Activity : Telephonic Etiquette, Role plays, Poster presentations and e-mail Writing
3	Oral Activity : Oral Presentation Skills, Public Speaking Data Interpretation
4	Oral Activity : Group Discussion: Do's and Don'ts –Types, Modalities
5	Oral Activity : Interview Skills: Preparatory Techniques, FAQ, Mock Interviews Pronunciation : Connected speech (pausing, tempo, tone, fluency etc.,)

Text Book:

Board of Editors, "Infotech" by Maruthi Publications (2019)

B. TECH 3rd SEMESTER	L	T	P	C
	3	-	-	3
19CE3T01: STRENGTH OF MATERIALS-I				

COURSE OUTCOMES

Course Outcomes:

1. The student will be able to understand the basic materials behavior under the influence of different external loading conditions and the support conditions
2. The student will be able to draw the diagrams indicating the variation of the key performance features like bending moment and shear forces
3. The student will have knowledge of bending concepts and calculation of section modulus and for determination of stresses developed in the beams and deflections due to various loading conditions
4. The student will be able to assess stresses across section of the thin and thick cylinders to arrive at optimum sections to withstand the internal pressure using Lame's equation.

SYLLABUS:

UNIT- I

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

Strain Energy – Resilience – Gradual, sudden, impact and shock loadings – simple applications.

UNIT-II

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

UNIT-III

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

Shear Stresses: Derivation of formula – Shear stress distribution across various beam sections like rectangular, circular, triangular, I, T angle sections, built up beams, shear center.

UNIT -IV

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

UNIT-V

Thin And Thick Cylinders: Thin seamless cylindrical shells – Derivation of formula for longitudinal and circumferential stresses – hoop, longitudinal and Volumetric strains – changes in diameter, and volume of thin cylinders – Thin spherical shells.

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

Text /Reference Books:

1. Strength of Materials by Strength of materials, R. K. Rajput, S. Chand & Co, New Delhi
2. Strength of Materials by R. Subramanian, Oxford Publications
3. Mechanics of Materials by B.C Punmia, Jain and Jain.
4. Strength of Materials by R.K Bansal, Lakshmi Publications

B. TECH 3rd SEMESTER	L	T	P	C
	3	-	-	3
19CE3T02: SURVEYING				

COURSE OUTCOMES

Students are able to

1. describe the principles and classification of surveying, Calculate horizontal and angular measurements.
2. identify to use various surveying instruments for Measure distances and bearings.
3. use different methods of surveying to Measure levels and draw contours .
4. demonstrate the various components of Theodolite. Prepare theodolite traversing including closing error and trigonometric levelling .
5. compute various data required for various methods of surveying for setting out of curves.
6. calculate areas of irregular boundaries, volumes of borrow pits, embankments ,capacity of reservoirs .

SYLLABUS:

UNIT – I

INTRODUCTION: definition - Uses of surveying-overview of plane surveying (chain, compass and plane table), Objectives, Principles and classifications- Errors in survey measurements.

UNIT - II

DISTANCES AND DIRECTION: Distance measurement conventions and methods; use of chain and tape, Electronic distance measurements (EDM) -principles of electro optical EDM-errors and corrections to linear measurements-compass survey -Meridians, Azimuths and Bearings, declination, computation of angle. Traversing – Purpose-types of traverse-traverse computation -traverse adjustments -omitted measurements.

UNIT - III

LEVELING AND CONTOURING: Concept and Terminology, Levelling Instruments and their Temporary and permanent adjustments - method of levelling. Characteristics and Uses of contours- methods of conducting.

UNIT - IV

THEODOLITE: Theodolite, description, principles - uses and adjustments -temporary and permanent, measurement of horizontal and vertical angles. Principles of Electronic Theodolite - Trigonometrical leveling..

TACHEOMETRIC SURVEYING: Stadia and tangential methods of Tacheometry. Distance and Elevation formulae for Staff vertical position.

UNIT - V

CURVES: Types of curves, design and setting out - simple and compound curves - transition curves. Introduction to geodetic surveying, Total Station and Global positioning system.

COMPUTATION OF AREAS AND VOLUMES: Area from field notes, computation of areas along irregular boundaries and area consisting of regular boundaries. Embankments and cutting for a level section and two level sections with and without transverse slopes, determination of the capacity of reservoir, volume of barrow pits.

Text /Reference Books:

1. Surveying (Vol No.1, 2 &3) by B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain – Laxmi Publications (P) ltd, New Delhi.
2. Advance Surveying by SatishGopi, R. Sathi Kumar and N. Madhu, Pearson Publications.
3. Text book of Surveying by C. Venkataramaiah, University press, India (P) limited.
4. Surveying and levelling by R. Subramanian, Oxford University press.
5. Text book of Surveying by S.K. Duggal (Vol No.1&2), Tata McGraw Hill Publishing Co. Ltd. NewDelhi.
6. Text book of Surveying by Arora (Vol No. 1&2), Standard Book House, Delhi.
7. Higher Surveying by A.M. Chandra, New Age International Pvt ltd.
8. Fundamentals of surveying by S.K. Roy - PHI learning (P) Ltd.
9. Plane Surveying by Alak de, S. Chand & Company, New Delhi.

B. TECH 3rd SEMESTER	L	T	P	C
	3	-	-	3
19CE3T03: ENGINEERING GEOLOGY &BUILDING MATERIALS				

COURSE OUTCOMES

Students are able to

1. demonstrate knowledge of how geological principles can be applied to engineering practice.
2. identify and classify the geological minerals, measure the rock strengths of various rocks.
3. know about geophysical studies and structural geology
4. identify various building materials and select suitable type of building.
5. know about Timber, alternative material used in civil engineering construction.

SYLLABUS

UNIT-I Introduction

Branches of geology useful to civil engineering - Importance of geology from civil engineering point of view - Brief study of case histories of failure of some civil engineering constructions due to geological draw backs- Branches of geology.

Weathering of rocks: Weathering effect over the properties of rocks, importance of weathering with reference to dams, reservoirs and tunnels- River process and their development.

UNIT-II Mineralogy and Petrology

Mineralogy: Definition of mineral, importance of study of minerals, different methods of study of minerals- Study of physical properties of following common rock forming minerals: Feldsper, Quartz, Flint, Jasper, Olivine, Augite, Hornblende, Muscovite, Biotite, Asbestos, Kyanite, Garnet, Talc, Calcite - Study of other common economics minerals such as Pyrite, Hematite, Magnetite, Chromite, Galena, Pyrolusite, Graphite, Magnesite and Bauxite.

Petrology: Definition of rock - Geological classification of rocks into igneous, sedimentary and metamorphic rocks - common structures and textures of igneous. Sedimentary & metamorphic rocks and their distinguishing features- Megascopic and microscopic study of Granite, Dolerite, Basalt, Pegmatite, Laterite, Conglomerate, Sand Stone, Shale, Limestone, Gneiss, Schist, Quartzite, Marble and Slate. Rock excavation, stone aggregates.

UNIT-III Structural Geology and Geophysical Studies

Structural Geology:

Strike, Dip and Outcrop study of common geological structures associating with the rocks such as Folds, Faults, Joints and Unconformities

Geophysical Studies: Importance of Geophysical studies. Principles of Geophysical study by Gravity methods, Magnetic methods, Electrical methods, Seismic methods, radiometric methods and geothermal method.

UNIT-IV building materials-Stones, Bricks, Tiles, Timber

Stones - Building stones, classification of building stones, quarrying procedures, dressing, and tools for dressing of stones.

Bricks -Composition of brick earth, manufacturing of brick & Tests on brick.

Tiles - Types of tiles, manufacturing of tiles.

Timber-Structure, properties, seasoning of timber; Classification of various types of woods used in buildings, defects in timber; Alternative materials for wood, galvanized iron, fibre-reinforced plastics, steel, aluminum

UNIT-V Lime, Cement and Finishing Materials

Lime: 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.

FINISHINGS: Damp Proofing and water proofing materials and uses - Paints: Constituents of a paint - Types of paints - Painting of new/old wood- Varnish.

Text/Reference Books

1. N.Chennakesavulu ―A Text book of Engineering Geology, Mac-Millan Publishers India Ltd. 2nd Edition, 2013.
2. Parbin Singh ―Engineering Geology and general geology, S. K. Kataria & Sons, 8thEdition, New Delhi, 2013.
3. F.G. Bell, "Fundamental of Engineering Geology" Butterworths Publications, New Delhi, 2016.
4. SK Duggal, "Building Materials", New Age Publications 4th Edition, April, 2014.
5. Sushil Kumar "Building Materials and construction", Standard Publishers, 20thedition, reprint, 2015.

B. TECH 3rd	L	T	P	C
SEMESTER	-	-	3	1.5

19CE3L01: SURVEYING LAB

COURSE OUTCOMES

Students are able to

1. use conventional surveying tools such as chain/tape, compass, plane table,theodolite, level in the field of civil engineering applications such as structural plotting and highway profiling.
2. apply the procedures involved in field work and to work as a surveying team.
3. demonstrate and Plan a survey appropriately with the skill to understand the surroundings.
4. select accurate measurements, field booking, plotting and adjustment of errors can be understood.
5. prepare and Plot traverses / sides of building and determine the location of points present on field on a piece of paper.
6. generalize the field procedures using total station.

SYLLABUS:

LIST OF EXPERIMENTS

1. Survey by chain survey of road profile with offsets in case of road
2. Survey in an area by chain survey (Closed circuit).
3. Determination of distance between two inaccessible points by using compass.
4. Finding the area of the given boundary using compass (Closed Traverse).
5. Plane table survey: finding the area of a given boundary by the method of Radiation & method of intersection.
6. Two Point Problem by the plane table survey.
7. Fly levelling: Height of the instrument method. (differential levelling) and rise and fall method
8. Fly levelling: Longitudinal Section and Cross sections of a given road profile.
9. Theodolite Survey: Determining the Horizontal and Vertical Angles by the method of repetition method and reiteration method
10. Theodolite Survey: Finding the distance between two inaccessible points.
11. Tacheomatric survey: Heights and distance problems using tachometric principles.
12. Total Station: Introduction to total station and practicing setting up,levelling up and elimination of parallax error.
13. Total Station: Determination of area using total station.
14. Total Station: Traversing

B. TECH 3rd SEMESTER	L	T	P	C
	-	-	3	1.5
19CE3L02: ENGINEERING GEOLOGY LAB				

Course Outcomes

Students are able to

1. learn geology and its types, various features like fault, fissures, weathering etc., minerals, rocks, and rock formations in relation to civil engineering structures.
2. understand various techniques to determine engineering properties of rocks etc.
3. analyze various techniques to analyze and to made possible solutions for various geological engineering problems.

SYLLABUS:

List of Experiments:

1. Study of physical properties of minerals.
2. Study of different group of minerals.
3. Study of Crystal and Crystal system.
4. Identification of minerals: Silica group: Quartz, Amethyst, Opal; Feldspar group: Orthoclase, Plagioclase; Cryptocrystalline group: Jasper; Carbonate group: Calcite; Element group: Graphite; Pyroxene group: Talc; Mica group: Muscovite; Amphibole group: Asbestos, Olivine, Hornblende, Magnetite, Hematite, Corundum, Kyanite, Garnet, Galena, Gypsum.
5. Identification of rocks (Igneous Petrology): Acidic Igneous rock: Granite and its varieties, Syenite, Rhyolite, Pumice, Obsidian, Scoria, Pegmatite, Volcanic Tuff. Basic rock: Gabbro, Dolerite, Basalt and its varieties, Trachyte.
6. Identification of rocks (Sedimentary Petrology): Conglomerate, Breccia, Sandstone and its varieties , Laterite, Limestone and its varieties, Shales and its varieties.
7. Identification of rocks (Metamorphic Petrolody): Marble, slate, Gneiss and its varieties, Schist and its varieties. Quartzite, Phyllite.
8. Study of topographical features from Geological maps- Identification of symbols in maps.

Reference Books:

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

B. TECH 3rd SEMESTER	L	T	P	C
	-	-	3	1.5
19CE3L03 : COMPUTER AIDED ENGINEERING DRAWING				

Course Outcomes:

Students are able to

1. define the concept of CAD software.
2. discuss various building components using CAD software.
3. examine aspects in 3D views of buildings by using software.
4. practice computer aided solid modeling.

SYLLABUS

UNIT – I

PROJECTIONS OF SOLIDS:

Projection of regular solids inclined to both the planes, Auxiliary views and sectional views of Regular solids.

UNIT –II

DEVELOPMENT OF SURFACES OF RIGHT REGULAR SOLIDS- Prisms, cylinders, pyramids, cone and their parts Interpenetration and Intersection of right regular solids.

UNIT –III

ISOMETRIC PROJECTIONS AND ORTHOGRAPHIC PROJECTIONS- Plane figures, simple and compound solids, isometric projections of objects having non-isometric lines and spherical parts.

UNIT-IV

INTRODUCTION TO COMPUTER AIDED DRAFTING - Generation of points, lines, curves, polygons, dimensioning Types of modeling-Object selection commands, edit, zoom, cross, hatching, pattern filling, utility commands in object selection commands,2D and 3D wire frame modeling. view point coordinates and views displayed, examples to exercise different options like save, restore, delete, joint, single option.

UNIT-V

COMPUTER AIDED SOLID MODELING- Isometric projections, orthographic projections of isometric projections, Building-plan, Section and Elevation.

Text /Reference Books:

1. Engineering graphics - K. C. John, PHI Publications.
2. Engineering Drawing by N.D.Bhatt , Charotar Publications.
3. Engineering Drawing - R.K. Dhawan,S.Chand
4. Engineering Drawing - K.L.Narayana, P.Kannaiah
5. Engineering Drawing - Agarwal &Agarwal, Mc Graw Hill
6. Text book of Engineering Drawing with AutoCAD - K.Venkata reddy / B.S.Publications.

B. TECH 4th	L	T	P	C
SEMESTER	3	-	-	3
19CE4T01: STRENGTH OF MATERIALS-II				

COURSE OUTCOMES:
Upon successful completion of this course,

1. The student will be able to understand the basic concepts of Principal stresses developed in a member when it is subjected to stresses along different axes and design the sections.
2. The student can assess stresses in different engineering applications like shafts, springs, columns and struts subjected to different loading conditions
3. The student will be able to assess forces in different types of trusses used in construction.

SYLLABUS:

UNIT-I
Principal Stresses and Strains And Theories Of Failures: Introduction – Stresses on an inclined section of a bar under axial loading – compound stresses – Normal and tangential stresses on an inclined plane for biaxial stresses – Two perpendicular normal stresses accompanied by a state of simple shear – Mohr's circle of stresses – Principal stresses and strains – Analytical and graphical solutions.
Theories Of Failures: Introduction – Various Theories of failures like Maximum Principal stress theory – Maximum Principal strain theory – Maximum shear stress theory – Maximum strain energy theory – Maximum shear strain energy theory.

UNIT-II
Torsion Of Circular Shafts And Springs: Theory of pure torsion – Derivation of Torsion equations: $T/J = q/r = N\phi/L$ – Assumptions made in the theory of pure torsion – Torsional moment of resistance – Polar section modulus – Power transmitted by shafts – Combined bending and torsion and end thrust – Design of shafts according to theories of failure.
Springs: Introduction – Types of springs – deflection of close and open coiled helical springs under axial pull and axial couple – springs in series and parallel – Carriage or leaf springs.

UNIT III:
Columns And Struts: Introduction – Types of columns – Short, medium and long columns – Axially loaded compression members – Crushing load – Euler's theorem for long columns-assumptions- derivation of Euler's critical load formulae for various end conditions – Equivalent length of a column – slenderness ratio – Euler's critical stress – Limitations of Euler's theory – Rankine – Gordon formula – Long columns subjected to eccentric loading – Secant formula – Empirical formulae – Straight line formula – Prof. Perry's formula.
Laterally loaded struts – subjected to uniformly distributed and concentrated loads – Maximum B.M. and stress due to transverse and lateral loading.

UNIT IV:
Direct and Bending Stresses: Stresses under the combined action of direct loading and B.M. Core of a section – determination of stresses in the case of chimneys, retaining walls and dams – conditions for stability – stresses due to direct loading and B.M. about both axis.

UNIT V:

Analysis Of Pin-Jointed Plane Frames: Determination of Forces in members of plane pin-jointed perfect trusses by (i) method of joints and (ii) method of sections. Analysis of various types of cantilever and simply supported trusses by method of joints, method of sections.

Text /Reference Books:

1. Mechanics of Materials- by R. C. Hibbler
2. Strength of materials by R. K Rajput, S.Chand and Co.
3. Strength of Materials by R. Subramanian, Oxford Publications
4. Mechanics of Materials by B.C Punmia, Jain and Jain.
5. Strength of materials by R. K. Bansal, Lakshmi Publications.

B. TECH 4th SEMESTER	L	T	P	C
	3	-	-	3
19CE4T02: FLUID MECHANICS & HYDRAULIC MACHINES				

COURSE OUTCOMES

At end of the course student able to

1. Understand and apply concepts of fluid statics, kinematics and dynamics for solving various fluid flow problems.
2. Analyze various losses in pipe flow problems and understand the measurement of flow.
3. Understand the concept of hydrodynamic force of jets on stationary and moving flat, inclined and curved vanes.
4. Explain the working and performance of various types of turbines and pumps and their characteristics.

SYLLABUS:

UNIT-I

FLUID STATICS: Dimensions and units- physical properties of fluids- specific gravity, viscosity and surface tension- vapour pressure and their influence on fluid motion- atmospheric gauge and vacuum pressure –measurement of pressure- Piezometer, U- Tube and Differential manometers.

UNIT-II

FLUID KINEMATICS: Stream line, path line, streak lines and stream tube-Classification of flows-steady & unsteady, uniform, non-uniform, laminar, turbulent, rotational, and irrational flows-Equation of continuity for one dimensional flow.

FLUID DYNAMICS: Surface and body forces -Euler's and Bernoulli's equations for flow along a stream line, momentum equation and its application on force on pipe bend.

UNIT-III

CLOSED CONDUIT FLOW: Reynold's experiment- Darcy Weisbach equation - Minor losses in pipes, pipes in series and pipes in parallel - Total energy line-hydraulic gradient line.

MEASUREMENT OF FLOW: Pilot tube, venture meter, orifice meter.

UNIT-IV

BASICS OF TURBO MACHINERY AND PUMPS

Basics of turbo machinery: Hydrodynamic force of jets on stationary and moving flat, inclined, and curved vanes, jet striking centrally and at tip, velocity diagrams, work done and efficiency, flow over radial vanes, Force exerted by jet of water on series of vanes.

Centrifugal pumps: Classification, working, work done – Manometric head- losses and efficiencies specific speed- pumps in series and parallel-performance characteristic curves, NPSH.

Reciprocating pumps: Working, Discharge, slip, indicator diagrams.

UNIT-V

HYDRAULIC TURBINES: Classification of turbines, impulse and reaction turbines, Pelton wheel,Francis turbine and Kaplan turbine-working proportions, work done, efficiencies , hydraulic design –draft tube theory- functions and efficiency.

PERFORMANCE OF HYDRAULIC TURBINES: Geometric similarity, Unit and specific quantities, characteristic curves, governing of turbines, selection of type of turbine, cavitation, surge tank, water hammer.

Text /Reference Books:

1. Hydraulics, fluid mechanics by P.N. MODI and S.M.SETH, Standard book house. 2015
2. A text book of Fluid Mechanics and Hydraulic Machines by R.K.Bansal, Laxmi Publications.2004.
3. Fluid Mechanics and Fluid Power Engineering by D.S. Kumar, Kotaria & Sons. 2014.
4. Fluid Mechanics and Machinery by D. Rama Durgaiah, New Age International.2007.

B. TECH 4th SEMESTER	L	T	P	C
	3	-	-	3
19CE4T03: STRCTURAL ANALYSIS-I				

COURSE OUTCOMES:

Upon successful completion of this course,

1. Analyze Propped Cantilever and fixed beam under different loading conditions.
2. Deduce Continuous Beams under different loading and support conditions by Clapeyron's theorem of three moments.
3. Evaluate the continuous beam using slope deflection method.
4. Apply Energy theorem in strain energy in linear elastic system & castigliano's first theorem.
5. Explain about the moving loads under different loading conditions & influence lines of S.F & B.M under different loading conditions.

SYLLABUS:

UNIT-I

PROPPED CANTILEVERS: Analysis of propped cantilevers-shear force and Bending moment diagrams-Deflection of propped cantilevers.

FIXED BEAMS: Introduction to statically indeterminate beams with U. D. load central point load, eccentric point load. Number of point loads, uniformly varying load, couple and combination of loads shear force and Bending moment diagrams-Deflection of fixed beams effect of sinking of support, effect of rotation of a support.

UNIT-II

CONTINUOUSBEAMS: Introduction-Clapeyron's theorem of three moments- Analysis of continuous beams with constant moment of inertia with one or both ends fixed-continuous beams with overhang, continuous beams with different moment of inertia for different spans-Effects of sinking of supports-shear force and Bending moment diagrams.

UNIT III:

SLOPE-DEFLECTION METHOD: Introduction, derivation of slope deflection equation, application to continuous beams with and without settlement of supports.

UNIT IV:

ENERGY THEOREMS: Introduction-Strain energy in linear elastic system, expression of strain energy due to axial load, bending moment and shear forces - Castigliano's first theorem-Deflections of simple beams and pin jointed trusses.

UNIT V:

MOVING LOADS AND INFLUENCE LINES: Introduction maximum SF and BM at a given section and absolute maximum S.F. and B.M due to single concentrated load U. D load longer than the span, U. D load shorter than the span, two point loads with fixed distance between them and several point loads-Equivalent uniformly distributed load-Focal length.

INFLUENCE LINES: Definition of influence line for SF, Influence line for BM- load position for maximum SF at a section-Load position for maximum BM at a sections, ingle point load, U.D. load longer than the span, U.D. load shorter than the span- Influence lines for forces in members of Pratt and Warren trusses.

Text /Reference Books:

1. Structural Analysis by V.D. Prasad Galgotia publications, 2nd Editions.
2. Analysis of Structures by T.S. Thandavamoorthy, Oxford University Press, New Delhi.
3. Theory of Structures by Gupta, Pandit& Gupta; Tata McGraw Hill, New Delhi.
4. Theory of Structures by R.S. Khurmi, S. Chand Publishers.
5. Structural analysis by R.C. Hibbeler, Pearson, New Delhi.

B. TECH 4th SEMESTER	L	T	P	C
	3	-	-	3
19CE4T04: CONCRETE TECHNOLOGY & BUILDING CONSTRUCTION				

COURSE OUTCOMES

Students are able to

1. Identify the characteristics of basic ingredients and properties of concrete
2. Distinguish the properties of fresh and hardened concrete
3. Discriminate Concepts Proportioning of concrete mixes by various methods -BIS method of mix design.
4. Justify the significance of special concretes
5. Prepare building components and various finishing's in building construction.
6. Explain about brick and stone masonry in building construction.

SYLLABUS:

UNIT-I

INGREDIENTS OF CONCRETE & ADMIXTURES: - Concrete ingredients-Admixtures-Mineral and chemical admixtures - accelerators, retarders, air entrainers, plasticizers, super plasticizers, fly ash and silica fume.

AGGREGATES: Classification of aggregate - Particle shape & texture - Bond, strength & other mechanical properties of aggregates - Specific gravity, Bulk density, porosity, adsorption & moisture content of aggregate -Bulking of sand -Deleterious substance in aggregate - Soundness of aggregate – Alkali aggregate reaction - Thermal properties - Sieve analysis - Fineness modulus - Grading curves - Grading of fine & coarse Aggregates -Gap graded and well graded aggregate as per relevant IS code - Maximum aggregate size. Quality of mixing water.

UNIT - II

FRESH AND HARDENED CONCRETE

Fresh concrete: Steps in Manufacture of Concrete-proportion, mixing, placing, compaction, finishing, curing - including various types in each stage. Properties of fresh concrete-Workability - Factors affecting workability - Measurement of workability by different tests, Setting times of concrete, Effect of time and temperature on workability - Segregation &bleeding - Mixing and vibration of concrete, Ready mixed concrete, Shotcrete.

Hardened concrete: Water / Cement ratio - Abram's Law –Gel space ratio - Nature of strength of concrete -Maturity concept - Strength in tension & compression - Factors affecting strength – Relation between compression & tensile strength - Curing, Testing of Hardened Concrete: Compression tests – Tension tests - Factors affecting strength -Flexure tests -Splitting tests - Non-destructive testing methods – codal provisions for NDT.

UNIT - III

ELASTICITY, CREEP & SHRINKAGE: Modulus of elasticity -Dynamic modulus of elasticity - Poisson's ratio - Creep of concrete -Factors influencing creep - Relation between creep & time - Nature of creep – Effects of creep - Shrinkage -types of shrinkage.

MIX DESIGN: Factors in the choice of mix proportions - Durability of concrete - Quality Control of concrete - Statistical methods - Acceptance criteria - Concepts Proportioning of concrete mixes by various methods -BIS method of mix design.

SPECIAL CONCRETES: Ready mixed concrete -Light weight aggregate concrete – Cellular concrete -No-fines concrete, High density concrete, Fibre reinforced concrete - High performance 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

MASONRY: Types of masonry, English and Flemish bonds, Rubble and Ashlar Masonry. Cavity and partition walls.

BUILDING FINISHINGS: Plastering Pointing, white washing and distempering -Form Works and Scaffoldings.

Text /Reference Books:

1. Concrete Technology by M.S.Shetty. - S.Chand& Co. 2004.
2. Concrete Technology by M.L. Gambhir. - Tata Mc. Graw Hill Publishers, New Delhi.
3. Properties of Concrete by A.M.Neville - PEARSON - 4th edition.
4. Concrete Technology by A.R. Santha Kumar, Oxford University Press, New Delhi.
5. Building Construction by S.S. Bhavikatti, Vices publications House private ltd.
6. Building Construction by B.C. Punmia, Laxmi Publications (p) ltd.
7. Building construction by P.C.Verghese, PHI Learning (P) Ltd.

B. TECH 4th SEMESTER	L	T	P	C
	3	-	-	3
19CE4T05: BUILDING PLANNING AND DRAWING				

COURSE OUTCOMES

Students are able to

1. distinguish the different income groups in India and their housing requirements
2. apply the concept of climatology for housing layouts and principles of planning
3. plan the individual rooms with reference to functional and furniture requirements.
4. prepare different sign conventions and bonds
5. develop the skills of Drawing Plans, Sections and Elevations of different houses.
6. design and draw various rooms with the given data.

SYLLABUS:

UNIT-I

BUILDING BYELAWS AND REGULATIONS: Introduction - terminology - objectives of building Bye laws - 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- wall thickness - lightening and ventilation requirements.

UNIT -II

RESIDENTIAL AND PUBLIC BUILDINGS

Residential buildings: Minimum standards for various parts of buildings -requirements of different rooms and their grouping- characteristics of various types residential buildings.

Public buildings: Planning of educational institutions, hospitals, dispensaries, office buildings, banks, industrial buildings, hotels & motels, buildings for recreation.

UNIT-III

SIGN CONVENTIONS AND BONDS : Brick, stone, plaster, sand filling, concrete, glass, steel, cast iron, copper alloys, aluminum 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- IV

DOORS, WINDOWS, VENTILATORS AND ROOFS: Panelled door, panelled and glassed door, glassed windows, paneled windows, swing ventilators, fixed ventilators, coupled roof, collar roofs. King Post truss, Queen Post truss Sloped and flat roof buildings: drawing plans, Elevations and Cross Sections of given sloped roof buildings.

UNIT-V

PLANNING AND DESIGNING OF BUILDINGS: Draw the Plan, Elevation and sections of a Residential & Public buildings from the given line diagram.

Text /Reference Books:

1. Planning and Design of buildings by Y.S. Sane.
2. Planning, designing and scheduling by Gurucharan Singh and Jagadish Singh
3. Building planning and drawing by M. Chakravarthi.
4. ‘A’ Series & ‘B’ Series of JNTU Engineering College, Anantapur.
5. Building drawing by Shah and Kale

B. TECH 4th SEMESTER	L	T	P	C
	-	-	3	1.5
19CE4L01 : STRENGTH OF MATERIALS LAB				

COURSE OUTCOMES

Students are able to

1. calculate Young Modulus, torsional strength, hardness and tensile strength of given specimens
2. determine the compressive strength of concrete cubes and bricks
3. estimate stiffness of open coiled and closed coiled springs.
4. evaluate the impact strength of the given specimen.
5. examine the bending moment of the given material (Steel / Wood) of Cantilever beam & simply supported beam.

SYLLABUS:

LIST OF EXPERIMENTS

1. Tension test on Steel bar
2. Bending test on (Steel / Wood) Cantilever beam.
3. Bending test on simple support beam.
4. Torsion test
5. Hardness test
6. Spring test
7. Compression test on wood or concrete
8. Impact test
9. Shear test
10. Verification of Maxwell's Reciprocal theorem on beams.
11. Use of Electrical resistance strain gauges
12. Continuous beam - deflection test.

B. TECH 4th SEMESTER	L	T	P	C
	-	-	3	1.5
19CE4L02: FLUID MECHANICS AND HYDRAULIC MACHINES LAB				

COURSE OUTCOMES

Students are able to

1. determine coefficient of discharge of venture meter and orifice meter
2. calculate friction factor and sudden contraction of given pipeline
3. evaluate impact of jet on vanes
4. test the efficiency of centrifugal pump, multi stage centrifugal pump ,reciprocating pump
5. evaluate the efficiency of pelton wheel ,Francis turbine

LIST OF EXPERIMENTS

1. Calibration of Venturi meter & 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 pieceby 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.

B. TECH 4th SEMESTER	L	T	P	C
	-	-	3	1.5
19CE4L03: CONCRETE TECHNOLOGY LAB				

COURSE OUTCOMES

Students are able to

1. describe the consistency and fineness of cement.
2. identify the setting times of cement.
3. estimate the specific gravity and soundness of cement.
4. discover the specific gravity of coarse aggregate and fine aggregate by Sieve analysis.
5. experiment the flakiness and elongation index of aggregates.
6. calculate the bulking of sand.

SYLLABUS:

LIST OF EXPERIMENTS:

At least 10 experiments must be conducted (at least one for each property)

1. Determination of normal Consistency and fineness of cement.
2. Determination of initial setting time and final setting time of cement.
3. Determination of specific gravity and soundness of cement.
4. Determination of compressive strength of cement.
5. Determination of grading and fineness modulus of coarse aggregate by sieve analysis.
6. Determination of specific gravity of coarse aggregate
7. Determination of grading and fineness modulus of fine aggregate (sand) by sieve analysis.
8. Determination of bulking of sand.
9. Determination of workability of concrete by compaction factor method.
10. Determination of workability of concrete by slump test.
11. Determination of workability of concrete by Vee-bee test.
12. Determination of compressive strength of cement concrete and its young's modulus.
13. Determination of split tensile strength of concrete.
14. Non-Destructive testing on concrete (for demonstration).