ANNAMACHARYA
INSTITUTE OF TECHNOLOGY AND SCIENCES
(AN AUTONOMOUS INSTITUTION)

25th ANNIVERSARY

R23 ACADEMIC REGULATIONS AND I YEAR COURSE STRUCTURE & SYLLABI

For the students admitted to B. Tech. Regular Four-Year Degree Programme from AY 2023-24
and
B. Tech. Lateral Entry Scheme from AY 2024-25

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ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES

(An Autonomous Institution)

RAJAMPET-516126 (A.P) INDIA

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Academic Regulations (R23) for
B. Tech (Regular-Full Time)

(Effective for the students admitted into I year from the Academic Year 2023-24 onwards)

&

Academic Regulations (R23) for
B. Tech (Lateral Entry Scheme)

(Effective for the students admitted into II year through Lateral Entry Scheme from the Academic Year 2024-25 onwards)

VISION AND MISSION OF THE INSTITUTION

Vision

We impart futuristic technical education and instill high patterns of discipline through our dedicated staff who set global standards, making our students technologically superior and ethically strong, who in turn shall improve the quality of life of the human race.

Mission

Our mission is to educate students from the local and rural areas and from other states so that they become enlightened individuals, improving the living standards of their families, industry and society. We provide individual attention, world-class quality of technical education and take care of character building.

ACADEMIC RULES AND REGULATIONS OF FOUR-YEAR B. TECH REGULAR DEGREE PROGRAMME

APPLICABLE FOR THE STUDENT BATCHES ADMITTED FROM THE ACADEMIC YEAR 2023-24

APPLICABLE FOR THE STUDENTS (Lateral Entry) ADMITTED FROM THE ACADEMIC YEAR 2024-25

CONTENTS

1. Preamble
2. Award of the Degree
3. Admissions
4. Program related terms
5. Semester /Credits
6. Programmes offered by the Institute
7. Structure of the Undergraduate Programme
8. Course Classification
9. Programme Pattern
10. Evaluation Process
11. Massive Open Online Courses (MOOCs)
12. Skill oriented Courses
13. Credit Transfer Policy
14. Academic Bank of Credits (ABC)
15. Mandatory Internship
16. Guidelines for offering Minor
17. Guidelines for offering Honors
18. Attendance Requirements
19. Promotion Rules
20. Grading
21. With-holding of Results
22. Multiple Entry / Exit Option
23. Gap Year Concept
24. Transitory Regulations
25. Minimum Instruction Days for a Semester
26. Medium of Instructions
27. Student Transfer
28. General Instructions

Academic Regulations (R23) for B. Tech (Regular-Full time)

(Effective for the students admitted into I year from the Academic Year **2023-24** onwards)

1. Preamble

Annamacharya Institute of Technology and Sciences (Autonomous), Rajampet, relentlessly aims to achieve academic excellence by implementing new initiatives in teaching-learning and evaluation processes. Based on the directions of the Institute Grants Commission (UGC), New Delhi, All India Council for Technical Education (AICTE), New Delhi and Jawaharlal Nehru Technological Institute Anantapur (JNTUA) Anantapuramu, the institute adopted AICTE and APSCHE model curriculum, with minor modifications to match the needs, expectations, and skillsets of students of the region, in both the under-graduate and post-graduate programmes offered from the academic year 2023-24.

2. Award of the Degree

(a) **Award of the B.Tech. Degree / B.Tech. Degree with a Minor** if he/she fulfills the following:

i. Pursues a course of study for not less than four academic years and not more than eight academic years. However, for the students availing Gap year facility this period shall be extended by two years at the most and these two years would in addition to the maximum period permitted for graduation (Eight years).

ii. Registers for 160 credits and secures all 160 credits.

(b) **Award of B.Tech. degree with Honors** if he/she fulfills the following:

i. Student secures additional 15 credits fulfilling all the requisites of a B.Tech. Programme i.e., 160 credits.

ii. Registering for Honors is optional.

iii. Honors are to be completed simultaneously with B.Tech. programme.

Students, who fail to fulfill all the academic requirements for the award of the degree within eight academic years from the year of their admission, shall forfeit their seat in B.Tech. course and their admission stands cancelled. This clause shall be read along with clause 2 a) i).

3. Admissions

Admission to the B.Tech Program shall be made subject to the eligibility, qualifications and specialization prescribed by the A.P. State Government/Institute from time to time. Admissions shall be made either based on the merit rank obtained by the student in the common entrance examination conducted by the A.P. Government/Institute or any other order of merit approved by the A.P. Government/Institute, subject to reservations as prescribed by the Government/Institute from time to time.

4. Program related terms

Credit: A unit by which the course work is measured. It determines the number of hours of instruction required per week. One credit is equivalent to one hour of teaching (Lecture/Tutorial) or two hours of practical work/field work per week.

Credit Definition:

1 Hr. Lecture (L) per week	1 credit
1 Hr. Tutorial (T) per week	1 credit
1 Hr. Practical (P) per week	0.5 credit
2 Hrs. Practical (Lab) per week	1 credit

a) Academic Year: Two consecutive (one odd + one even) semesters constitute one academic year.

b) Choice Based Credit System (CBCS): The CBCS provides a choice for students to select from the prescribed courses.

5. Semester/Credits:

i. A semester comprises 90 working days and an academic year is divided into two semesters.

ii. The summer term is for eight weeks during summer vacation. Internship/ apprenticeship / work-based vocational education and training can be carried out during the summer term, especially by students who wish to exit after two semesters or four semesters of study.

iii. Regular courses may also be completed well in advance through MOOCs satisfying prerequisites.

6. Programmes of offered by the Institute

The following B. Tech. programmes are offered as specializations by the Institute from 2023-2024.

S. No	Name of the Program	Programme Code
1	Civil Engineering	01
2	Electrical and Electronics Engineering	02
3	Mechanical Engineering	03
4	Electronics and Communication Engineering	04
5	Computer Sciences and Engineering	05
6	Artificial Intelligence and Data Science	30
7	Computer Science and Engineering (Artificial Intelligence)	31
8	Computer Science and Engineering (Data Science)	32
9	Artificial Intelligence and Machine Learning	33

7. Structure of the Undergraduate Programme

All courses offered for the undergraduate program (B. Tech.) are broadly classified as follows:

S. No	Category	Breakup of Credits	Percentage of Total Credits	ACITE Recommendation (%)
1	Humanities and Social Science including Management	13	8%	8-9%
2	Basic Sciences (BS)	20	13%	12-16%
3	Engineering Sciences (ES)	23.5	14%	10-18%
4	Professional Core (PC)	54.5	34%	30-36%
5	Electives – Professional (PE) & Open Electives (OE); Domain Specific Skill Enhancement courses (SEC)	33	21%	19-23%
6	Internship & Project work (PR)	16	10%	8-11%
7	Mandatory Courses (MC)	Non-Credit	Non-Credit	-

8. Course Classification:

All subjects/ courses offered for the undergraduate programme in Engineering & Technology (B.Tech. degree programmes) are broadly classified as follows:

S. No.	Broad Course Classification	Course Category	Description
1.	Foundation Courses	Foundation courses	Includes Mathematics, Physics and Chemistry; fundamental engineering courses; humanities, social sciences and management courses
2.	Core Courses	Professional Core Courses (PC)	Includes subjects related to the parent discipline/department/branch of Engineering
3.	Elective Courses	Professional Elective Courses (PE)	Includes elective subjects related to the parent discipline/department/ branch of Engineering
		Open Elective Courses (OE)	Elective subjects which include interdisciplinary subjects or subjects in an area outside the parent discipline/ department/ branch of Engineering
		Domain specific skill enhancement courses (SEC)	interdisciplinary/job-oriented/domain courses which are relevant to the industry
4	Project & Internships	Project	B.Tech. Project or Major Project
		Internships	Summer Internships – Community based and Industry Internships; Industry oriented Full Semester Internship
5.	Audit Courses	Mandatory non- credit courses	Covering subjects of developing desired attitude among the learners

9. Programme Pattern

i. Total duration of the of B. Tech (Regular) Programme is four academic years.

ii. Each academic year of study is divided into two semesters.

iii. Minimum number of instruction days in each semester is 90 days.

iv. There shall be mandatory student induction program for fresher's, with a three- week duration before the commencement of first semester. Physical activity, Creative Arts, Universal Human Values, Literary, Proficiency Modules, Lectures by Eminent People, Visits to local Areas, Familiarization to Dept./Branch & Innovations etc., are included as per the guidelines issued by AICTE.

v. Health/wellness/yoga/sports and NSS /NSS /Scouts & Guides / Community service activities are made mandatory as credit courses for all the under graduate students.

vi. Courses like Environmental Sciences, Indian Constitution, and Technical Paper Writing & IPR are offered as non-credit mandatory courses for all the undergraduate students.

vii. Design Thinking for Innovation & Tinkering Labs is made mandatory as credit courses for all the undergraduate students.

viii. Increased flexibility for students through an increase in the elective component of the curriculum, with 05 Professional Elective courses and 04 Open Elective courses.

ix. Professional Elective Courses, include the elective courses relevant to the chosen specialization/branch. Proper choice of professional elective courses can lead to students specializing in emerging areas within the chosen field of study.

x. A total of 04 Open Electives are offered in the curriculum. A student can complete the requirement for B.Tech. Degree with a Minor within the 160 credits by opting for the courses offered through various verticals/tracks under Open Electives.

xi. While choosing the electives, students shall ensure that they do not opt for the courses with syllabus contents similar to courses already pursued.

xii. A pool of interdisciplinary/job-oriented/domain skill courses which are relevant to the industry are integrated into the curriculum of all disciplines. There shall be 05 skill-oriented courses offered during III to VII semesters. Among the five skill courses, four courses shall focus on the basic and advanced skills related to the domain/interdisciplinary courses and the other shall be a soft skills course.

xiii. Students shall undergo mandatory summer internships, for a minimum of eight weeks duration at the end of second and third year of the programme. The internship at the end of second year shall be community oriented and industry internship at the end of third year.

xiv. There shall also be mandatory full internship in the final semester of the programme along with the project work.

xv. Undergraduate degree with Honors is introduced by the Institute for the students having good academic record.

xvi. Each college shall take measures to implement Virtual Labs (https://www.vlab.co.in) which provide remote access to labs in various disciplines of Engineering and will help student in learning basic and advanced concept through remote experimentation. Student shall be made to work on virtual lab experiments during the regular labs.

xvii. Each college shall assign a faculty advisor/mentor after admission to a group of students from same department to provide guidance in courses registration/career growth/placements/opportunities for higher studies/GATE/other competitive exams etc.

xviii. Preferably 25% of course work for the theory courses in every semester shall be conducted in the blended mode of learning.

10. Evaluation Process

The performance of a student in each semester shall be evaluated subject wise with a maximum of 100 marks for theory and 100 marks for practical subject. Summer Internships shall be evaluated for 50 marks, Full Internship &Project work in final semester shall be evaluated for 200 marks, and mandatory courses with no credits shall be evaluated for 30 mid semester marks.

A student has to secure not less than 35% of marks in the end examination and a minimum of 40% of marks in the sum total of the mid semester and end examination marks taken together for the theory, practical, design, drawing subject or project etc. In case of a mandatory course, he/she should secure 40% of the total marks.

Theory Courses

Assessment Method	Marks
Continuous Internal Assessment	30
Semester End Examination	70
Total	**100**

i. For theory subject, the distribution shall be 30 marks for Internal Evaluation and 70 marks for the End-Examination.

ii. For practical subject, the distribution shall be 30 marks for Internal Evaluation and 70 marks for the End- Examination.

iii. If any course contains two different branch subjects, the syllabus shall be written in two parts with 3 units each (Part-A and Part-B)and external examination question paper shall be set with two parts each for 35 marks.

iv. If any subject is having both theory and practical components, they will be evaluated separately as theory subject and practical subject. However, they will be given same subject code with an extension of 'T' for theory subject and 'P' for practical subject.

a) Continuous Internal Evaluation

i. For theory subjects, during the semester, there shall be two midterm examinations. Each midterm examination shall be evaluated for 30 marks of which 10 marks for objective paper (20 minutes duration), 15 marks for subjective paper (90 minutes duration) and 5 marks for assignment.

ii. Objective paper shall contain 5 short answer questions with 2 marks each or maximum of 20 bits for 10 marks. Subjective paper shall contain 3 either or type questions (totally six questions from 1 to 6) of which student has to answer one from each either-or type of question. Each question carries 10 marks. The marks obtained in the subjective paper are condensed to 15 marks.

NOTE:

- The objective paper shall be prepared in line with the quality of competitive examinations questions.
- The subjective paper shall contain 3 either or type questions of equal weight age of 10 marks. Any fraction shall be rounded off to the next higher mark.
- The objective paper shall be conducted by the respective institution on the day of subjective paper test.
- Assignments shall be in the form of problems, mini projects, design problems, slip tests, quizzes etc., depending on the course content. It should be continuous assessment throughout the semester and the average marks shall be considered.

Evaluation Criteria of Internal Examination for Courses handled on shared basis:

Question paper shall contain two sections. Section I is for Objective / Short Answer Questions. Section II is for Descriptive type questions. Internal examination is designed to assess students' knowledge of both PART A and PART B of the course syllabus, it is conducted to assess knowledge of students in one and a half units in PART A and one and a half units in PART B of the course.

Section I: Section I consists of 10 objective questions in total, 5 from PART A of the syllabus and 5 from PART B from the syllabus. Each objective question carries 1 mark, and a student is required to answer all of them. **Section II**: Section II consists of descriptive type questions aimed at evaluating deeper understanding of the course. Section II consists of PART A and PART B and each has TWO

descriptive type questions with an internal choice. One descriptive question in PART A / PART B carries 5 marks, and other descriptive question in PART A / PART B carries 10 marks. 30 Marks in Section II will be scaled down to 15 marks making the internal examination for 25 Marks.

Question Paper Pattern:

Section I (10 Marks)

PART A (Objective Type Questions)

1, 2, 3, 4, 5

PART B (Objective Type Questions)

6, 7, 8, 9, 10

Section II (30 Marks, scaled down to 15 Marks)

PART A (Descriptive Type Questions)

1 or 2 (5 Marks)

3 or 4 (10 Marks)

PART B (Descriptive Type Questions)

5 or 6 (5 Marks)

7 or 8 (10 Marks)

iii. If the student is absent for the mid semester examination, no re-exam shall be conducted and mid semester marks for that examination shall be considered as zero.

iv. First midterm examination shall be conducted for I, II units of syllabus with one either or type question from each unit and third either or type question from both the units. The second midterm examination shall be conducted for III, IV and V units with one either or type question from each unit.

v. Final mid semester marks shall be arrived at by considering the marks secured by the student in both the mid examinations with 80% weight age given to the better mid exam and 20% to the other.

For example:

Marks obtained in first mid: 25
Marks obtained in second mid: 20
Final mid semester Marks: (25x0.8) + (20x0.2) = 24
If the student is absent for any one midterm examination, the final mid semester marks shall be arrived at by considering 80% weight age to the marks secured by the student in the appeared examination and zero to the other. For Example:
Marks obtained in first mid: Absent
Marks obtained in second mid: 25
Final mid semester Marks: (25x0.8) + (0x0.2) =20

b) End Examination Evaluation:

End examination of theory subjects shall have the following pattern:

i. There shall be 6 questions and all questions are compulsory.

ii. Question I shall contain 10 compulsory short answer questions for a total of 20marks such that each question carries 2 marks.

iii. There shall be 2 short answer questions from each unit.
In each of the questions from 2 to 6, there shall be either/or type questions of 10 marks each. Student shall answer any one of them.

iv. The questions from 2 to 6 shall be set by covering one unit of the syllabus for each question.

v. End examination of theory subjects consisting of two parts of different subjects, for Example: Basic Electrical &Electronics Engineering shall have the following pattern:

vi. Question paper shall be in two parts viz., Part A and Part B with equal weight age of 35 marks each.

vii. In each part, question 1 shall contain 5 compulsory short answer questions for a total of 5 marks such that each question carries 1 mark.

viii. In each part, questions from 2 to 4, there shall be either/or type questions of 10 marks each. Student shall answer any one of them.

ix. The questions from 2 to 4 shall be set by covering one unit of the syllabus for each question.

Practical Courses

Assessment Method	**Marks**
Continuous Internal Assessment	30
Semester End Examination	70
Total	**100**

a. For practical courses, there shall be a continuous evaluation during the semester for 30 sessional marks and end examination shall be for 70 marks.

b. Day-to-day work in the laboratory shall be evaluated for 15 marks by the concerned laboratory teacher based on the record/viva and 15 marks for the internal test.

c. The end examination shall be evaluated for 70 marks, conducted by the concerned laboratory teacher and a senior expert in the subject from the same department.
   - Procedure: 20 marks
   - Experimental work & Results: 30 marks
   - Viva voce: 20 marks.

   In a practical subject consisting of two parts (Eg: Basic Electrical & Electronics Engineering Lab), the end examination shall be conducted for 70 marks as a single laboratory in 3 hours. Mid semester examination shall be evaluated as above for 30 marks in each part and final mid semester marks shall be arrived by considering the average of marks obtained in two parts.

d. For the subject having design and/or drawing, such as Engineering Drawing, the distribution of marks shall be 30 for mid semester evaluation and 70 for end examination.

Assessment Method	**Marks**
Continuous Internal Assessment	30
Semester End Examination	70
Total	**100**

Day-to-day work shall be evaluated for 15 marks by the concerned subject teacher based on the reports/submissions prepared in the class. And there shall be two midterm examinations in a semester for duration of 2 hours each for 15 marks with weight age of 80% to better mid marks and

20% for the other. The subjective paper shall contain 3 either or type questions of equal weight age of 5 marks. There shall be no objective paper in mid semester examination. The sum of day- to-day evaluation and the mid semester marks will be the final sessional marks for the subject.

The end examination pattern for Engineering Graphics, shall consists of 5 questions, either/or type, of 14 marks each. There shall be no objective type questions in the end examination. However, the end examination pattern for other subjects related to design/drawing, multiple branches, etc., is mentioned along with the syllabus.

e. There shall be no external examination for mandatory courses with zero credits. However, attendance shall be considered while calculating aggregate attendance and student shall be declared to have passed the mandatory course only when he/she secures 40% or more in the internal examinations. In case, the student fails, a re-examination shall be conducted for failed candidates for 30 marks satisfying the conditions mentioned in item 1 & 2 of the regulations.

f. The laboratory records and mid semester test papers shall be preserved for a minimum of 3 years in the respective institutions as per the Institute norms and shall be produced to the Committees of the Institute as and when the same are asked for.

11. Skill oriented Courses

i. There shall be five skill-oriented courses offered during III to VII semesters.

ii. Out of the five skill courses two shall be skill-oriented courses from the same domain. Of the remaining three skill courses, one shall be a soft skill course and the remaining two shall be skill-advanced courses from the same domain/Interdisciplinary/Job oriented.

iii. The course shall carry 100 marks and shall be evaluated through continuous assessments during the semester for 30 sessional marks and end examination shall be for 70 marks. Day-to-day work in the class / laboratory shall be evaluated for 30 marks by the concerned teacher based on the regularity/assignments/viva/mid semester test. The end examination similar to practical examination pattern shall be conducted by the concerned teacher and an expert in the subject nominated by the principal.

iv. The Head of the Department shall identify a faculty member as coordinator for the course. A committee consisting of the Head of the Department, coordinator and a senior Faculty member nominated by the Head of the Department shall monitor the evaluation process. The marks/grades shall be assigned to the students by the above committee based on their performance.

v. The student shall be given an option to choose either the skill courses being offered by the college or to choose a certificate course being offered by industries/Professional bodies or any other accredited bodies. If a student chooses to take a Certificate Course offered by external agencies, the credits shall be awarded to the student upon producing the Course Completion Certificate from the agency. A committee shall be formed at the level of the college to evaluate the grades/marks given for a course by external agencies and convert to the equivalent marks/grades.

vi. The recommended courses offered by external agencies, conversions and appropriate grades/marks are to be approved by the Institute at the beginning of the semester. The principal of the respective college shall forward such proposals to the Institute for approval.

vii. If a student prefers to take a certificate course offered by external agency, the department shall mark attendance of the student for the remaining courses in that semester excluding the skill course in all the calculations of mandatory attendance requirements upon producing a valid certificate as approved by the Institute.

12. Massive Open Online Courses (MOOCs):

A Student has to pursue and complete one course compulsorily through MOOCs approved by the Institute. A student can pursue courses other than core through MOOCs and it is mandatory to complete one course successfully through MOOCs for awarding the degree. A student is not permitted to register and pursue core courses through MOOCs.

A student shall register for the course (Minimum of either 8 weeks or 12 weeks) offered through MOOCs with the approval of Head of the Department. The Head of the Department shall appoint one mentor to monitor the student's progression. The student needs to earn a certificate by passing the exam. The student shall be awarded the credits assigned in the curriculum only by submission of the certificate. Examination fee, if any, will be borne by the student.

Students who have qualified in the proctored examinations conducted through MOOCs platform can apply for credit transfer as specified and are exempted from appearing internal as well as external examination (for the specified equivalent credit course only) conducted by the Institute.

Necessary amendments in rules and regulations regarding adoption of MOOC courses would be proposed from time to time.

13. Credit Transfer Policy

Adoption of MOOCs is mandatory, to enable Blended model of teaching-learning as also envisaged in the NEP 2020. As per Institute Grants Commission (Credit Framework for Online Learning Courses through SWAYAM) Regulation, 2016, the Institute shall allow up to a maximum of 20% of the total courses being offered in a particular programme i.e., maximum of 32 credits through MOOCs platform.

i. The Institute shall offer credit mobility for MOOCs and give the equivalent credit weight age to the students for the credits earned through online learning courses.
ii. Student registration for the MOOCs shall be only through the respective department of the institution, it is mandatory for the student to share necessary information with the department.
iii. Credit transfer policy will be applicable to the Professional & Open Elective courses only.
iv. The concerned department shall identify the courses permitted for credit transfer.
v. The Institute/institution shall notify at the beginning of semester the list of the online learning courses eligible for credit transfer.
vi. The institution shall designate a faculty member as a Mentor for each course to guide the students from registration till completion of the credit course.
vii. The Institute shall ensure no overlap of MOOC exams with that of the Institute examination schedule. In case of delay in results, the Institute will re-issue the marks sheet for such students.
viii. Student pursuing courses under MOOCs shall acquire the required credits only after successful completion of the course and submitting a certificate issued by the competent authority along with the percentage of marks and grades.
ix. The institution shall submit the following to the examination section of the Institute:
    a) List of students who have passed MOOC courses in the current semester along with the certificate of completion.
    b) Undertaking form filled by the students for credit transfer.
x. The universities shall resolve any issues that may arise in the implementation of this policy from time to time and shall review its credit transfer policy in the light of periodic changes brought by UGC, SWAYAM, NPTEL and state government.

Note: Students shall be permitted to register for MOOCs offered through online platforms approved by the Institute from time to time.

14. Academic Bank of Credits (ABC)

The Institute has implemented Academic Bank of Credits (ABC) to promote flexibility in curriculum as per NEP 2020 to

i. Provide option of mobility for learners across the universities of their choice
ii. Provide option to gain the credits through MOOCs from approved digital platforms.
iii. Facilitate award of certificate/diploma/degree in line with the accumulated credits in ABC
iv. Execute Multiple Entry and Exit system with credit count, credit transfer and credit acceptance from students' account.

15. Mandatory Internships

Summer Internships: Two summer internships either onsite or virtual each with a minimum of 08 weeks duration, done at the end of second and third years, respectively are mandatory. It shall be completed in collaboration with local industries, Govt. Organizations, construction agencies, Power projects, software MNCs or any industries in the areas of concerned specialization of the Undergraduate program. One of the two summer internships at the end of second year (Community Service Project) shall be society oriented and shall be completed in collaboration with government organizations/NGOs & others. The other internship at the end of third year is Industry Internship and shall be completed in collaboration with Industries. The student shall register for the internship as per course structure after commencement of academic year. The guidelines issued by the APSCHE / Institute shall be followed for carrying out and evaluation of Community Service Project and Industry Internship.

Evaluation of the summer internships shall be through the departmental committee. A student will be required to submit a summer internship report to the concerned department and appear for an oral presentation before the departmental committee comprising of Head of the Department, supervisor of the internship and a senior faculty member of the department. A certificate of successful completion from industry shall be included in the report. The report and the oral presentation shall carry

50% weight age each. It shall be evaluated for 50 external marks. There shall be no internal marks for Summer Internship. A student shall secure minimum 40% of marks for successful completion. In case, if a student fails, he/she shall reappear as and when semester supplementary examinations are conducted by the Institute.

Full Semester Internship and Project work: In the final semester, the student should mandatorily register and undergo internship (onsite/virtual) and in parallel he/she should work on a project with well-defined objectives. At the end of the semester the candidate shall submit an internship completion certificate and a project report. A student shall also be permitted to submit project report on the work carried out during the internship.

The project report shall be evaluated with an external examiner. The total marks for project work 200 marks and distribution shall be 60 marks for internal and 140 marks for external evaluation. The supervisor assesses the student for 30 marks (Report: 15 marks, Seminar: 15 marks). At the end of the semester, all projects shall be showcased at the department for the benefit of all students and staff and the same is to be evaluated by the departmental Project Review Committee consisting of supervisor, a senior faculty and HOD for 30 marks. The external evaluation of Project Work is a Viva-Voce Examination

conducted in the presence of internal examiner and external examiner appointed by the Institute and is evaluated for 140 marks.

The college shall facilitate and monitor the student internship programs. Completion of internships is mandatory, if any student fails to complete internship, he/she will not be eligible for the award of degree. In such cases, the student shall repeat and complete the internship.

16. Guidelines for offering a Minor

To promote interdisciplinary knowledge among the students, the students admitted into B.Tech. in a major stream/branch are eligible to obtain degree in Minor in another stream.

i. The Minor program requires the completion of 12 credits in Minor stream chosen.
ii. Two courses for 06 credits related to a Minor are to be pursued compulsorily for the minor degree, but maybe waived for students who have done similar/equivalent courses. If waived for a student, then the student must take an extra elective course in its place. It is recommended that students should complete the compulsory courses (or equivalents) before registering for the electives.
iii. Electives (minimum of 2 courses) to complete a total of 12 credits.

Note: A total of 04 Open Electives are offered in the curriculum. A student can complete the requirement for Minor by opting for the courses offered through various verticals/tracks under Open Electives.

17. Guidelines for offering Honors

The objective of introducing B.Tech. (Hons.) is to facilitate the students to choose additionally the specialized courses of their choice and build their competence in a specialized area in the UG level. The programme is a best choice for academically excellent students having good academic record and interest towards higher studies and research.

i. Honors is introduced in the curriculum of all B. Tech. programs offering a major degree and is applicable to all B. Tech (Regular and Lateral Entry) students admitted in Engineering & Technology.
ii. A student shall earn additional 15 credits for award of B.Tech.(Honors) degree from same branch/department/discipline registered for major degree. This is in addition to the credits essential for obtaining the Undergraduate degree in Major Discipline (i.e., 160 credits).
iii. A student is permitted to register for Honors in IV semester after the results of III Semester are declared and students may be allowed to take maximum two subjects per semester pertaining to the Honors from V Semester onwards.
iv. The concerned Principal of the college shall arrange separate class work and timetable of the courses offered under Honors program.
v. Courses that are used to fulfill the student's primary major may not be double counted towards the Honors. Courses with content substantially equivalent to courses in the student's primary Major may not be counted towards the Honors.
vi. Students can complete the courses offered under Honors either in the college or in online platforms like SWAYAM with a minimum duration of 12 weeks for a 3-credit course and 8 weeks duration for a 2-credit course satisfying the criteria for credit mobility. If the courses under Honors are offered in conventional mode, then the teaching and evaluation procedure shall be similar to regular B. Tech courses.
vii. The attendance for the registered courses under Honors and regular courses offered for Major degree in a semester are to be considered separately.
viii. A student shall maintain an attendance of 75% in all registered courses under

ix. Honors to be eligible for attending semester end examinations.

x. A student registered for Honors shall pass in all subjects that constitute the requirement for the Honors degree program. No class/division (i.e., second class, first class and distinction, etc.) shall be awarded for Honors degree programme.

xi. If a student drops or is terminated from the Honors program, the additional credits so far earned cannot be converted into open or core electives; they will remain extra. However, such students will receive a separate grade sheet mentioning the additional courses completed by them.

xii. The Honors will be mentioned in the degree certificate as Bachelor of Technology (Honors) in XYZ. For example, B.Tech. (Honors) in Mechanical Engineering.

Enrolment into Honors:

i. Students of a Department/Discipline are eligible to opt for Honors program offered by the same Department/Discipline

ii. The enrolment of student into Honors is based on the CGPA obtained in the major degree program. CGPA shall be taken up to III semester in case of regular entry students and only III semester in case of lateral entry students. Students having 7 CGPA without any backlog subjects will be permitted to register for Honors.

iii. If a student is detained due to lack of attendance either in Major or in Honors, registration shall be cancelled.

iv. Transfer of credits from Honors to regular B. Tech degree and vice-versa shall not be permitted.

v. Honors is to be completed simultaneously with a Major degree program.

Registration for Honors:

i. The eligible and interested students shall apply through the HOD of his/her parent department. The whole process should be completed within one week before the start of every semester. Selected students shall be permitted to register the courses under Honors.

ii. The selected students shall submit their willingness to the principal through his/her parent department offering Honors. The parent department shall maintain the record of student pursuing the Honors.

iii. The students enrolled in the Honors courses will be monitored continuously.

iv. An advisor/mentor from parent department shall be assigned to a group of students to monitor the progress.

v. There is no fee for registration of subjects for Honors program offered in offline at the respective institutions.

18. Attendance Requirements:

i. A student shall be eligible to appear for the Institute external examinations if he/she acquires a minimum of 40% attendance in each subject and 75% of attendance in aggregate of all the subjects. b) Condonation of shortage of attendance in aggregate up to 10% (65% and above and below 75%) in each semester may be granted by the College Academic Committee.

ii. Shortage of Attendance below 65% in aggregate shall in NO CASE be condoned.

iii. A stipulated fee shall be payable towards condonation of shortage of attendance to the Institute.

iv. Students whose shortage of attendance is not condoned in any semester are not eligible to take their end examination of that class and their registration shall stand cancelled.

v. A student will not be promoted to the next semester unless he satisfies the attendance requirements of the present semester. They may seek readmission for that semester from the date of commencement of class work.

vi. If any candidate fulfills the attendance requirement in the present semester, he shall not be eligible for readmission into the same class.

vii. If the learning is carried out in blended mode (both offline & online), then the total attendance of the student shall be calculated considering the offline and online attendance of the student.

viii. For induction programme attendance shall be maintained as per AICTE norms.

19. Promotion Rules:

The following academic requirements must be satisfied in addition to the attendance requirements mentioned in section 18.

i. A student shall be promoted from first year to second year if he/she fulfills the minimum attendance requirement as per Institute norms.

ii. A student will be promoted from II to III year if he/she fulfills the academic requirement of securing 40% of the credits (any ***decimal*** fraction should be ***rounded off*** to ***lower*** digit) up to in the subjects that have been studied up to III semester.

iii. A student shall be promoted from III year to IV year if he/she fulfills the academic requirements of securing 40% of the credits (any ***decimal*** fraction should be ***rounded off*** to ***lower*** digit) in the subjects that have been studied up to V semester. And in case a student is detained for want of credits for a particular academic year by ii) & iii) above, the student may make up the credits through supplementary examinations and only after securing the required credits he/she shall be permitted to join in the V semester or VII semester respectively as the case may be.

iv. When a student is detained due to lack of credits/shortage of attendance he/she may be re-admitted when the semester is offered after fulfillment of academic regulations. In such case, he/she shall be in the academic regulations into which he/she is readmitted.

20. Grading:

As a measure of the student's performance, a 10-point Absolute Grading System using the following Letter Grades and corresponding percentage of marks shall be followed:

After each course is evaluated for 100 marks, the marks obtained in each course will be converted to a corresponding letter grade as given below, depending on the range in which the marks obtained by the student fall.

Structure of Grading of Academic Performance

Range in which the marks in the subject fall	Grade	Grade points Assigned
90 & above	Superior	10
80 - 89	A(Excellent)	9
70 - 79	B(Very Good)	8
60 - 69	C (Good)	7
50 - 59	D (Average)	6
40 - 49	E (Pass)	5
< 40	F (Fail)	0
Absent	Ab (Absent)	0

i. A student obtaining Grade 'F' or Grade 'Ab' in a subject shall be considered failed and will be required to reappear for that subject when it is offered the next supplementary examination.

ii. For non-credit audit courses, "Satisfactory" or "Unsatisfactory" shall be indicated instead of the letter grade and this will not be counted for the computation of SGPA/CGPA/Percentage.

Computation of Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA):

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

$$SGPA = \frac{\sum(C_i * G_i)}{\sum C_i}$$

Where $\boldsymbol{C_i}$ is the number of credits of the $\boldsymbol{i^{th}}$ subject and $\boldsymbol{G_i}$ is the grade point scored by the student in the $\boldsymbol{i^{th}}$ course

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

$$CGPA = \frac{\sum(C_i * S_i)}{\sum C_i}$$

Where $\boldsymbol{S_i}$ is the SGPA of the $\boldsymbol{i^{th}}$ semester and $\boldsymbol{C_i}$ is the total number of credits up to that semester

Both SGPA and CGPA shall be rounded off to 2 decimal points and reported in the transcripts. While computing the SGPA the subjects in which the student is awarded Zero grade points will also be included.

Grade Point: It is a numerical weight allotted to each letter grade on a 10-point scale. Letter Grade: It is an index of the performance of students in a said course. Grades are denoted by the letters S, A, B, C, D and F.

Award of Class:

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

Class Awarded	**CGPA Secured**
First Class with Distinction	≥7.5
First Class	≥6.5 <7.5
Second Class	≥5.5 <6.5
Pass Class	≥5.0 <5.5

CGPA to Percentage conversion Formula – (CGPA – 0.5) x 10

21. With–holding of Results

If the candidate has any dues not paid to the Institute or if any case of indiscipline or malpractice is pending against him/her, the result of the candidate shall be withheld in such cases.

22. Multiple Entry / Exit Option

(a) Exit Policy:

The students can choose to exit the four-year programme at the end of first/second/third year.

i. **UG Certificate in (Field of study/discipline)** - Programme duration: First year (first two semesters) of the undergraduate programme, 40 credits followed by an additional exit 10-credit bridge course(s)

lasting two months, including at least 6- credit job-specific internship/ apprenticeship that would help the candidates acquire job-ready competencies required to enter the workforce.

ii. **UG Diploma (in Field of study/discipline)** - Programme duration: First two years (first four semesters) of the undergraduate programme, 80 credits followed by an additional exit 10-credit bridge course(s) lasting two months, including at least 6- credit job-specific internship/ apprenticeship that would help the candidates acquire job-ready competencies required to enter the workforce.

iii. **Bachelor of Science (in Field of study/discipline) i.e**., B.Sc**. Engineering in (Field of study/discipline)** - Programme duration: First three years (first six semesters) of the undergraduate programme, 120 credits.

(b) Entry Policy:

Modalities on multiple entry by the student into the B.Tech. Programme will be provided in due course of time.

Note: The Universities shall resolve any issues that may arise in the implementation of Multiple Entry and Exit policies from time to time and shall review the policies in the light of periodic changes brought by UGC, AICTE and State government.

23. Gap Year Concept

Gap year concept for Student Entrepreneur in Residence is introduced and outstanding students who wish to pursue entrepreneurship / become entrepreneur are allowed to take a break of one year at any time after II year to pursue full-time entrepreneurship programme/to establish start-ups. This period 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. The principal of the respective college shall forward such proposals submitted by the students to the Institute. An evaluation committee constituted by the Institute shall evaluate the proposal submitted by the student and the committee shall decide whether to permit the student(s) to avail the Gap Year or not

24. Transitory Regulations

Discontinued, detained, or failed candidates are eligible for readmission as and when the semester is offered after fulfillment of academic regulations. Candidates who have been detained for want of attendance or not fulfilled academic requirements or who have failed after having undergone the course in earlier regulations or have discontinued and wish to continue the course are eligible for admission into the unfinished semester from the date of commencement of class work with the same or equivalent subjects as and when subjects are offered, subject to Section 2 and they will follow the academic regulations into which they are readmitted.

Candidates who are permitted to avail Gap Year shall be eligible for re-joining into the succeeding year of their B. Tech from the date of commencement of class work, subject to Section **2** and they will follow the academic regulations into which they are readmitted.

25. Minimum Instruction Days for a Semester:

The minimum instruction days including exams for each semester shall be 90 days.

26. Medium of Instruction:

The medium of instruction of the entire B.Tech undergraduate programme in Engineering & Technology (including examinations and project reports) will be in English only.

27. Student Transfers:

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

28. General Instructions:

i. The academic regulations should be read as a whole for purpose of any interpretation.

ii. Malpractices rules-nature and punishments are appended.

iii. Where the words “he”, “him”, “his”, occur in the regulations, they also include “she”, “her”, “hers”, respectively.

iv. In the case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Vice-Chancellor is final

v. The Universities may change or amend the academic regulations or syllabi at any time and the changes or amendments shall be made applicable to all the students on rolls with effect from the dates notified by the Universities.

vi. In the case of any doubt or ambiguity in the interpretation of the guidelines given, the decision of the Vice-Chancellor / Head of the institution is final

ACADEMIC REGULATIONS (R23) FOR B.TECH. (LATERAL ENTRY SCHEME)

*(Effective for the students admitted into II year through Lateral Entry Scheme from the Academic Year **2024-25** onwards)*

1. Award of the Degree

(a) Award of the B.Tech. Degree / B.Tech. Degree with a Minor if he/she fulfills the following:

i. Pursues a course of study for not less than three academic years and not more than six academic years. However, for the students availing Gap year facility this period shall be extended by two years at the most and these two years would in addition to the maximum period permitted for graduation (Six years).

ii. Registers for 120 credits and secures all 120 credits.

(b) Award of B.Tech. Degree with Honors if he/she fulfills the following:

i. Student secures additional 15 credits fulfilling all the requisites of a B.Tech. Programme i.e., 120 credits. Registering for Honors is optional.

ii. Honors is to be completed simultaneously with B.Tech. Programme.

2. Students, who fail to fulfill the requirement for the award of the degree within six consecutive academic years from the year of admission, shall forfeit their seat.

3. Minimum Academic Requirements

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

i. A student shall be deemed to have satisfied the minimum academic requirements and earned the credits allotted to each theory, practical, design, drawing subject or project if he secures not less than 35% of marks in the end examination and a minimum of 40% of marks in the sum total of the mid semester evaluation and end examination taken together.

ii. A student shall be promoted from III year to IV year if he/she fulfills the academic requirements of securing 40% of the credits (any decimal fraction should be rounded off to lower digit) in the subjects that have been studied up to V semester.

iii. And case if student is already detained for want of credits for particular academic year, the student may make up the credits through supplementary exams of the above exams before the commencement of IV year I semester class work of next year.

4. Course Pattern

i. The entire course of study is three academic years on semester pattern.

ii. A student eligible to appear for the end examination in a subject but absent at it or has failed in the end examination may appear for that subject at the next supplementary examination offered.

iii. When a student is detained due to lack of credits/shortage of attendance the student may be re-admitted when the semester is offered after fulfillment of academic regulations, the student shall be in the academic regulations into which he/she is readmitted.

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

Appendix-I: Internship Guidelines

The Head of the Department will arrange internship for students in industries/organization after fifth semester or as per AICTE/ affiliating University guidelines. Institutions may also device online system for arranging &managing internships. The general procedure for arranging internship is given below:

Step 1: Request Letter/ Email from the office of HOD of the department should go to industry to allot various slots of 4-6 weeks during summer vacation as internship periods for the students. Students request letter/profile/ interest areas may be submitted to industries for their willingness for providing the training.

Step 2: Industry will confirm the training slots and the number of seats allocated for internships via Confirmation Letter/ Email. In case the students arrange the training themselves the confirmation letter will be submitted by the students in the office of Training & Placement through concerned department. Based on the number of slots agreed to by the Industry.

Step 3: Students on joining Training at the concerned Industry / Organization, submit the Joining Report/ Letters / Email.

Step 4: Students undergo industrial training at the concerned Industry / Organization. In-between Faculty Member(s) evaluate(s) the performance of students once/twice by visiting the Industry/Organization and Evaluation Report of the students is submitted in department office/TPO with the consent of Industry persons/ Trainers.

Step 5: Students will submit training report after completion of internship.

Step 6: Training Certificate to be obtained from industry.

Step 7: List of students who have completed their internship successfully will be issued by concerned Department.

For more details refer:

https://www.aicte-india.org/sites/default/files/AICTE%20Internship%20Policy.pdf

Appendix II: Norms and Procedures for Challenge Evaluation/Revaluation/Recounting

Revaluation / Recounting:

- The students who wishes to apply for Revaluation/Recounting of his/her answer-books(s) must submit his/her application on the prescribed from together with the requisite fee to the Controller of Examinations before expiry of 15 days excluding the date of the declaration of his/her examination result. Application not received in the prescribed form or by the due date or without the requisite fee shall be rejected.
- After Recounting / Revaluation, records are updated with changes if any and the student will be issued a revised memorandum of marks. If there are no changes, the student shall be intimated the same through a notice.
- No Revaluation / Recounting for Laboratory Examination.
- The students are informed to be more careful in furnishing the information while applying for Recounting / Revaluation. The applications with insufficient information will be summarily rejected and the student has to forfeit the amount paid in this connection.
- **Challenge valuation:**
- Applications are invited from the students, who wish to apply for Challenge Valuation in the subjects of the B.Tech Regular and Supplementary examinations
- The student will apply for Challenge valuation in a specified application and should be routed through the HOD concerned.
- The students who have applied for the revaluation for a paper(s) of an examination are only eligible for the Challenge Valuation of that paper(s) of that examination.
- A Fee of Rs. 10000/- (Ten Thousand Rupees Only) for each paper is to be paid within the last date for challenge valuation.
- A Xerox copy of the answer script will be provided to the student on receipt of the payment of fee and date and time of the valuation will be informed to the student, so that valuation will be done in the presence of the teacher attended in support of the student nominated by the HOD concerned.
- The HOD concerned will nominate a teacher of the concerned subject to observe the valuation in support of the student. This will be done on the request of the student.
- If the marks obtained in the challenge valuation are more than or equal to 15% of the maximum marks with respect to the original marks obtained in the first valuation, then the marks obtained in the Challenge valuation will be awarded to the student and the institute will pay back Rs 9,000 (Nine thousands rupees only) to the student. If the student status changes from fail to pass, an amount of Rs. 5000 will be refunded to the student. Otherwise there will not be any change in the result of the student and original marks will be retained and the student will forfeit the fee paid.
- No Challenge valuation for Laboratory Examination

APPENDIX III: Rules for Disciplinary Action for Malpractices / Improper Conduct in Examinations

Malpractices identified by squad or special invigilators or invigilators

Punishments shall be given to the students as per the above guidelines. The case is to be referred to the malpractice committee.

Malpractice committee

1. The Principal, Chairman
2. Dean, Academics, Member
3. Invigilator, Member
4. Subject expert, Member
5. Concerned Head of the Department, Member
6. Controller of Examinations, Member Secretary

Note:

Whenever the performance of a student is cancelled in any subject/subjects due to Malpractice, he has to register for End Examinations in that subject/subjects consequently and has to fill all the norms required for the award of Degree.

	Nature of Malpractices/Improper conduct	**Punishment**
	If the candidate:	
1.(a)	Possesses or keeps accessible in examination hall, any paper, note book, programmable calculators, Cell phones, pager, palm computers or any other form of material concerned with or related to the subject of the examination (theory or practical) in which he is appearing but has not made use of (material shall include any marks on the body of the candidate which can be used as an aid in the subject of the examination)	Expulsion from the examination hall and cancellation of the performance in that subject only.
1 (b)	Gives assistance or guidance or receives it from any other candidate orally or by any other body language methods or communicates through cell phones with any candidate or persons in or outside the exam hall in respect of any matter.	Expulsion from the examination hall and cancellation of performance in that subject only of all the candidates involved. In case of an outsider, he will be handed over to the police and a case is registered against him.
2.	Has copied in the examination hall from any paper, book, programmable calculators, palm computers or any other form of material relevant to the subject of the examination (theory or practical) in which the candidate is appearing	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted to appear for the remaining examinations of the subjects of that semester/year. The Hall Ticket of the candidate is to be cancelled and sent to the University.
3.	Impersonates any other candidate in	The candidate who has impersonated shall be

	connection with the examination.	expelled from examination hall. The candidate is also debarred for four consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat. The performance of the original candidate who has been impersonated, shall be cancelled in all the subjects of the examination (including practical's and project work) already appeared and shall not be allowed to appear for examinations of the remaining subjects of that semester/year. The candidate is also debarred for four consecutive semesters from class work and all University examinations, if his involvement is established. Otherwise, the candidate is debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat. If the imposter is an outsider, he will be handed over to the police and a case is registered against him.
4.	Smuggles in the Answer book or additional sheet or takes out or arranges to send out the question paper during the examination or answer book or additional sheet, during or after the examination.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
5.	Uses objectionable, abusive or offensive language in the answer paper or in letters to the examiners or writes to the examiner requesting him to award pass marks.	Cancellation of the performance in that subject only.
6.	Refuses to obey the orders of the Chief Superintendent/Assistant — Superintendent / any officer on duty or misbehaves or creates disturbance of any kind in and around the examination hall or organizes a walk out or instigates	In case of student of the college, they shall be expelled from examination halls and cancellation of their performance in that subject and all other subjects the candidate(s) has (have) already appeared and shall not be permitted to appear for the remaining examinations of the subjects of

	others to walk out, or threatens the officer-in charge or any person on duty in or outside the examination hall of any injury to his person or to any of his relations whether by words, either spoken or written or by signs or by visible representation, assaults the officer-in-charge, or any person on duty in or outside the examination hall or any of his relations, or indulges in any other act of misconduct or mischief which result in damage to or destruction of property in the examination hall or any part of the College campus or engages in any other act which in the opinion of the officer on duty amounts to use of unfair means or misconduct or has the tendency to disrupt the orderly conduct of the examination.	that semester/year. If the candidate physically assaults the invigilator/officer-in-charge of the Examinations, then the candidate is also debarred and forfeits his/her seat. In case of outsiders, they will be handed over to the police and a police case is registered against them.
7.	Leaves the exam hall taking away answer script or intentionally tears of the script or any part thereof inside or outside the examination hall.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
8.	Possess any lethal weapon or firearm in the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat.
9.	If students of the college, who is not a candidate for the particular examination or any person not connected with the college indulges in nay malpractice or improper conduct mentioned in class 6 to 8.	Student of the colleges expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that

		semester/year. The candidate is also debarred and forfeits the seat. Person (s) who does not belong to the College will be handed over to police and, a police case will be registered against them.
10.	Comes in a drunken condition to the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year.
11.	Copying detected on the basis of internal evidence, such as, during valuation or during special scrutiny.	Cancellation of the performance in that subject only or in that subject and all other subjects the candidate has appeared including practical examinations and project work of that semester / year examinations, depending on the recommendation of the committee.
12.	If any malpractice is detected which is not covered in the above clauses 1 to 12 shall be reported to the University for further action to award suitable punishment.	

Activities (Non-Credit) as per AICTE Guidelines

List of Activities

1. Physical and Health

1.1 Physical Activities: (a) Games and Sports, (b) Gardening (c) Tree Plantation (d) Yoga:

1.2 NCC/NSS: Standard procedure

2. Culture

2.1 Learning an art form: music, dance, theatre, painting, and other art forms

2.2 Heritage: Visit to museum, archaeology sites, cultural walks, tours, local traditions

2.3 Intangible Cultural Heritage: Festivals, Food ways, Local Games

3. Literature & Media

3.1 Literature, Cinema and Media: workshop, reading multiple news sources, analyses ads

3.2 Group reading: Group sits and each person reads aloud (if possible, with proper modulation) taking turns. This if done properly for an hour one may complete 30-40 pages in an hour

4. Social Service

4.1 Social Awareness: Artisans-relates to engg., visit to hospitals, orphanages, police station, courts, trauma centres, consumer forums

4.2 Social Service: teach in neighborhood, adopt an underprivileged school, village stay / visit (NSS), cleanliness drive, and skill transfer

5. Self-Development

5.1 Spiritual, Mindfulness & Meditation

5.2 Religion and Inter-faith: Reading of books on religious texts of different faiths by famous authors, organizing lecture on interfaith issues covering philosophies and chronology and contemporary situations world over at a given time

5.3 Human Values

5.4 Behavioural and Interpersonal skills: Motivational lectures, Group Discussions/activities, Case Study, Games/Stimulation Exercises, Role-Playing, Mindfulness training.

5.5 Lectures: Areas could be from science, engineering, social sciences, arts or even politics.

6. Nature

6.1 Nature Club: bird watching, recognizing plants at institute/at home, recognizing local animals, appreciating biodiversity

6.2 Environment Protection (non-credit course)

7. Innovation

7.1 Project based – Sc. Tech., Social, Design & Innovation: (a) Exposure to social problems (which are amenable to technological solutions) (b) Design & Innovation (to address above problems)

First 3-weeks – Induction Program will have Physical activities (*), Learning an art form (*), Literature & Cinema, Social Awareness (*) Lectures, Visits to local areas, Universal Human Values (*)

(*) It is the core part of Induction Program (Besides Familiarization to the College, Department and Branch career opportunities)

After first 3 weeks (1st semester)

Based on student interest – the above may be continued

Universal Human Values Groups – Meet once a week with 1st year students with the same faculty mentor & senior student guide.

Semester 2 to 4

Every student should register for some activity mentioned above in every semester. Spend 3-5 hours per week on the activity.

a. Environment Science (mandatory non-credit course prescribed at 1/2 semester)
b. Life Sciences for Engineers (mandatory non-credit course prescribed at 3/4 semester)

c. Constitution of India (mandatory non-credit course prescribed at 5/6 semester)
d. Essence of Indian Traditional Knowledge (mandatory non-credit course prescribed at 5/6 semester)

For mandatory non-credit courses, these will be graded as Pass or Fail (P/F). Thus, the grades obtained will not affect the grade point average. However, they will appear on the grade sheet.

Semester 5 to 8

Every student should register for some activity mentioned above in every semester. Spend 3-5 hours per week on the activity. For activities, suitable registration system in case of the semesters will be developed.

STUDENT INDUCTION PROGRAMME (Zero Semesters)

Induction programme for newly admitted students is conducted in line with AICTE/UGC Induction programme policy, every year before the commencement of the first semester classes. The objective of the Induction programme is to demystify what is expected of students in Intermediate level and to provide adequate foundation in the core applied science subjects and English limited to moderate level so that students do not face any difficulty when the classes commence.

The syllabus for the course is framed in such a way that equal importance is given to both Engineering discipline and personality development which includes soft skills, sports and cultural Activities. The duration of the induction programme is **THREE** weeks. The students are trained in Foundation courses, basics of programming and English apart from other co-curricular and extra-curricular activities.

The objective of the Induction Programme is to work closely with the newly joined students in order to facilitate the following:

- Make the students feel comfortable in the new environment
- Allow them to explore their academic interests and activities
- Reduce competition and make them work for excellence
- Promote bonding within them
- Build relations between teachers and students
- Give a broader view of life
- Build character

S. No	Course Name	Category	L-T-P-C
1	Physical Activities – Sports, Yoga and Meditation	MC	0-0-6-0
2	Career Counseling	MC	2-0-2-0
3	Orientation to all branches – Career options, tools etc.	MC	3-0-0-0
4	Orientation on admitted Branch—Corresponding Labs, Tools, and Platforms	EC	2-0-3-0
5	Proficiency Modules & Productivity Tools	BS	2-1-2-0
6	Assessment on basic attitude and mathematical skills	MC	2-0-3-0
7	Remedial Training in Foundations Courses	MC	2-1-2-0
8	Human Values and Professional Ethics	MC	3-0-0-0
9	Communication Skills – Focus on Listening, Speaking, Reading and Writing Skills	BS	2-1-2-0
10	Concepts of Programming	ES	2-0-2-0

DEPARTMENT OF CIVIL ENGINEERING

I YEAR COURSE STRUCTURE

I Semester							
S.No.	**Category**	**Code**	**Title**	**L**	**T**	**P**	**Credits**
1	BS&H	23AHS12T	Communicative English	2	0	0	2
2	BS&H	23AHS13T	Engineering Chemistry	3	0	0	3
3	BS&H	23AHS11T	Linear Algebra & Calculus	3	0	0	3
4	ES	23A0111T	Basic Civil & Mechanical Engineering	3	0	0	3
5	ES	23A0511T	Introduction to Programming	3	0	0	3
6	BS&H	23AHS12L	Communicative English Lab	0	0	2	1
7	BS&H	23AHS13L	Engineering Chemistry Lab	0	0	2	1
8	ES	23A0311L	Engineering Workshop	0	0	3	1.5
9	ES	23A0511L	Computer Programming Lab	0	0	3	1.5
10	BS&H	23AHS16L	Health and wellness, Yoga and Sports	-	-	1	0.5
			Total	14	0	11	19.5

Category	**Credits**
Basic Science & Humanities Courses	10.5
Engineering Science Courses	9
Total Credits	19.5

II Semester							
S.No.	**Category**	**Code**	**Title**	**L**	**T**	**P**	**Credits**
1	BS&H	23AHS25T	Engineering Physics	3	0	0	3
2	BS&H	23AHS21T	Differential Equations & Vector Calculus	3	0	0	3
3	ES	23A0221T	Basic Electrical and Electronics Engineering	3	0	0	3
4	ES	23A0322T	Engineering Graphics	1	0	4	3
5	ES	23A0522L	IT Workshop	0	0	2	1
6	PC	23A0323T	Engineering Mechanics	3	0	0	3
7	BS&H	23AHS25L	Engineering Physics Lab	0	0	2	1
8	ES	23A0221L	Electrical and Electronics Engineering Workshop	0	0	3	1.5
9	PC	23A0121L	Engineering Mechanics & Building Practices Lab	0	0	3	1.5
10	BS&H	23AHS27L	NSS/NCC/Scouts & Guides/Community Service	-	-	1	0.5
			Total	13	0	15	20.5

Category	**Credits**
Basic Science & Humanities Courses	7.5
Engineering Science Courses	13
Total Credits	20.5

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

I YEAR COURSE STRUCTUTRE

I Semester							
S. No.	**Category**	**Code**	**Title**	**L**	**T**	**P**	**Credits**
1	BS&H	23AHS15T	Engineering Physics	3	0	0	3
2	BS&H	23AHS11T	Linear Algebra & Calculus	3	0	0	3
3	ES	23A0211T	Basic Electrical & Electronics Engineering	3	0	0	3
4	ES	23A0312T	Engineering Graphics	1	0	4	3
5	ES	23A0511T	Introduction to Programming	3	0	0	3
7	BS&H	23AHS15L	Engineering Physics Lab	0	0	2	1
8	ES	23A0211L	Electrical & Electronics Engineering Workshop	0	0	3	1.5
9	ES	23A0511L	Computer Programming Lab	0	0	3	1.5
10	BS&H	23AHS17L	NSS/NCC/Scouts & Guides/Community Service	-	-	1	0.5
			Total	13	0	13	19.5

Category	**Credits**
Basic Science & Humanities Courses	7.5
Engineering Science Courses	12
Total Credits	19.5

II Semester							
S. No.	**Category**	**Code**	**Title**	**L**	**T**	**P**	**Credits**
1	BS&H	23AHS22T	Communicative English	2	0	0	2
2	BS&H	23AHS24T	Chemistry	3	0	0	3
3	ES	23AHS21T	Differential Equations & Vector Calculus	3	0	0	3
4	ES	23A0121T	Basic Civil & Mechanical Engineering	3	0	0	3
5	PC	23A0222T	Electrical Circuit Analysis-I	3	0	0	3
6	BS&H	23AHS22L	Communicative English Lab	0	0	2	1
7	BS&H	23AHS24L	Chemistry Lab	0	0	2	1
8	ES	23A0321L	Engineering Workshop	0	0	3	1.5
9	PC	23A0222L	Electrical Circuit Analysis-I Lab	0	0	3	1.5
10	ES	23A0522L	IT Workshop	0	0	2	1
11	BS&H	23AHS26L	Health and wellness, Yoga and Sports	-	-	1	0.5
			Total	14	0	13	20.5

Category	**Credits**
Basic Science & Humanities Courses	7.5
Engineering Science Courses	13
Total Credits	20.5

DEPARTMENT OF MECHANICAL ENGINEERING

I YEAR COURSE STRUCTURE

I Semester							
S.No.	**Category**	**Code**	**Title**	**L**	**T**	**P**	**Credits**
1	BS&H	23AHS12T	Communicative English	2	0	0	2
2	BS&H	23AHS13T	Engineering Chemistry	3	0	0	3
3	BS&H	23AHS11T	Linear Algebra & Calculus	3	0	0	3
4	ES	23A0111T	Basic Civil & Mechanical Engineering	3	0	0	3
5	ES	23A0511T	Introduction to Programming	3	0	0	3
6	BS&H	23AHS12L	Communicative English Lab	0	0	2	1
7	BS&H	23AHS13L	Engineering Chemistry Lab	0	0	2	1
8	ES	23A0311L	Engineering Workshop	0	0	3	1.5
9	ES	23A0511L	Computer Programming Lab	0	0	3	1.5
10	BS&H	23AHS16L	Health and wellness, Yoga and Sports	-	-	1	0.5
			Total	14	0	11	19.5

Category	**Credits**
Basic Science & Humanities Courses	10.5
Engineering Science Courses	9
Total Credits	19.5

II Semester							
S.No.	**Category**	**Code**	**Title**	**L**	**T**	**P**	**Credits**
1	BS&H	23AHS25T	Engineering Physics	3	0	0	3
2	BS&H	23AHS21T	Differential Equations & Vector Calculus	3	0	0	3
3	ES	23A0221T	Basic Electrical and Electronics Engineering	3	0	0	3
4	ES	23A0322T	Engineering Graphics	1	0	4	3
5	ES	23A0522L	IT Workshop	0	0	2	1
6	PC	23A0323T	Engineering Mechanics	3	0	0	3
7	BS&H	23AHS25L	Engineering Physics Lab	0	0	2	1
8	ES	23A0221L	Electrical and Electronics Engineering Workshop	0	0	3	1.5
9	PC	23A0323L	Engineering Mechanics Lab	0	0	3	1.5
10	BS&H	23AHS27L	NSS/NCC/Scouts & Guides/Community Service	-	-	1	0.5
			Total	13	0	15	20.5

Category	**Credits**
Basic Science & Humanities Courses	7.5
Engineering Science Courses	13
Total Credits	20.5

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

I YEAR COURSE STRUCTUTRE

I Semester							
S. No.	**Category**	**Code**	**Title**	**L**	**T**	**P**	**Credits**
1	BS&H	23AHS15T	Engineering Physics	3	0	0	3
2	BS&H	23AHS11T	Linear Algebra & Calculus	3	0	0	3
3	ES	23A0211T	Basic Electrical & Electronics Engineering	3	0	0	3
4	ES	23A0312T	Engineering Graphics	1	0	4	3
5	ES	23A0511T	Introduction to Programming	3	0	0	3
7	BS&H	23AHS15L	Engineering Physics Lab	0	0	2	1
8	ES	23A0211L	Electrical & Electronics Engineering Workshop	0	0	3	1.5
9	ES	23A0511L	Computer Programming Lab	0	0	3	1.5
10	BS&H	23AHS17L	NSS/NCC/Scouts & Guides/Community Service	-	-	1	0.5
			Total	13	0	13	19.5

Category	**Credits**
Basic Science & Humanities Courses	7.5
Engineering Science Courses	12
Total Credits	19.5

II Semester							
S. No.	**Category**	**Code**	**Title**	**L**	**T**	**P**	**Credits**
1	BS&H	23AHS22T	Communicative English	2	0	0	2
2	BS&H	23AHS24T	Chemistry	3	0	0	3
3	ES	23AHS21T	Differential Equations & Vector Calculus	3	0	0	3
4	ES	23A0121T	Basic Civil & Mechanical Engineering	3	0	0	3
5	PC	23A0421T	Network Analysis	3	0	0	3
6	BS&H	23AHS22L	Communicative English Lab	0	0	2	1
7	BS&H	23AHS24L	Chemistry Lab	0	0	2	1
8	ES	23A0321L	Engineering Workshop	0	0	3	1.5
9	PC	23A0421L	Network Analysis Lab	0	0	3	1.5
10	ES	23A0522L	IT Workshop	0	0	2	1
11	BS&H	23AHS26L	Health and wellness, Yoga and Sports	-	-	1	0.5
			Total	14	0	13	20.5

Category	**Credits**
Basic Science & Humanities Courses	7.5
Engineering Science Courses	13
Total Credits	20.5

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

I YEAR COURSE STRUCTURE

I Semester							
S.No.	**Category**	**Code**	**Title**	**L**	**T**	**P**	**Credits**
1	BS&H	23AHS12T	Communicative English	2	0	0	2
2	BS&H	23AHS14T	Chemistry	3	0	0	3
3	BS&H	23AHS11T	Linear Algebra & Calculus	3	0	0	3
4	ES	23A0111T	Basic Civil & Mechanical Engineering	3	0	0	3
5	ES	23A0511T	Introduction to Programming	3	0	0	3
6	BS&H	23AHS12L	Communicative English Lab	0	0	2	1
7	BS&H	23AHS14L	Chemistry Lab	0	0	2	1
8	ES	23A0311L	Engineering Workshop	0	0	3	1.5
9	ES	23A0511L	Computer Programming Lab	0	0	3	1.5
10	BS&H	23AHS16L	Health and wellness, Yoga and Sports	-	-	1	0.5
			Total	14	0	11	19.5

Category	**Credits**
Basic Science & Humanities Courses	10.5
Engineering Science Courses	9
Total Credits	19.5

II Semester							
S. No.	**Category**	**Code**	**Title**	**L**	**T**	**P**	**Credits**
1	BS&H	23AHS25T	Engineering Physics	3	0	0	3
2	BS&H	23AHS21T	Differential Equations & Vector Calculus	3	0	0	3
3	ES	23A0221T	Basic Electrical and Electronics Engineering	3	0	0	3
4	ES	23A0322T	Engineering Graphics	1	0	4	3
5	ES	23A0522L	IT Workshop	0	0	2	1
6	PC	23A0521T	Data Structures	3	0	0	3
7	BS&H	23AHS25L	Engineering Physics Lab	0	0	2	1
8	ES	23A0221L	Electrical and Electronics Engineering Workshop	0	0	3	1.5
9	PC	23A0521L	Data Structures Lab	0	0	3	1.5
10	BS&H	23AHS27L	NSS/NCC/Scouts & Guides/Community Service	-	-	1	0.5
			Total	13	0	15	20.5

Category	**Credits**
Basic Science & Humanities Courses	7.5
Engineering Science Courses	13
Total Credits	20.5

DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

I YEAR COURSE STRUCTURE

I Semester							
S.No.	**Category**	**Code**	**Title**	**L**	**T**	**P**	**Credits**
1	BS&H	23AHS12T	Communicative English	2	0	0	2
2	BS&H	23AHS14T	Chemistry	3	0	0	3
3	BS&H	23AHS11T	Linear Algebra & Calculus	3	0	0	3
4	ES	23A0111T	Basic Civil & Mechanical Engineering	3	0	0	3
5	ES	23A0511T	Introduction to Programming	3	0	0	3
6	BS&H	23AHS12L	Communicative English Lab	0	0	2	1
7	BS&H	23AHS14L	Chemistry Lab	0	0	2	1
8	ES	23A0311L	Engineering Workshop	0	0	3	1.5
9	ES	23A0511L	Computer Programming Lab	0	0	3	1.5
10	BS&H	23AHS16L	Health and wellness, Yoga and Sports	-	-	1	0.5
			Total	14	0	11	19.5

Category	**Credits**
Basic Science & Humanities Courses	10.5
Engineering Science Courses	9
Total Credits	19.5

II Semester							
S. No.	**Category**	**Code**	**Title**	**L**	**T**	**P**	**Credits**
1	BS&H	23AHS25T	Engineering Physics	3	0	0	3
2	BS&H	23AHS21T	Differential Equations & Vector Calculus	3	0	0	3
3	ES	23A0221T	Basic Electrical and Electronics Engineering	3	0	0	3
4	ES	23A0322T	Engineering Graphics	1	0	4	3
5	ES	23A0522L	IT Workshop	0	0	2	1
6	PC	23A0521T	Data Structures	3	0	0	3
7	BS&H	23AHS25L	Engineering Physics Lab	0	0	2	1
8	ES	23A0221L	Electrical and Electronics Engineering Workshop	0	0	3	1.5
9	PC	23A0521L	Data Structures Lab	0	0	3	1.5
10	BS&H	23AHS27L	NSS/NCC/Scouts & Guides/Community Service	-	-	1	0.5
			Total	13	0	15	20.5

Category	**Credits**
Basic Science & Humanities Courses	7.5
Engineering Science Courses	13
Total Credits	20.5

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING (DATA SCIENCE)

I YEAR COURSE STRUCTURE

I Semester							
S.No.	**Category**	**Code**	**Title**	**L**	**T**	**P**	**Credits**
1	BS&H	23AHS12T	Communicative English	2	0	0	2
2	BS&H	23AHS14T	Chemistry	3	0	0	3
3	BS&H	23AHS11T	Linear Algebra & Calculus	3	0	0	3
4	ES	23A0111T	Basic Civil & Mechanical Engineering	3	0	0	3
5	ES	23A0511T	Introduction to Programming	3	0	0	3
6	BS&H	23AHS12L	Communicative English Lab	0	0	2	1
7	BS&H	23AHS14L	Chemistry Lab	0	0	2	1
8	ES	23A0311L	Engineering Workshop	0	0	3	1.5
9	ES	23A0511L	Computer Programming Lab	0	0	3	1.5
10	BS&H	23AHS16L	Health and wellness, Yoga and Sports	-	-	1	0.5
			Total	14	0	11	19.5

Category	**Credits**
Basic Science & Humanities Courses	10.5
Engineering Science Courses	9
Total Credits	19.5

II Semester							
S. No.	**Category**	**Code**	**Title**	**L**	**T**	**P**	**Credits**
1	BS&H	23AHS25T	Engineering Physics	3	0	0	3
2	BS&H	23AHS21T	Differential Equations & Vector Calculus	3	0	0	3
3	ES	23A0221T	Basic Electrical and Electronics Engineering	3	0	0	3
4	ES	23A0322T	Engineering Graphics	1	0	4	3
5	ES	23A0522L	IT Workshop	0	0	2	1
6	PC	23A0521T	Data Structures	3	0	0	3
7	BS&H	23AHS25L	Engineering Physics Lab	0	0	2	1
8	ES	23A0221L	Electrical and Electronics Engineering Workshop	0	0	3	1.5
9	PC	23A0521L	Data Structures Lab	0	0	3	1.5
10	BS&H	23AHS27L	NSS/NCC/Scouts & Guides/Community Service	-	-	1	0.5
			Total	13	0	15	20.5

Category	**Credits**
Basic Science & Humanities Courses	7.5
Engineering Science Courses	13
Total Credits	20.5

DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE
I YEAR COURSE STRUCTURE

I Semester							
S. No.	**Category**	**Code**	**Title**	**L**	**T**	**P**	**Credits**
1	BS&H	23AHS15T	Engineering Physics	3	0	0	3
2	BS&H	23AHS11T	Linear Algebra & Calculus	3	0	0	3
3	ES	23A0211T	Basic Electrical & Electronics Engineering	3	0	0	3
4	ES	23A0312T	Engineering Graphics	1	0	4	3
5	ES	23A0511T	Introduction to Programming	3	0	0	3
7	BS&H	23AHS15L	Engineering Physics Lab	0	0	2	1
8	ES	23A0211L	Electrical & Electronics Engineering Workshop	0	0	3	1.5
9	ES	23A0511L	Computer Programming Lab	0	0	3	1.5
10	BS&H	23AHS17L	NSS/NCC/Scouts & Guides/Community Service	-	-	1	0.5
			Total	13	0	13	19.5

Category	**Credits**
Basic Science & Humanities Courses	7.5
Engineering Science Courses	12
Total Credits	19.5

II Semester							
S. No.	**Category**	**Code**	**Title**	**L**	**T**	**P**	**Credits**
1	BS&H	23AHS22T	Communicative English	2	0	0	2
2	BS&H	23AHS24T	Chemistry	3	0	0	3
3	ES	23AHS21T	Differential Equations & Vector Calculus	3	0	0	3
4	ES	23A0121T	Basic Civil & Mechanical Engineering	3	0	0	3
5	PC	23A0521T	Data structures	3	0	0	3
6	BS&H	23AHS22L	Communicative English Lab	0	0	2	1
7	BS&H	23AHS24L	Chemistry Lab	0	0	2	1
8	ES	23A0321L	Engineering Workshop	0	0	3	1.5
9	PC	23A0521L	Data structures Lab	0	0	3	1.5
10	ES	23A0522L	IT Workshop	0	0	2	1
11	BS&H	23AHS26L	Health and wellness, Yoga and Sports	-	-	1	0.5
			Total	14	0	13	20.5

Category	**Credits**
Basic Science & Humanities Courses	7.5
Engineering Science Courses	13
Total Credits	20.5

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING (ARTIFICIAL INTELLIGENCE)
I YEAR COURSE STRUCTURE

I Semester							
S. No.	**Category**	**Code**	**Title**	**L**	**T**	**P**	**Credits**
1	BS&H	23AHS15T	Engineering Physics	3	0	0	3
2	BS&H	23AHS11T	Linear Algebra & Calculus	3	0	0	3
3	ES	23A0211T	Basic Electrical & Electronics Engineering	3	0	0	3
4	ES	23A0312T	Engineering Graphics	1	0	4	3
5	ES	23A0511T	Introduction to Programming	3	0	0	3
7	BS&H	23AHS15L	Engineering Physics Lab	0	0	2	1
8	ES	23A0211L	Electrical & Electronics Engineering Workshop	0	0	3	1.5
9	ES	23A0511L	Computer Programming Lab	0	0	3	1.5
10	BS&H	23AHS17L	NSS/NCC/Scouts & Guides/Community Service	-	-	1	0.5
			Total	13	0	13	19.5

Category	**Credits**
Basic Science & Humanities Courses	7.5
Engineering Science Courses	12
Total Credits	19.5

II Semester							
S. No.	**Category**	**Code**	**Title**	**L**	**T**	**P**	**Credits**
1	BS&H	23AHS22T	Communicative English	2	0	0	2
2	BS&H	23AHS24T	Chemistry	3	0	0	3
3	ES	23AHS21T	Differential Equations & Vector Calculus	3	0	0	3
4	ES	23A0121T	Basic Civil & Mechanical Engineering	3	0	0	3
5	PC	23A0521T	Data structures	3	0	0	3
6	BS&H	23AHS22L	Communicative English Lab	0	0	2	1
7	BS&H	23AHS24L	Chemistry Lab	0	0	2	1
8	ES	23A0321L	Engineering Workshop	0	0	3	1.5
9	PC	23A0521L	Data structures Lab	0	0	3	1.5
10	ES	23A0522L	IT Workshop	0	0	2	1
11	BS&H	23AHS26L	Health and wellness, Yoga and Sports	-	-	1	0.5
			Total	14	0	13	20.5

Category	**Credits**
Basic Science & Humanities Courses	7.5
Engineering Science Courses	13
Total Credits	20.5

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)

Title of the Course: Linear Algebra and Calculus
Category: BS&H
Couse Code: 23AHS11T
Branch/es: Common to all branches of engineering
Semester: I Semester

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	-	-	3

Course Objectives:

1. To enlighten the learners in the concept of differential equations and multivariable 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.

Course Outcomes:

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

1. solve system of linear equations.
2. use the techniques of matrix algebra for engineering applications.
3. apply properties of mean value theorems in engineering techniques.
4. apply the functions of several variables in optimization techniques.
5. apply multiple integrals to find area of solids.

Unit 1 Matrices 9

Rank of a matrix by echelon form, normal form. Cauchy –Binet formulae (without proof). Inverse of Non-singular matrices by Gauss-Jordan method, System of linear equations: Solving system of Homogeneous and Non-Homogeneous equations by Gauss elimination method, Gauss Seidel Iteration Method.

Unit 2 Linear Transformation and Orthogonal Transformation 8

Eigenvalues, Eigenvectors and their properties, Diagonalization of a matrix, Cayley-Hamilton Theorem (without proof), finding inverse and power of a matrix by Cayley-Hamilton Theorem, Quadratic forms and Nature of the Quadratic forms, Reduction of Quadratic form to canonical forms by Orthogonal Transformation.

Unit 3 Calculus 8

Mean Value Theorems: Rolle's Theorem, Lagrange's mean value theorem with their geometrical interpretation, Cauchy's mean value theorem, Taylor's and Maclaurin theorems with remainders (without proof), Problems and applications on the above theorems.

Unit 4 Partial differentiation and Applications (Multi variable calculus) 10

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

Unit 5 Multiple Integrals (Multi variable Calculus) 9

Double integrals, triple integrals, change of order of integration, change of variables to polar, cylindrical and spherical coordinates. Finding areas (by double integrals) and volumes (by double integrals and triple integrals).

Prescribed Textbooks:

1. B. S. Grewal, Higher Engineering Mathematics, 44/e, Khanna Publishers, 2017.
2. Erwin Kreyszig, Advanced Engineering Mathematics, 10/e, John Wiley & Sons, 2018.

Reference Books:

1. R. K. Jain and S. R. K. Iyengar, Advanced Engineering Mathematics, 5th edition, Alpha Science International Ltd., 2021 (9th reprint).
2. George B. Thomas, Maurice D. Weir and Joel Hass, Thomas Calculus, 14th edition, Pearson Publishers, 2018.
3. Glyn James, Advanced Modern Engineering Mathematics, 5/e, Pearson Publishers, 2018.
4. Michael Greenberg, Advanced Engineering Mathematics, 9th edition, Pearson
5. H. K. Das, Er. Rajnish Verma, Higher Engineering Mathematics, S. Chand, 2021

Web resources:

1. https://proofwiki.org/wiki/Cauchy-Binet_Formula

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long learning
23AHS11T.1	3	2	1	2	-	-	-	-	-	-	-	1
23AHS11T.2	3	2	1	2	-	-	-	-	-	-	-	1
23AHS11T.3	3	2	1	2	-	-	-	-	-	-	-	1
23AHS11T.4	3	2	1	2	-	-	-	-	-	-	-	1
23AHS11T.5	3	2	1	2	-	-	-	-	-	-	-	1

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)

Title of the Course:	Communicative English	
Category:	BS&H	
Couse Code:	23AHS12T	23AHS22T
Branch/es:	CE, ME, CSE, AIML, CSE (DS)	ECE, EEE, AIDS, CSE (AI)
Semester:	I Semester	II Semester

Lecture Hours	Tutorial Hours	Practice Hours	Credits
2	-	-	2

Course Objectives: The main objective of introducing this course, communicative English, is to facilitate effective listening, Reading, Speaking and Writing skills among the students. It enhances the same in their comprehending abilities, oral presentations, reporting useful information and providing knowledge of grammatical structures and vocabulary. This course helps the students to make them effective in speaking and writing skills and to make them industry-ready.

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

1. understand the context, topic, and pieces of specific information from social or transactional dialogues spoken by native speakers of English
2. analyse literary forms, journalistic articles and scientific readings for comprehension and retention
3. demonstrate effective writing and speaking skills
4. apply grammatical knowledge in speech and writing and formulate sentences with accuracy
5. produce coherent and unified paragraphs with adequate support and detail

Unit 1 9

Lesson: HUMAN VALUES: The Gift of the Magi (Short Story)
Listening: Identifying the topic, the context and specific pieces of information by listening to short audio texts and answering a series of questions.
Speaking: Asking and answering general questions on familiar topics such as home, family, work, studies and interests; introducing oneself and others.
Reading: Skimming to get the main idea of a text; scanning to look for specific pieces of information.
Writing: Mechanics of Writing-Capitalization, Spellings, Punctuation-Parts of Sentences.
Grammar: Parts of Speech, Basic Sentence Structures-forming questions
Vocabulary: Synonyms, Antonyms, Affixes (Prefixes/Suffixes), Root words.

Unit 2 9

Lesson: NATURE: The Brook by Alfred Tennyson (Poem)
Listening: Answering a series of questions about main ideas and supporting ideas after listening to audio texts.
Speaking: Discussion in pairs/small groups on specific topics followed by short structure talks.
Reading: Identifying sequence of ideas; recognizing verbal techniques that help to link the ideas in a paragraph together.
Writing: Structure of a paragraph - Paragraph writing (specific topics)
Grammar: Cohesive devices - linkers, use of articles and zero article; prepositions.
Vocabulary: Homonyms, Homophones, Homographs.

Unit 3 9

Lesson: BIOGRAPHY: Elon Musk
Listening: Listening for global comprehension and summarizing what is listened to.
Speaking: Discussing specific topics in pairs or small groups and reporting what is discussed

Reading: Reading a text in detail by making basic inferences -recognizing and interpreting specific context clues; strategies to use text clues for comprehension.
Writing: Summarizing, Note-making, paraphrasing
Grammar: Verbs - tenses; subject-verb agreement; Compound words, Collocations
Vocabulary: Compound words, Collocations

Unit 4 9
Lesson: INSPIRATION: The Toys of Peace by Saki
Listening: Making predictions while listening to conversations/ transactional dialogues without video; listening with video.
Speaking: Role plays for practice of conversational English in academic contexts (formal and informal) - asking for and giving information/directions.
Reading: Studying the use of graphic elements in texts to convey information, reveal trends /patterns /relationships, communicate processes or display complicated data.
Writing: Letter Writing: Official Letters, Resumes
Grammar: Reporting verbs, Direct & Indirect speech, Active & Passive Voice
Vocabulary: Words often confused, Jargon

Unit 5 9
Lesson: MOTIVATION: The Power of Intrapersonal Communication (An Essay)
Listening: Identifying key terms, understanding concepts and answering a series of relevant questions that test comprehension.
Speaking: Formal oral presentations on topics from academic contexts
Reading: Reading comprehension.
Writing: Writing structured essays on specific topics.
Grammar: Editing short texts –identifying and correcting common errors in grammar and usage (articles, prepositions, tenses, subject verb agreement)
Vocabulary: Technical Jargon

Prescribed Textbooks:
1. Pathfinder: Communicative English for Undergraduate Students, 1st Edition, Orient Black Swan, 2023
2. Empowering with Language by Cengage Publications, 2023

Reference Books:

1. Dubey, Sham Ji & Co. English for Engineers, Vikas Publishers, 2020
2. Bailey, Stephen. Academic writing: A Handbook for International Students. Routledge, 2014.
3. Murphy, Raymond. English Grammar in Use, Fourth Edition, Cambridge University Press, 2019.
4. Lewis, Norman. Word Power Made Easy- The Complete Handbook for Building a Superior Vocabulary. Anchor, 2014.

Web Resources:
GRAMMAR:
1. www.bbc.co.uk/learningenglish
2. https://dictionary.cambridge.org/grammar/british-grammar/
3. www.eslpod.com/index.html
4. https://www.learngrammar.net/
5. https://english4today.com/english-grammar-online-with-quizzes/
6. https://www.talkenglish.com/grammar/grammar.aspx

VOCABULARY
1. https://www.youtube.com/c/DailyVideoVocabulary/videos
2. https://www.youtube.com/channel/UC4cmBAit8i_NJZE8qK8sfpA

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long learning
23AHS12T/22T.1	1	-	-	-	-	-	-	1	-	3	-	1
23AHS12T/22T.2	1	-	-	-	-	-	-	1	-	3	-	1
23AHS12T/22T.3	1	-	-	-	-	-	-	1	-	3	-	1
23AHS12T/22T.4	1	-	-	-	-	-	-	1	-	3	-	1
23AHS12T/22T.5	1	-	-	-	-	-	-	1	-	3	-	1

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)

Title of the Course:	Communicative English Lab	
Category:	BS&H	
Couse Code:	23AHS12L	23AHS22L
Branch/es:	CE, ME, CSE, AIML, CSE (DS)	ECE, EEE, AIDS, CSE (AI)
Semester:	I Semester	II Semester

Lecture Hours	Tutorial Hours	Practice Hours	Credits
-	-	2	1

Course Objectives: The main objective of introducing this course, Communicative English Laboratory, is to expose the students to a variety of self-instructional, learner friendly modes of language learning. The students will get trained in the basic communication skills and also make them ready to face job interviews.

Course Outcomes:
At the end of the course, the student will be able to
1. improve their public speaking skills and make oral presentations effectively
2. apply communication skills through various language learning activities.
3. analyze the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension.
4. evaluate and exhibit professionalism in participating in debates and group discussions.
5. create effective resonate and prepare themselves to face interviews in future.

List of Topics
1. Vowels & Consonants
2. Neutralization/Accent Rules
3. Just a Minute
4. Role Play / Situational Dialogues
5. Oral Presentation/ Poster Presentation
6. Information Transfer
7. Describing people/objects/situations

Advanced topics
8. E-mail Writing
9. Resume Writing, Cover letter, SOP
10. Group Discussions - Methods & Practice
11. Debates - Methods & Practice
12. Interviews Skills

Suggested Software:
1. Walden Infotech
2. Sky Pronunciation Suite
3. Clarity Pronunciation Power – Part I
4. Learning to Speak English - 4 CDs
5. Loose Your Accent in 28 days, CD Rom, Judy Ravin

Reference Books:

1. Meenakshi Raman, Sangeeta-Sharma. Technical Communication. Oxford Press.2018.
2. Grant Taylor: English Conversation Practice, Tata McGraw-Hill Education India, 2016
3. Hewing's, Martin. Cambridge Academic English (B2). CUP, 2012.
4. T. Balasubramanyam, A Textbook of English Phonetics for Indian Students, (3rd Ed) Trinity Press.

Web Resources:

Spoken English:

1. www.esl-lab.com
2. www.englishmedialab.com
3. www.englishinteractive.net
4. https://www.britishcouncil.in/english/online
5. http://www.letstalkpodcast.com/
6. https://www.youtube.com/c/mmmEnglish_Emma/featured
7. https://www.youtube.com/c/ArnelsEverydayEnglish/featured
8. https://www.youtube.com/c/engvidAdam/featured
9. https://www.youtube.com/c/EnglishClass101/featured
10. https://www.youtube.com/c/SpeakEnglishWithTiffani/playlists
11. https://www.youtube.com/channel/UCV1h_cBE0Drdx19qkTM0WNw

Voice & Accent:

1. https://www.youtube.com/user/letstalkaccent/videos
2. https://www.youtube.com/c/EngLanguageClub/featured
3. https://www.youtube.com/channel/UC_OskgZBoS4dAnVUgJVexc
4. https://www.youtube.com/channel/UCNfm92h83W2i2ijc5Xwp_IA

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long learning
23AHS12L/22L.1	-	-	-	-	-	-	-	1	2	3	-	3
23AHS12L/22L.2	-	-	-	-	-	-	-	1	2	3	-	3
23AHS12L/22L.3	-	-	-	-	-	-	-	1	2	3	-	3
23AHS12L/22L.4	-	-	-	-	-	-	-	1	2	3	-	3
23AHS12L/22L.5	-	-	-	-	-	-	-	1	2	3	-	3

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)

Title of the Course: Engineering Chemistry
Category: BS&H
Couse Code: 23AHS13T
Branch/es: CE & ME
Semester: I Semester

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	-	-	3

Course Objectives:
1. To familiarize engineering chemistry and its applications
2. To impart the concept of soft and hard waters, softening methods of hard water
3. To train the students on the principles and applications of electrochemistry, polymers, surface chemistry, and cement

Course Outcomes:
At the end of the course, the student will be able to
1. analyze the hardness of water and its treatment methods
2. demonstrate the working principle of the batteries, corrosion prevention methods and factors affecting corrosion.
3. explain the preparation, properties, and applications of thermoplastics & thermosetting polymers, refining of petroleum and cracking of oils.
4. explain the classification, properties and applications of composites, refractories, lubricants, and setting & hardening of cement.
5. summarize the concepts of colloids, micelle and nanomaterials.

Unit 1 Water Technology 9

Soft and hardwater, Estimation of hardness of water by EDTA Method, Estimation of dissolved Oxygen - Boiler troubles –Priming, foaming, scale and sludge, Caustic embrittlement, Industrial water treatment – Specifications for drinking water, Bureau of Indian Standards (BIS) and World health organization (WHO) standards, Ion-exchange processes - desalination of brackish water, reverse osmosis (RO) and electrodialysis.

Unit 2 Electrochemistry and Applications 11

Electrodes –electrochemical cell, Nernst equation, cell potential calculations.
Primary cells – Zinc-air battery, Secondary cells – Nickel-Cadmium (NiCad) and lithium-ion batteries-working principle of the batteries including cell reactions; Fuel cells-Basic Concepts, the principle and working of hydrogen-oxygen Fuel cell.
Corrosion: Introduction to corrosion, electrochemical theory of corrosion, differential aeration cell corrosion, galvanic corrosion, metal oxide formation by dry electrochemical corrosion, Pilling Bedworth ratios and uses, Factors affecting the corrosion, cathodic and anodic protection, electroplating and electro less plating (Nickel and Copper).

Unit 3 Polymers and Fuel Chemistry 10

Introduction to polymers, functionality of monomers, Mechanism of chain growth, step-growth polymerization.
Thermoplastics and Thermo-setting plastics-: Preparation, properties and applications of poly styrene. PVC Nylon 6,6 and Bakelite.
Elastomers – Preparation, properties and applications of Buna S, Buna N, Thiokol rubbers.
Fuels – Types of fuels, calorific value of fuels, numerical problems based on calorific value; Analysis of coal

(Proximate and Ultimate analysis), Liquid Fuels, refining of petroleum, Octane and Cetane number- alternative fuels- propane, methanol, ethanol and bio fuel-bio diesel.

Unit 4 Modern Engineering Materials 10

Composites- Definition, Constituents, Classification- Particle, Fibre and Structural reinforced composites, properties and Engineering applications

Refractories-Classification, Properties, Factors affecting the refractory materials and Applications.

Lubricants- Classification, Functions of lubricants, Mechanism, Properties of lubricating oils – Viscosity, Viscosity Index, Flash point, Fire point, Cloud point, saponification and Applications.

Building materials- Portland Cement, constituents, Setting and Hardening of cement.

Unit 5 Surface Chemistry and Nanomaterials 10

Introduction to surface chemistry, colloids, nanometals and nanometal oxides, micelle formation, synthesis of colloids (Braggs Method), chemical and biological methods of preparation of nanometals and metal oxides, stabilization of colloids and nanomaterials by stabilizing agents, adsorption isotherm (Freundlich and Longmuir), BET equation (no derivation) applications of colloids and nanomaterials – catalysis, medicine, sensors, etc.

Prescribed Textbooks:

1. Jain and Jain, Engineering Chemistry, 16/e, Dhanpat Rai, 2013.
2. Peter Atkins, Julio de Paula and James Keeler, Atkins' Physical Chemistry, 10/e, Oxford University Press, 2010

Reference Books:

1. H.F.W. Taylor, Cement Chemistry, 2/e, Thomas Telford Publications, 1997.
2. D.J. Shaw, Introduction to Colloids and Surface Chemistry, Butterworth- Heineman, 1992.
3. Textbook of Polymer Science, Fred W. Billmayer Jr, 3rd Edition

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long learning
23AHS13T.1	3	3	2	2	-	-	2	-	-	-	-	1
23AHS13T.2	2	2	1	1	-	-	2	-	-	-	-	1
23AHS13T.3	2	2	1	1	-	-	2	-	-	-	-	1
23AHS13T.4	2	2	1	1	-	-	2	-	-	-	-	1
23AHS13T.5	2	2	1	1	-	-	2	-	-	-	-	1

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)

Title of the Course: Engineering Chemistry Lab
Category: BS&H
Couse Code: 23AHS13L
Branches: CE & ME
Semester: I Semester

Lecture Hours	Tutorial Hours	Practice Hours	Credits
0	0	2	1

Course Objectives: To verify the fundamental concepts with experiments

Course Outcomes: At the end of the course, the student will be able to
1. determine the Strength of an acid in secondary battery.
2. synthesize advanced polymer materials.
3. determine the physical properties like surface tension, adsorption, calorific values and viscosity.
4. estimate the Iron and Calcium in cement
5. analyze the hardness and Dissolved oxygen levels of various water samples.

List of experiments
1. Determination of Hardness of a groundwater sample.
2. Estimation of Dissolved Oxygen by Winkler's method.
3. Determination of Strength of an acid in Pb-Acid battery.
4. Preparation of a polymer (Bakelite).
5. Determination of percentage of Iron in Cement sample by colorimetry
6. Estimation of Calcium in port land Cement.
7. Preparation of nanomaterials by precipitation method.
8. Adsorption of acetic acid by charcoal.
9. Determination of percentage Moisture content in a coal sample.
10. Determination of Viscosity of lubricating oil by Redwood Viscometer 1.
11. Determination of Viscosity of lubricating oil by Redwood Viscometer 2.
12. Determination of Calorific value of gases by Junker's gas Calorimeter.

Prescribed Textbooks:
1. Vogel's Quantitative Chemical Analysis, J. Mendham, R. C. Denney, J. D. Barnes and B. Sivasankar Pearson Publications, 6th Edition.

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long learning
23AHS13L.1	3	3	-	3	1	-	2	-	1	-	-	3
23AHS13L.2	3	3	-	3	1	-	2	-	1	-	-	3
23AHS13L.3	3	3	-	3	1	-	2	-	1	-	-	3
23AHS13L.4	3	3	-	3	1	-	2	-	1	-	-	3
23AHS13L.5	3	2	-	2	1	-	2	-	1	-	-	3

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)

Title of the Course:	Chemistry	
Category:	BS&H	
Couse Code:	23AHS14T	23AHS24T
Branches:	CSE, AIML, CSE (DS)	EEE, ECE, AIDS, CSE (AI)
Semester:	I Semester	II Semester

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	-	-	3

Course Objectives:

1. To familiarize engineering chemistry and its applications
2. To train the students on the principles and applications of electrochemistry and polymers
3. To introduce instrumental methods

Course Outcomes:

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

1. apply quantum mechanics and molecular orbital theory to analyze bonding, energy levels, and bond order in various molecules.
2. apply semiconductor, superconductor, supercapacitor, and nanomaterial concepts to engineer practical solutions in electronics and materials science.
3. explain the construction and working of various sensors, cells and fuel cells.
4. explain the preparation, properties and applications of various polymers.
5. analyze the concepts of various spectroscopic and chromatographic techniques.

Unit 1 Structure and Bonding Models 9

Fundamentals of Quantum mechanics, Schrodinger Wave equation, significance of Ψ and Ψ^2, particle in one dimensional box, molecular orbital theory – bonding in homo- and heteronuclear diatomic molecules – energy level diagrams of O_2 and CO, etc. π-molecular orbitals of butadiene and benzene, calculation of bond order

Unit 2 Modern Engineering materials 10

Semiconductors – Introduction, basic concepts, applications
Super conductors-Introduction basic concepts, applications.
Supercapacitors: Introduction, basic concepts-classification – Applications.
Nano materials: Introduction, classification, properties and applications of Fullerenes, carbon nano tubes and Graphenes nanoparticles

Unit 3 Electrochemistry and Applications 10

Electrochemical cell, Nernst equation, cell potential calculations and numerical problems, potentiometry-potentiometric titrations (redox titrations), concept of conductivity, conductivity cell, conductometric titrations (acid-base titrations).
Electrochemical sensors – potentiometric sensors with examples, amperometric sensors with examples.
Primary cells – Zinc-air battery, Secondary cells –lithium-ion batteries- working of the batteries including cell reactions; Fuel cells, hydrogen-oxygen fuel cell– working of the cells. Polymer Electrolyte Membrane Fuel cells (PEMFC).

Unit 4 Polymer Chemistry 10

Introduction to polymers, functionality of monomers, chain growth and step growth polymerization, coordination polymerization, with specific examples and mechanisms of polymer formation.
Plastics –Thermo and Thermosetting plastics, Preparation, properties and applications of – PVC, Teflon,

Bakelite, Nylon-6,6, carbon fibres.
Elastomers–Buna-S, Buna-N–preparation, properties and applications.
Conducting polymers – polyacetylene, polyaniline, – mechanism of conduction and applications. Bio-Degradable polymers - Poly Glycolic Acid (PGA), Polyl Lactic Acid (PLA).

Unit 5 Instrumental Methods and Applications 9

Electromagnetic spectrum. Absorption of radiation: Beer-Lambert's law. UV-Visible Spectroscopy, electronic transitions, Instrumentation, IR spectroscopy, fundamental modes and selection rules, Instrumentation. Chromatography-Basic Principle, Classification-HPLC: Principle, Instrumentation and Applications

Prescribed Textbooks:

1. Jain and Jain, Engineering Chemistry, 16/e, DhanpatRai, 2013.
2. Peter Atkins, Julio de Paula and James Keeler, Atkins' Physical Chemistry, 10/e, Oxford University Press, 2010.

Reference Books:

1. Skoog and West, Principles of Instrumental Analysis, 6/e, Thomson, 2007
2. J.D. Lee, Concise Inorganic Chemistry, 5th Edition, Wiley Publications, Feb.2008
3. Textbook of Polymer Science, Fred W. Billmayer Jr, 3rd Edition

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long learning
23AHS14T/24T.1	3	2	1	2	-	-	2	-	-	-	-	1
23AHS14T/24T.2	3	2	1	2	-	-	2	-	-	-	-	1
23AHS14T/24T.3	2	2	1	1	-	-	2	-	-	-	-	1
23AHS14T/24T.4	2	2	1	1	-	-	2	-	-	-	-	1
23AHS14T/24T.5	3	3	2	2	-	-	2	-	-	-	-	1

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)

Title of the Course:	Chemistry Lab	
Category:	BS&H	
Couse Code:	23AHS14L	23AHS24L
Branch/es:	CSE, AIML, CSE (DS)	EEE, ECE, AIDS, CSE (AI)
Semester:	I Semester	II Semester

Lecture Hours	Tutorial Hours	Practice Hours	Credits
0	0	2	1

Course Objective: Verify the fundamental concepts with experiments

Course Outcomes:

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

1. determine the cell constant and conductance of solutions.
2. Synthesize nanomaterials and polymer materials.
3. measure the strength of an acid present in secondary batteries.
4. analyze the UV-visible and IR spectra of some organic and inorganic compounds.
5. estimate ferrous ion by potentiometric and volumetric methods

List of experiments

1. Measurement of 10Dq by spectrophotometric method.
2. Conductometric titration of strong acid vs. strong base.
3. Conductometric titration of weak acid vs. strong base.
4. Determination of cell constant and conductance of solutions.
5. Potentiometry - determination of redox potentials and emfs.
6. Determination of Strength of an acid in Pb-Acid battery.
7. Preparation of a Bakelite.
8. Verify Lambert-Beer's law.
9. Wavelength measurement of sample through UV-Visible Spectroscopy.
10. Identification of simple organic compounds by IR.
11. Preparation of nanomaterials by precipitation method.
12. Estimation of Ferrous Iron by Dichrometry.

Prescribed Textbooks:

1. Vogel's Quantitative Chemical Analysis 6th Edition 6th Edition" Pearson Publications by J. Mendham, R. C. Denney, J. D. Barnes and B. Sivasankar

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long learning
23AHS14L/24L.1	3	3	-	3	1	-	2	-	1	-	-	3
23AHS14L/24L.2	3	3	-	3	1	-	2	-	1	-	-	3
23AHS14L/24L.3	3	3	-	3	1	-	2	-	1	-	-	3
23AHS14L/24L.4	3	3	-	3	1	-	2	-	1	-	-	3
23AHS14L/24L.5	3	2	-	2	1	-	2	-	1	-	-	3

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)

Title of the Course:	Engineering Physics	
Category:	BS&H	
Couse Code:	23AHS15T	23AHS25T
Branch/es:	EEE, ECE, AIDS, CSE (AI)	CE, ME, CSE, AIML, CSE (DS)
Semester:	I Semester	II Semester

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	-	-	3

Course Objectives: To bridge the gap between the Physics in school at 10+2 level and UG level engineering courses by identifying the importance of the optical phenomenon like interference, diffraction etc, enlightening the periodic arrangement of atoms in crystalline solids and concepts of quantum mechanics, introduce novel concepts of dielectric and magnetic materials, physics of semiconductors.

Course Outcomes:
At the end of the course, the student will be able to
1. apply interference, diffraction and polarization of light in engineering.
2. explain the basics of crystals structures and x-ray diffraction.
3. describe various types of polarization of dielectrics and magnetic materials.
4. explain the basic concepts of Quantum Mechanics and the electron theory of solids.
5. describe the properties and behavior of semiconductors

Unit 1 Wave Optics 10

Interference: Introduction - Principle of superposition –Interference of light - Interference in thin films (Reflection Geometry) & applications - Colours in thin films- Newton's Rings, Determination of wavelength and refractive index.
Diffraction: Introduction - Fresnel and Fraunhofer diffractions - Fraunhofer diffraction due to single slit, double slit & N-slits (Qualitative) – Diffraction Grating - Dispersive power and resolving power of Grating (Qualitative). Polarization: Introduction -Types of polarization - Polarization by reflection, refraction and Double refraction - Nicol's Prism -Half wave and Quarter wave plates.

Unit 2 Crystallography and X-ray diffraction 10

Crystallography: Space lattice, Basis, Unit Cell and lattice parameters – Bravais Lattices – crystal systems (3D) – coordination number - packing fraction of SC, BCC & FCC - Miller indices – separation between successive (hkl) planes.
X-ray diffraction: Bragg's law - X-ray Diffractometer – crystal structure determination by Laue's and powder methods

Unit 3 Dielectric and Magnetic Materials 10

Dielectric Materials: Introduction - Dielectric polarization - Dielectric polarizability, Susceptibility, Dielectric constant and Displacement Vector – Relation between the electric vectors - Types of polarizations- Electronic (Quantitative), Ionic (Quantitative) and Orientation polarizations (Qualitative) - Lorentz internal field - Clausius- Mossotti equation - complex dielectric constant – Frequency dependence of polarization – dielectric loss
Magnetic Materials: Introduction - Magnetic dipole moment - Magnetization-Magnetic susceptibility and permeability – Atomic origin of magnetism - Classification of magnetic materials: Dia, para, Ferro, anti-ferro & Ferri magnetic materials - Domain concept for Ferromagnetism & Domain walls (Qualitative) - Hysteresis - soft and hard magnetic materials.

Unit 4 Quantum Mechanics and Free electron Theory 10

Quantum Mechanics: Dual nature of matter – Heisenberg's Uncertainty Principle – Significance and properties of wave function – Schrodinger's time independent and dependent wave equations– Particle in a one-dimensional infinite potential well.

Free Electron Theory: Classical free electron theory (Qualitative with discussion of merits and demerits) – Quantum free electron theory – electrical conductivity based on quantum free electron theory - Fermi-Dirac distribution - Density of states - Fermi energy

Unit 5 Semiconductors 8

Semiconductors: Formation of energy bands – classification of crystalline solids

Intrinsic semiconductors: Density of charge carriers – Electrical conductivity – Fermi level

Extrinsic semiconductors: density of charge carriers – dependence of Fermi energy on carrier concentration and temperature - Drift and diffusion currents – Einstein's equation – Hall effect and its applications.

Prescribed Textbooks:

1. A Text book of Engineering Physics, M. N. Avadhanulu, P. G. Kshirsagar & TVS Arun Murthy, S. Chand Publications, 11th Edition 2019.
2. Engineering Physics - D. K. Bhattacharya and Poonam Tandon, Oxford press (2015)

Reference Books:

1. Engineering Physics - B.K. Pandey and S. Chaturvedi, Cengage Learning 2021.
2. Engineering Physics - Shatendra Sharma, Jyotsna Sharma, Pearson Education, 2018.
3. Engineering Physics" - Sanjay D. Jain, D. Sahasrabudhe and Girish, University Press. 2010
4. Engineering Physics - M.R. Srinivasan, New Age international publishers (2009).

Web Resources: https://www.loc.gov/rr/scitech/selected-internet/physics.html

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long learning
23AHS15T/25T.1	3	2	1	2	-	-	-	-	-	-	-	1
23AHS15T/25T.2	2	2	1	1	-	-	-	-	-	-	-	1
23AHS15T/25T.3	2	2	1	1	-	-	-	-	-	-	-	1
23AHS15T/25T.4	2	2	1	1	-	-	-	-	-	-	-	1
23AHS15T/25T.5	2	2	1	1	-	-	-	-	-	-	-	1

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)

Title of the Course:	Engineering Physics Lab	
Category:	BS&H	
Couse Code:	23AHS15L	23AHS25L
Branch/es:	EEE, ECE, AIDS, CSE (AI)	CE, ME, CSE, AIML, CSE (DS)
Semester:	I Semester	II Semester

Lecture Hours	Tutorial Hours	Practice Hours	Credits
-	-	2	1

Course Objectives: To study the concepts of optical phenomenon like interference, diffraction etc., recognize the importance of energy gap in the study of conductivity and Hall effect in semiconductors and study the parameters and applications of dielectric and magnetic materials by conducting experiments.

Course Outcomes: At the end of the course, the student will be able to
1. estimate various optical parameters from optical instruments.
2. evaluate various magnetic and dielectric parameters.
3. estimate the properties of semiconductors.
4. estimate the physical quantities of various materials.

List of Experiments:
1. Determination of radius of curvature of a given Plano-convex lens by Newton's rings.
2. Determination of wavelengths of different spectral lines in mercury spectrum using diffraction grating in normal incidence configuration.
3. Verification of Brewster's law
4. Determination of dielectric constant using charging and discharging method.
5. Study the variation of B versus H by magnetizing the magnetic material (B-H curve).
6. Determination of wavelength of Laser light using diffraction grating.
7. Estimation of Planck's constant using photoelectric effect.
8. Determination of the resistivity of semiconductors by four probe methods.
9. Determination of energy gap of a semiconductor using p-n junction diode.
10. Magnetic field along the axis of a current carrying circular coil by Stewart Gee's Method.
11. Determination of Hall voltage and Hall coefficient of a given semiconductor using Hall effect.
12. Determination of temperature coefficients of a thermistor.
13. Determination of acceleration due to gravity and radius of Gyration by using a compound pendulum.
14. Determination of magnetic susceptibility by Kundt's tube method.
15. Determination of rigidity modulus of the material of the given wire using Torsional pendulum.
16. Sonometer: Verification of laws of stretched string.
17. Determination of young's modulus for the given material of wooden scale by non-uniform bending (or double cantilever) method.
18. Determination of Frequency of electrically maintained tuning fork by Melde's experiment.

Note: Any TEN of the listed experiments are to be conducted. Out of which any TWO experiments may be conducted in virtual mode.

Prescribed Textbooks:
1. A Textbook of Practical Physics - S. Balasubramanian, M.N. Srinivasan, S. Chand Publishers, 2017.

Web Resources:

1. www.vlab.co.in
2. https://phet.colorado.edu/en/simulations/filter?subjects=physics&type=html,prototype

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long learning
23AHS15L/25L.1	3	3	1	1	2	-	-	-	-	-	-	3
23AHS15L/25L.2	3	3	1	1	2	-	-	-	-	-	-	3
23AHS15L/25L.3	2	3	1	1	2	-	-	-	-	-	-	3
23AHS15L/25L.4	3	3	1	1	2	-	-	-	-	-	-	3

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)

Title of the Course: Differential Equations and Vector Calculus
Category: BS&H
Couse Code: 23AHS21T
Branch/es: Common to all branches of engineering
Semester: II Semester

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	-	-	3

Course Objectives:
1. To enlighten the learners in the concept of differential equations and multivariable 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.

Course Outcomes:
At the end of the course, the student will be able to
1. solve the differential equations related to various engineering fields
2. apply the knowledge of the higher order differential equations in electrical circuit problems
3. solve the standard partial differential equations.
4. illustrate the physical meaning of different operators such as gradient, curl and divergence.
5. estimate the work done against a field, circulation and flux using vector calculus.

Unit 1 Differential equations of first order and first degree 10
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 -Electrical circuits.

Unit 2 Linear differential equations of higher order (Constant Coefficients) 8
Definitions, homogeneous and non-homogeneous, complimentary function, general solution, particular integral, Wronskian, Method of variation of parameters. Simultaneous linear equations, Applications to L-C-R Circuit problems and Simple Harmonic motion.

Unit 3 Partial Differential Equations 8
Introduction and formation of Partial Differential Equations by elimination of arbitrary constants and arbitrary functions, solutions of first order linear equations using Lagrange's method. Homogeneous Linear Partial differential equations with constant coefficients.

Unit 4 Vector differentiation 8
Scalar and vector point functions, vector operator Del, Del applies to scalar point functions-Gradient, Directional derivative, del applied to vector point functions-Divergence and Curl, vector identities

Unit 5 Vector integration 10
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) and related problems

Prescribed Textbooks:
1. Higher Engineering Mathematics, B. S. Grewal, Khanna Publishers, 2017, 44th Edition
2. Advanced Engineering Mathematics, Erwin Kreyszig, John Wiley & Sons, 2018, 10th Edition.

Reference Books:

1. Thomas Calculus, George B. Thomas, Maurice D. Weir and Joel Hass, Pearson Publishers, 2018, 14th Edition
2. Advanced Engineering Mathematics, Dennis G. Zill and Warren S. Wright, Jones and Bartlett, 2018
3. Advanced Modern Engineering Mathematics, Glyn James, Pearson publishers, 2018, 5th Edition.
4. Advanced Engineering Mathematics, R. K. Jain and S. R. K. Iyengar, Alpha Science International Ltd., 2021 5th Edition (9th reprint).
5. Higher Engineering Mathematics, B. V. Ramana, , McGraw Hill Education, 2017

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long learning
23AHS21T.1	3	2	1	2	-	-	-	-	-	-	-	1
23AHS21T.2	3	2	1	2	-	-	-	-	-	-	-	1
23AHS21T.3	3	2	1	2	-	-	-	-	-	-		1
23AHS21T.4	3	2	1	2	-	-	-	-	-	-	-	1
23AHS21T.5	3	3	2	3	-	-	-	-	-	-	-	1

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)

Title of the Course:	Basic Civil and Mechanical Engineering	
Category:	ES	
Couse Code:	23A0111T	23A0121T
Year:	I B. Tech.	I B. Tech.
Semester:	I Semester	II Semester
Branch/es:	CSE, CE, ME, AIML, CSE (DS)	ECE, EEE, AI & DS, CSE(AI)

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	-	-	3

PART A: BASIC CIVIL ENGINEERING

Course Objectives: Get familiarized with the scope and importance of Civil Engineering sub-divisions.

1. Introduce the preliminary concepts of surveying.
2. Acquire preliminary knowledge on Transportation and its importance in nation'seconomy.
3. Get familiarized with the importance of quality, conveyance and storage of water.
4. Introduction to basic civil engineering materials and construction techniques.

Course Outcomes:

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

1. understand various sub-divisions of Civil Engineering and to appreciate their role inensuring better society.
2. know the concepts of surveying and to understand the measurement of distances, angles and levels through surveying.
3. realize the importance of Transportation in nation's economy and the engineeringmeasures related to Transportation.

Unit 1 Basics of Civil Engineering 8

Role of Civil Engineers in Society- Various Disciplines of Civil Engineering- Surveying-Structural Engineering- Transportation Engineering- Hydraulics and Water Resources Engineering - Environmental Engineering- Geo-technical Engineering -Scope of each discipline.

Building Construction and Planning- Construction Materials-Cement - Aggregate - Bricks- Cement concrete- Steel. Introduction to Prefabricated construction Techniques.

Geo-technical Engineering-Engineering properties of soil like Voids ratio, Porosity, Degree of saturation, Moisture content, Specific gravity, Bulk density, Dry density , Liquid Limit , Plastic Limit, shrinkage Limit (only theory).

Unit 2 8

Surveying: Objectives of Surveying- Horizontal Measurements- Angular Measurements- Introduction to Bearings. Levelling instruments used for levelling -Simple problems on levelling and bearings-Contour mapping.

Estimation: Introduction to Estimation- General items– different Standard Units in Civil components of Buildings -working out quantities for detailed and abstract estimates for Buildings (only theory).

Unit 3 8

Transportation Engineering: Importance of Transportation in Nation's economic development- Types of Highway Pavements- Flexible Pavements and Rigid Pavements - Simple Differences. Basics of Harbour, Tunnel, Airport, and Railway Engineering.

Water Resources and Environmental Engineering: Introduction, Sources of water- Quality of water- Specifications- Introduction to Hydrology–Rainwater Harvesting-Water Storage and Conveyance Structures (Simple introduction to Dams and Reservoirs).

Prescribed Textbooks:

1. Basic Civil Engineering, M.S.Palanisamy, , Tata Mcgraw Hill publications (India) Pvt.Ltd. Fourth Edition.
2. Introduction to Civil Engineering, S.S. Bhavikatti, New Age International Publishers.2022. First Edition.
3. Basic Civil Engineering, Satheesh Gopi, Pearson Publications, 2009, First Edition.
4. Building Construction by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain - Laxmi Publications (P) ltd., New Delhi
5. Estimating and Costing, 27threvised edition by B.N. Dutta, UBS publishers, 2000.

Reference Books:

1. Surveying, Vol- I and Vol-II, S.K. Duggal, Tata McGraw Hill Publishers 2019. FifthEdition.
2. Hydrology and Water Resources Engineering, Santosh Kumar Garg, KhannaPublishers, Delhi. 2016
3. Irrigation Engineering and Hydraulic Structures - Santosh Kumar Garg, KhannaPublishers, Delhi 2023. 38th Edition.
4. Highway Engineering, S.K.Khanna, C.E.G. Justo and Veeraraghavan, Nemchand and Brothers Publications 2019. 10th Edition.
5. Indian Standard DRINKING WATER — SPECIFICATION IS 10500-2012.
6. Soil Mechanics and Foundation Engg. By K.R. Arora, Standard Publishers and Distributors, Delhi.

PART B: BASIC MECHANICAL ENGINEERING

Course Objectives: The students after completing the course are expected to

1. Get familiarized with the scope and importance of Mechanical Engineering in different sectors and industries.
2. Explain different engineering materials and different manufacturing processes.
3. Provide an overview of different thermal and mechanical transmission systems and introduce basics of robotics and its applications.

Course Outcomes:

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

4. summarize the importance of mechanical engineer role in different sectors and also in the selection of engineering materials
5. describe different manufacturing process and also the basics of thermal engineering
6. explain the working of different mechanical power transmission systems, power plants and basics of robotics

Unit 4 8

Introduction to Mechanical Engineering: Role of Mechanical Engineering in Industries and Society-Technologies in different sectors such as Energy, Manufacturing, Automotive, Aerospace, and Marine sectors.

Engineering Materials - Metals-Ferrous and Non-ferrous, Ceramics, Composites, Smart materials

Unit 5 8

Manufacturing Processes: Principles of Casting, Forming, joining processes, Machining, Introduction to CNC machines, 3D printing, and Smart manufacturing.

Thermal Engineering – working principle of Boilers, Otto cycle, Diesel cycle, Refrigeration and air-conditioning cycles, IC engines, 2-Stroke and 4-Stroke engines, SI/CI Engines, Components of Electric and Hybrid Vehicles.

Unit 6 8

Power plants – working principle of Steam, Diesel, Hydro, Nuclear power plants.

Mechanical Power Transmission - Belt Drives, Chain, Rope drives, Gear Drives and their applications.

Introduction to Robotics - Joints & links, configurations, and applications of robotics.

(Note: The subject covers only the basic principles of Civil and Mechanical Engineering systems. The evaluation shall be intended to test only the fundamentals of the subject)

Prescribed Textbooks:

1. An introduction to Mechanical Engg by Jonathan Wicker and Kemper Lewis, Cengage learning India Pvt. Ltd
2. Internal Combustion Engines by V.Ganesan, By Tata McGraw Hill publications (India) Pvt. Ltd

Reference Books:

1. Appuu Kuttan KK, Robotics, I.K. International Publishing House Pvt. Ltd. Volume-I
2. 3D printing & Additive Manufacturing Technology- L. Jyothish Kumar, Pulak M Pandey, Springer publications
3. G. Shanmugam and M. S. Palanisamy, Basic Civil and the Mechanical Engineering, Tata McGraw Hill publications (India) Pvt. Ltd
4. Thermal Engineering by Mahesh M Rathore Tata McGraw Hill publications (India) Pvt. Ltd.

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long learning
23A0111T/21T.1	2	2	1	1	-	-	-	-	-	-	-	-
23A0111T/21T.2	2	2	1	1	-	-	-	-	-	-	-	-
23A0111T/21T.3	2	2	1	1	-	-	-	-	-	-	-	-
23A0111T/21T.4	3	3	1	1	-	-	-	-	-	-	-	-
23A0111T/21T.5	3	3	1	1	-	-	-	-	-	-	-	-
23A0111T/21T.6	3	3	1	1	-	-	-	-	-	-	-	-

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)

Title of the Course: Engineering Mechanics
Category: PC
Couse Code: 23A0323T
Year: I B.Tech.
Semester: II Semester
Branch/es: CE & ME

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	-	-	3

Course Objectives:
1. To explain the effect of force and moment in the different engineering applications.
2. To familiarize frictional forces in mechanical applications.
3. To teach centre of gravity and moment of inertia of solids and surfaces.
4. To apply the Work-Energy method to particle motion.
5. To understand the analysis of rigid bodies under dynamic conditions.

Course Outcomes:
At the end of the course, the student will be able to:
1. calculate the resultant forces and couple in mechanical systems.
2. analyze the frictional forces under equilibrium conditions and forces in members of a truss.
3. evaluate the centroid, centre of gravity and moment of inertia for various geometric shapes.
4. evaluate the different types of motions of a body without considering forces.
5. calculate the displacement, velocity and acceleration in dynamic systems.

Unit 1 Introduction to Engineering Mechanics 9

Introduction to Engineering Mechanics: Composition and resolution of forces, parallelogram law, principle of transmissibility, types of force systems - concurrent and concurrent coplanar forces, resultant of coplanar force systems, couple, moment of a force, Varignon's theorem. Concept of free body diagrams, concept of equilibrium of coplanar force and non-coplanar force systems (Use Graphical Method also). Equations of Equilibrium for Spatial System of forces, Numerical examples on spatial system of forces using vector approach.

Unit 2 Analysis of Structures and Friction 9

Introduction to plane trusses, analysis of plane trusses by method of joints and method of sections.
Friction: Introduction, limiting friction and impending motion, Coulomb's laws of dry friction, coefficient of friction, Cone of Static friction.

Unit 3 Centroid and Moments of Inertia 9

Properties of Surfaces and Volumes: Centroid and center of gravity, derivation of centroids from first moment of area, centroids of composite sections, center of gravity of common volumes - cylinder, cone, sphere, theorem of Pappus-guldinus.
Moment of Inertia: Area moment of inertia of plane and composite shapes, parallel axis theorem, perpendicular axis theorem, polar moment of inertia, mass moment of inertia of common volumes -thin plates, thin rod, cylinder, cone, sphere, rectangular prism, radius of gyration.

Unit 4 Kinematics 9

Equations of motion for rigid bodies, constant and variable acceleration, rectilinear and curvilinear motion, motion under gravity -projectile motion, rotation of a rigid body about a fixed axis, introduction to plane motion.

Unit 5 Kinetics 9

Kinetics: Principles of dynamics - Newton's Laws of motion, D'Alembert's principle in rectilinear translation, principle of Work-Energy method and Impulse Momentum method. Principle of virtual work with simple examples.

Prescribed Textbooks:

1. Engineering Mechanics, Statics and Dynamics, Rogers and M A. Nelson., McGraw Hill Education. 2017. First Edition.
2. A Textbook of Engineering Mechanics, S.S Bhavikatti. New age international Publications 2018. 4th Edition.

Reference Books:

1. J. L. Meriam , L. G. Kraige , J. N. Bolton, Engineering Mechanics-statics, Engineering Mechanics-Dynamics, Wiley India Private Limited, Fifth edition (June 2006)
2. RK Bansal, Engineering Mechanics, Laxmi Publications, Sixth edition (2015) Reference Books:
3. K L Kumar, Veenu Kumar, Engineering Mechanics, 4/e, Tata McGraw Hill, 2010.
4. Basudeb Bhattacharya., Engineering Mechanics, 2/e, Oxford University Press (India), 2015.

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long learning
23A0323T.1	3	3	2	3	2	-	-	1	-	1	-	2
23A0323T.2	3	3	3	3	-	-	-	-	-	1	-	2
23A0323T.3	3	3	3	3	2	-	-	1	-	-	-	2
23A0323T.4	3	3	3	3	2	-	-	1	-	1	-	2
23A0323T.5	3	3	2	3	2	-	-	-	-	1	-	2

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)

Title of the Course: Engineering Mechanics and Building Practices Lab
Category: PC
Couse Code: 23A0121L
Year: I B.Tech.
Semester: II Semester
Branch/es: Civil Engineering

Lecture Hours	Tutorial Hours	Practice Hours	Credits
-	-	3	1.5

Course Objectives:

1. Verify the Law of Parallelogram of Forces and Lami's theorem.
2. Determine the coefficients of friction of Static and Rolling friction and Centre of gravityof different plane Lamina.
3. Understand the layout of a building, concepts of Non-Destructive Testing and differentAlternative Materials.

Course Outcomes:

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

1. evaluate the coefficient of friction between two different surfaces and between theinclined plane and the roller.
2. verify Law of Parallelogram of forces and Law of Moment using force polygon and bellcrank lever.
3. determine the Centre of gravity different configurations and
4. understand the Quality Testing and Assessment Procedures and principles of Non-Destructive Testing.
5. practice safety practices in the construction industry.

List of Experiments:

1. To study various types of tools used in construction.
2. Forces in Pin Jointed Trusses
3. Experimental Proof of Lami's Theorem
4. Verification of Law of Parallelogram of Forces.
5. Determination of Center of Gravity of different shaped Plane Lamina.
6. Determination of coefficient of Static and Rolling Friction.
7. Verification of Law of Moment using Rotation Disc Apparatus and Bell Crank Lever
8. Study of Alternative Materials like M-sand, Fly ash, Sea Sand etc.
9. Field-Visit to understand the Quality Testing - report.
10. Safety Practices in Construction industry
11. Demonstration of Non-Destructive Testing - using Rebound Hammer & UPV
12. Study of Plumbing in buildings.

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long learning
23A0121L .1	3	3	2	3	-	-	-	3	3	3	1	2
23A0121L .2	3	2	1	2	-	-	-	3	3	3	1	2
23A0121L .3	2	2	1	1	-	-	-	3	3	3	1	2
23A0121L .4	2	2	1	1	-	-	-	3	3	3	1	2
23A0121L .5	2	2	1	1	-	-	-	3	3	3	1	2

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)

Title of the Course: Engineering Mechanics Lab
Category: PC
Couse Code: 23A0323L
Year: I B.Tech.
Semester: II Semester
Branch/es: Mechanical Engineering

Lecture Hours	Tutorial Hours	Practice Hours	Credits
-	-	3	1.5

Course Objectives:

1. Verify the Law of Parallelogram and Triangle of Forces.
2. Determine the coefficients of friction of Static and Rolling friction and Centre of gravity of different plane Lamina.
3. Analyse the system of Pulleys and Moment of Inertia of Compound Pendulum and Flywheel.

Course Outcomes:

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

1. analyze the system of forces acting on a system.
2. evaluate the frictional parameters in different conditions.
3. calculate the centroid, centre of gravity of different plane shape lamina.
4. analyze the equilibrium of a rigid body under various conditions.
5. evaluate the Moment of Inertia of the compound pendulum and Flywheel.

List of Experiments:

1. Verification of Law of Parallelogram of Forces.
2. Verification of Law of Triangle of Forces.
3. Verification of the Law of polygon for coplanar-concurrent forces acting on a particle in equilibrium and to find the value of unknown forces considering particle to be in equilibrium using universal force table.
4. Determination of coefficient of Static and Rolling Frictions.
5. Determination of Centre of Gravity of different shaped Plane Lamina.
6. Verification of the conditions of equilibrium of a rigid body under the action of coplanar non concurrent, parallel force system with the help of a simply supported beam.
7. Study of the systems of pulleys and draw the free body diagram of the system.
8. Determine the acceleration due to gravity using a compound pendulum.
9. Determine the Moment of Inertia of the compound pendulum about an axis perpendicular to the plane of oscillation and passing through its centre of mass.
10. Determine the Moment of Inertia of a Flywheel.
11. Verification of Law of Moment using Rotation Disc Apparatus and Bell Crank Lever.

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long learning
23A0323L.1	3	3	3	3	-	-	-	2	-	-	-	2
23A0323L.2	3	3	3	3	-	-	-	2	-	-	-	2
23A0323L.3	3	3	2	3	-	-	-	2	-	-	-	2
23A0323L.4	3	3	3	3	-	-	-	2	-	-	-	2
23A0323L.5	3	3	2	3	-	-	-	2	-	-	-	2

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)

Title of the Course:	Engineering Graphics	
Category:	ES	
Couse Code:	23A0312T	23A0322T
Year:	I B.Tech.	
Semester:	I Semester	II Semester
Branch/es:	EEE, ECE, AIDS & CSE-AI	CSE, CE, ME, AIML & CSE-DS

Lecture Hours	Tutorial Hours	Practice Hours	Credits
1	-	4	3

Course Objectives:

1. To enable the students with various concepts like dimensioning, conventions and standards related to Engineering Drawing.
2. To impart knowledge on the projection of points, lines and plane surfaces.
3. To improve the visualization skills for better understanding of projection of solids.
4. To develop the imaginative skills of the students required to understand Section of solids and Developments of surfaces.
5. To make the students understand the viewing perception of a solid object in Isometric and Perspective projections.

Course Outcomes:

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

1. apply the appropriate annotations and geometric techniques to draw the conic sections, Cycloidal Curves and Involutes
2. apply the principles of orthographic projection for engineering problems involving inclined lines to create drawings that represent real-world objects
3. apply the principles of orthographic projection for solving engineering problems of planes and solids
4. apply knowledge to draw sectional views, true shapes and sectional views of right regular solids and can draw surface developments related to various parts of right regular solids.
5. apply the conversion techniques to solve problems related to orthographic projections and isometric projection views

Unit 1 5

Introduction: Lines, Lettering and Dimensioning, Geometrical Constructions and Constructing regular polygons by general methods.

Engineering Curves:

Conics: construction of ellipse, parabola and hyperbola by general method, Normal and tangent to curves

Cycloidal curves: Cycloids, Epi Cycloid and Hypo Cycloid, Normal and tangent to curves.

Involutes: Square, Pentagon, Hexagon **-** Normal and tangent to Curves (treatment of simple problems)

Scales: Plain scales, diagonal scales and vernier scales.

Unit 2 3

Orthographic Projections: Reference plane, importance of reference lines or Plane, Projections of a point situated in any one of the four quadrants.

Projections of Straight Lines: Projections of straight lines parallel to both reference planes, perpendicular to one reference plane and parallel to other reference plane, inclined to one reference plane and parallel to the other reference plane. Projections of Straight Line Inclined to both the reference planes

Unit 3 5

Projections of Planes: regular planes Perpendicular to both reference planes, parallel to one reference plane and inclined to the other reference plane; plane inclined to both the reference planes

Projections of Solids: Types of solids: Polyhedra and Solids of revolution. Projections of solids (Prism, Pyramid, Cylinder and Cone) in simple positions: Axis perpendicular to horizontal plane, Axis perpendicular to vertical plane and Axis parallel to both the reference planes, Projection of Solids with axis inclined to one reference plane and parallel to another plane

Unit 4 5

Sections of Solids: Perpendicular and inclined section planes, Sectional views and True shape of section, Sections of solids in simple position only

Development of Surfaces: Methods of Development: Parallel line development and radial line development - Development of a cube, prism, cylinder, pyramid and cone

Unit 5 5

Conversion of Views:

Isometric Projections and its principles: Conversion of orthographic views to isometric views.
Conversion of isometric views to orthographic views.

Computer graphics: Creating 2D & 3D drawings of objects including PCB and Transformations using Auto CAD (Not for internal and end examination)

Prescribed Textbooks:

1. N. D. Bhatt, Engineering Drawing, Charotar Publishing House

Reference Books:

1. Engineering Drawing, K.L. Narayana and P. Kannaiah, Tata McGraw Hill
2. Engineering Drawing, M.B.Shah and B.C. Rana, Pearson Education Inc
3. Engineering Drawing with an Introduction to AutoCAD, Dhananjay Jolhe, Tata McGraw Hill

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long learning
23A0312T/22T.1	3	2	1	2	-	-	-	1	-	1	-	1
23A0312T/22T.2	3	2	1	2	-	-	-	1	-	1	-	1
23A0312T/22T.3	3	2	1	2	-	-	-	1	-	1	-	1
23A0312T/22T.4	3	2	1	2	-	-	-	1	-	1	-	1
23A0312T/22T.5	3	2	1	2	2	-	-	1	-	1	-	1

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)

Title of the Course:	Engineering Workshop	
Category:	ES	
Couse Code:	23A0311L	23A0321L
Year:	I B.Tech.	
Semester:	I Semester	II Semester
Branch/es:	CSE, CE, ME, AIML & CSE-DS	EEE, ECE, AIDS & CSE-AI

Lecture Hours	Tutorial Hours	Practice Hours	Credits
-	-	3	1.5

Course Objectives: This course will enable the student to

1. make familiar with different types of wooden joints.
2. make conversant with tools used in sheet metal work.
3. identify tools, work material and measuring instruments useful for fitting.
4. develop electrical wiring skills in students.
5. have practical exposure in foundry, welding and plumbing.

Course Outcomes:

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

1. apply wood working skills to prepare different joints.
2. development of sheet metal jobs with GI sheet.
3. design and model various proto types with mild steel for different assemblies.
4. apply basic electrical engineering knowledge for house wiring practice.
5. practice on manufacturing of components in foundry, welding and pipe line fitting execution in plumbing.

Cycle:01

Trade 1 Wood Working: 6

Familiarity with different types of woods and tools used in wood working and make following joints.

a) Half – Lap joint b) Mortise and Tenon joint

Trade 2 Sheet Metal Working: 6

Familiarity with different types of tools used in sheet metalworking, Developments of following sheet metal job from GI sheets.

a) Tapered tray b) Conical funnel c) Brazing (Demonstration)

Trade 3 Fitting: 9

Familiarity with different types of tools used in fitting and do the followingfitting exercises.

a) V-fit b) Dovetail fit

c) Two-wheeler tyre puncture and change of tyre (Demonstration)

Cycle:02

Trade 4 Electrical Wiring: 9

Familiarity with different types of basic electrical circuits and makethe following connections.

a) Parallel and series b) Two-way switch

c) Tube light d) Soldering of wires

Trade 5 Foundry Trade: 3

Demonstration and practice on Moulding tools and processes,Preparation of Green Sand Mould for given Pattern.

Trade 6 Welding Shop: 6

Demonstration and practice on Arc Welding and Gas welding.Preparation of Lap joint and Butt joint.

Trade 7 Plumbing: 6

Demonstration and practice of Plumbing tools, Preparation of Pipe jointswith coupling for same diameter and with reducer for different diameters.

Prescribed Textbooks:

1. A Course in Workshop Technology Vol I. & II, B.S. Raghuwanshi, Dhanpath Rai & Co., 2015 & 2017.
2. Kannaiah P. and Narayana K.L., Workshop Manual, 3rd Edn, Scitech publishers.

Reference Books:

1. Elements of Workshop Technology, Vol. I by S. K. Hajra Choudhury & Others, Media Promoters and Publishers, Mumbai. 2007, 14th edition
2. Workshop Practice by H. S. Bawa, Tata-McGraw Hill, 2004.
3. Wiring Estimating, Costing and Contracting; Soni P.M. & Upadhyay P.A.; Atul Prakashan, 2021-22.
4. Jeyapoovan T. and Pranitha S., Engineering Practices Lab Manual, 3rd Edn. Vikas Pub.2008.

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long learning
23A0311L/21L.1	3	3	1	-	-	1	-	-	2	2	-	2
23A0311L/21L.2	3	3	1	-	-	1	-	-	2	2	-	2
23A0311L/21L.3	3	3	1	-	-	1	-	-	2	2	-	2
23A0311L/21L.4	3	3	1	-	-	1	-	-	2	2	-	2
23A0311L/21L.5	3	3	1	-	-	1	-	-	2	2	-	2

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)

Title of the Course:	Basic Electrical and Electronics Engineering	
Category:	ES	
Couse Code:	23A0211T	23A0221T
Year:	I B.Tech.	I B.Tech.
Semester:	I Semester	II Semester
Branch/es:	ECE, EEE, AIDS, CSE-AI	CSE, CE, ME, AIML, CSE-DS

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	-	-	3

PART-A: BASIC ELECTRICAL ENGINEERING

Course Objectives: To expose to the field of electrical & electronics engineering, laws and principles of electrical/ electronic engineering and to acquire fundamental knowledge in the relevant field.

Course Outcomes:
At the end of the course, the student will be able to
1. analyze DC & AC circuits
2. understand the concept of machines and know the various measuring instruments
3. know the different energy resources, electricity billing concept and importance of safety measures

Unit 1 DC & AC Circuits 8

DC Circuits: Electrical circuit elements (R, L and C), Ohm's Law and its limitations, KCL & KVL, series, parallel, series-parallel circuits, Super Position theorem, Simple numerical problems.

AC Circuits: A.C. Fundamentals: Equation of AC Voltage and current, waveform, time period, frequency, amplitude, phase, phase difference, average value, RMS value, form factor, peak factor, Voltage and current relationship with phasor diagrams in R, L, and C circuits, Concept of Impedance, Active power, reactive power and apparent power, Concept of power factor (Simple Numerical problems).

Unit 2 Machines and Measuring Instruments 8

Machines: Construction, principle and operation of (i) DC Motor, (ii) DC Generator, (iii) Single Phase Transformer, (iv) Three Phase Induction Motor and (v) Alternator, Applications of electrical machines.

Measuring Instruments: Construction and working principle of Permanent Magnet Moving Coil (PMMC), Moving Iron (MI) Instruments and Wheat Stone bridge.

Unit 3 Energy Resources, Electricity Bill & Safety Measures 8

Energy Resources: Conventional and non-conventional energy resources; Layout and operation of various Power Generation systems: Hydel, Nuclear, Solar & Wind power generation.

Electricity bill: Power rating of household appliances including air conditioners, PCs, Laptops, Printers, etc. Definition of "unit" used for consumption of electrical energy, two-part electricity tariff, calculation of electricity bill for domestic consumers.

Equipment Safety Measures: Working principle of Fuse and Miniature circuit breaker (MCB), merits and demerits. Personal safety measures: Electric Shock, Earthing and its types, Safety Precautions to avoid shock.

Prescribed Textbooks:

1. Basic Electrical Engineering, D. C. Kulshreshtha, Tata McGraw Hill, 2019, First Edition
2. Power System Engineering, P.V. Gupta, M.L. Soni, U.S. Bhatnagar and A. Chakrabarti, Dhanpat Rai & Co, 2013.
3. Fundamentals of Electrical Engineering, Rajendra Prasad, PHI publishers, 2014, Third Edition

Reference Books:

1. Basic Electrical Engineering, D. P. Kothari and I. J. Nagrath, Mc Graw Hill, 2019, Fourth Edition
2. Principles of Power Systems, V.K. Mehtha, S.Chand Technical Publishers, 2020
3. Basic Electrical Engineering, T. K. Nagsarkar and M. S. Sukhija, Oxford University Press, 2017
4. Basic Electrical and Electronics Engineering, S. K. Bhatacharya, Person Publications, 2018, Second Edition

Web Resources:

1. https://nptel.ac.in/courses/108105053
2. https://nptel.ac.in/courses/108108076

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long learning
23A0211T/21T.1	3	3	3	3	2	-	-	-	-	-	2	2
23A0211T/21T.2	3	3	3	3	3	-	-	-	-	-	2	3
23A0211T/21T.3	3	3	3	3	3	3	3	3	3	3	3	3

PART B: BASIC ELECTRONICS ENGINEERING

Course Objectives: This course provides the student with the fundamental skills to understand the principles of digital electronics, basics of semiconductor devices like diodes & transistors, characteristics and its applications

Course Outcomes:

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

4. apply the concept of science and mathematics to comprehend the working of diodes, transistors, and their characteristics.
5. explain the applications of diodes and transistors
6. familiarize with the number systems, codes, Boolean algebra and logic gates and comprehend the basic principles of combinational, sequential circuits role in digital systems

Unit 1 Semiconductor Devices 8

Introduction - Evolution of electronics – Vacuum tubes to Nano electronics - Characteristics of PN Junction Diode — Zener Effect — Zener Diode and its Characteristics. Bipolar Junction Transistor — CB, CE, CC Configurations and Characteristics — Elementary Treatment of Small Signal CE Amplifier.

Unit 2 Basic Electronic Circuits and Instrumentation 8

Rectifiers and power supplies: Block diagram description of a dc power supply, working of a full wave bridge rectifier, capacitor filter (no analysis), working of simple Zener voltage regulator. Amplifiers: Block diagram of Public Address system, Circuit diagram and working of common emitter (RC coupled) amplifier with its frequency response. Electronic Instrumentation: Block diagram of an electronic instrumentation system.

Unit 3 Digital Electronics 8

Overview of Number Systems, Logic gates including Universal Gates, BCD codes, Excess-3 code, Gray code, Hamming code. Boolean Algebra, Basic Theorems and properties of Boolean Algebra, Truth Tables and Functionality of Logic Gates – NOT, OR, AND, NOR, NAND, XOR and XNOR. Simple combinational circuits–Half and Full Adder, Introduction to sequential circuits, Flip flops, Registers and counters (Elementary Treatment only)

Prescribed Textbooks:

1. R. L. Boylestad & Louis Nashlesky, Electronic Devices & Circuit Theory, Pearson Education, 2021
2. R. P. Jain, Modern Digital Electronics, 4th Edition, Tata Mc Graw Hill, 2009

Reference Books:

1. R. S. Sedha, A Textbook of Electronic Devices and Circuits, S. Chand & Co, 2010.
2. Santiram Kal, Basic Electronics- Devices, Circuits and IT Fundamentals, Prentice Hall, India, 2002.
3. R. T. Paynter, Introductory Electronic Devices & Circuits – Conventional Flow Version, Pearson Education, 2009.

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long learning
20A0211T/21T.4	3	3	1	1	3	-	1	-	-	1	-	2
20A0211T/21T.5	3	3	1	1	3	-	-	-	-	1	-	1
20A0211T/21T.6	2	2	1	1	2	-	2	1	1	-	-	2

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)

Title of the Course:	Electrical and Electronics Engineering Workshop	
Category:	ES	
Couse Code:	23A0211L	23A0221L
Year:	I B.Tech.	I B.Tech.
Semester:	I Semester	II Semester
Branch/es:	ECE, EEE, AIDS, CSE-AI	CSE, CE, ME, AIML, CSE-DS

Lecture Hours	Tutorial Hours	Practice Hours	Credits
0	0	3	1.5

Course objectives:
To impart knowledge on the fundamental laws & theorems of electrical circuits, functions of electrical machines and energy calculations.

Course Outcomes:
At the end of the course, the student will be able to
1. understand the Electrical circuit design concept; measurement of resistance, power, power factor; concept of wiring and operation of Electrical Machines and Transformer
2. analyse various characteristics of electrical circuits, electrical machines and measuring instruments
3. design suitable circuits and methodologies for the measurement of various electrical parameters; Household and commercial wiring

Activities:
1. Familiarization of commonly used Electrical & Electronic Workshop Tools: Bread board, Solder, cables, relays, switches, connectors, fuses, Cutter, plier, screwdriver set, wire stripper, flux, knife/blade, soldering iron, de-soldering pump etc.
2. Provide some exercises so that hardware tools and instruments are learned to be used by the students.
3. Familiarization of Measuring Instruments like Voltmeters, Ammeters, multimeter, LCR-Q meter, Power Supplies, CRO, DSO, Function Generator, Frequency counter.
4. Provide some exercises so that measuring instruments are learned to be used by the students.
   Components:
   a. Familiarization/Identification of components (Resistors, Capacitors, Inductors, Diodes, transistors, IC's etc.) – Functionality, type, size, colour coding package, symbol, cost etc.
5. Testing of components like Resistor, Capacitor, Diode, Transistor, ICs etc. - Compare values of components like resistors, inductors, capacitors etc with the measured values by using instruments

PART A: ELECTRICAL ENGINEERING LAB

List of experiments
1.Verification of KCL and KVL
2.Verification of Superposition theorem
3.Measurement of Resistance using Wheat stone bridge
4.Magnetization Characteristics of DC shunt Generator
5.Measurement of Power and Power factor using Single-phase wattmeter
6.Measurement of Earth Resistance using Megger
7.Calculation of Electrical Energy for Domestic Premises
8. Brake Test on DC Shunt Motor
9. OC and SC Test on Single Phase Transformer

Prescribed Textbooks:

1. Basic Electrical engineering , C L Wadhwa, New Age International (P) Ltd., Publishers,2018,4th edition
2. Principles of Basic Electrical Engineering, T.N. Nagsarkar & M.S. Sukhija, Oxford University press, August 2018, 2nd Edition.

Reference Books:

1. Basic Electrical Engineering, D. C. Kulshreshtha, Tata McGraw Hill, 2019, First Edition
2. Power System Engineering, P.V. Gupta, M.L. Soni, U.S. Bhatnagar and A. Chakrabarti, Dhanpat Rai & Co, 2013
3. Fundamentals of Electrical Engineering, Rajendra Prasad, PHI publishers, 2014, Third Edition

Note: Minimum Six Experiments to be performed

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long learning
23A0211L/21L.1	3	3	3	3	3	-	2	-	3	3	3	3
23A0211L/21L.2	3	3	3	3	3	-	2	-	3	3	3	3
23A0211L/21L.3	3	3	3	3	3	-	2	-	3	3	3	3

PART B: ELECTRONICS ENGINEERING LAB

Course Objectives: To impart knowledge on the principles of digital electronics and fundamentals of Electronic devices & its applications.

Course Outcomes:

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

4. identify & testing of various electronic components and plot the characteristics of various electronic devices
5. comprehend the usage of electronic measuring instruments.
6. explain the operation of a digital circuit.

List of Experiments

1. Plot V-I characteristics of PN Junction diode A) Forward bias B) Reverse bias
2. Plot V – I characteristics of Zener Diode and its application as voltage Regulator.
3. Implementation of half wave and full wave rectifiers
4. Plot Input & Output characteristics of BJT in CE and CB configurations
5. Frequency response of CE amplifier
6. Simulation of RC coupled amplifier with the design supplied
7. Verification of Truth Table of AND, OR, NOT, NAND, NOR, Ex-OR, Ex-NOR gates using ICs.
8. Verification of Truth Tables of S-R, J-K& D flip flops using respective ICs.

Reference Books:

1. R. L. Boylestad & Louis Nashlesky, Electronic Devices & Circuit Theory, Pearson Education, 2021
2. R. P. Jain, Modern Digital Electronics, 4th Edition, Tata Mc Graw Hill, 2009
3. R. T. Paynter, Introductory Electronic Devices & Circuits – Conventional Flow Version, Pearson Education, 2009.

Note: Minimum Six Experiments to be performed. All the experiments shall be implemented Using both Hardware and Software.

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long learning	**PSO1**	**PSO2**	**PSO3**
23A0211L/21L.4	2	2	1	1	2	-	-	-	-	-	-	1	-	-	-
23A0211L/21L.5	2	2	1	1	2	-	-	-	-	1	-	1	-	-	-
23A0211L/21L.6	2	2	1	1	2	1	-	1	-	1	-	1	-	--	

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)

Title of the Course: Electrical Analysis – 1
Category: PC
Couse Code: 23A0222T
Year: I
Semester: II Semester
Branch/es: EEE

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	-	-	3

Course Objectives:
To develop an understanding of the fundamental laws, elements of electrical circuits and to apply circuit analysis to DC and AC circuits.

Course Outcomes:
At the end of the course, the student will be able to
1. remembering the basic electrical elements and different fundamental laws, network reduction techniques & transformations.
2. understand the concept of self-inductance and mutual inductance.
3. understand the basic concepts of single-phase AC circuits.
4. apply the concept of resonance and locus diagrams.
5. evaluate the circuits using Network theorems.

Unit 1 Introduction to Electrical Circuits 9
Basic Concepts of passive elements of R, L, C and their V-I relations, Sources (dependent and independent), Kirchoff's laws, Network reduction techniques (series, parallel, series - parallel, star-to-delta and delta-to-star transformation), source transformation technique, nodal analysis and mesh analysis to DC networks with dependent and independent voltage and current sources, node and mesh analysis.

Unit 2 Magnetic Circuits 9
Basic definition of MMF, flux and reluctance, analogy between electrical and magnetic circuits, Faraday's laws of electromagnetic induction – concept of self and mutual inductance, Dot convention – coefficient of coupling and composite magnetic circuit, analysis of series and parallel magnetic circuits.

Unit 3 Single Phase Circuits 9
Characteristics of periodic functions, Average value, R.M.S. value, form factor, representation of a sine function, concept of phasor, phasor diagrams, node and mesh analysis. Steady state analysis of R, L and C circuits to sinusoidal excitations-response of pure resistance, inductance, capacitance, series RL circuit, series RC circuit, series RLC circuit, parallel RL circuit, parallel RC circuit

Unit 4 Resonance and Locus Diagrams 9
Series Resonance: Characteristics of a series resonant circuit, Q-factor, selectivity and bandwidth, expression for half power frequencies; Parallel resonance: Q-factor, selectivity and bandwidth; Locus diagram: RL, RC, RLC with R, L and C variables

Unit 5 Network Theorems (DC & AC Excitations) 9
Superposition theorem, Thevenin's theorem, Norton's theorem, Maximum Power Transfer theorem, Reciprocity theorem, Millman's theorem and compensation theorem

Prescribed Textbooks:

1. Engineering Circuits Analysis, Jack Kemmerly, William Hayt and Steven Durbin, Tata Mc Graw Hill Education, 2005, sixth edition.
2. Network Analysis, M. E. Van Valkenburg, Pearson Education, 2019, Revised Third Edition

Reference Books:

1. Fundamentals of Electrical Circuits, Charles K. Alexander and Mathew N.O. Sadiku, Mc Graw Hill Education (India), 2013, Fifth Edition
2. Electric Circuits (Schaum's outline Series), Mahmood Nahvi, Joseph Edminister, and K. Rao, Mc Graw Hill Education, 2017, Fifth Edition.
3. Electric Circuits, David A. Bell, Oxford University Press, 2009, Seventh Edition.
4. Introductory Circuit Analysis, Robert L Boylestad, Pearson Publications, 2023, Fourteenth Edition.
5. Circuit Theory: Analysis and Synthesis, A. Chakrabarti, Dhanpat Rai & Co., 2018, Seventh Revised Edition.

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long learning	**PSO1**	**PSO2**
23A0222T.1	3	3	-	-	-	-	-	1	-	-	2	-	-	-
23A0222T.2	3	2	2	1	-	-	-	-	-	-	-	-	-	-
23A0222T.3	3	2	-	-	-	-	-	-	-	-	-	-	-	
23A0222T.4	3	2	2	1	-	-	-	-	-	-	-	-	-	-
23A0222T.5	3	2	2	1	1	-	-	-	-	-	-	-	-	-

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)

Title of the Course: Electrical Circuits Lab
Category: PC
Couse Code: 23A0222L
Year: I
Semester: II Semester
Branch/es: EEE

Lecture Hours	Tutorial Hours	Practice Hours	Credits
-	-	3	1.5

Course Objectives:
To impart hands on experience in verification of circuit laws and theorems, measurement of circuit parameters, study of circuit characteristics. It also gives practical exposure to the usage of different circuits with different conditions.

Course Outcomes:
At the end of the course, the student will be able to
1. understand the concepts of network theorems, node and mesh networks, series and parallel resonance and Locus diagrams.
2. apply various theorems to compare practical results obtained with theoretical calculations.
3. determine self, mutual inductances and coefficient of coupling values, parameters of choke coil.
4. analyze different circuit characteristics with the help of fundamental laws and various configurations.
5. create locus diagrams of RL, RC series circuits and examine series and parallel resonance.

List of Experiments:
Perform any ten experiments out of the following
1. Verification of Kirchhoff's circuit laws.
2. Verification of node and mesh analysis.
3. Verification of network reduction techniques.
4. Determination of cold and hot resistance of an electric lamp.
5. Determination of Parameters of a choke coil.
6. Determination of self, mutual inductances, and coefficient of coupling.
7. Series and parallel resonance.
8. Locus diagrams of R-L (L Variable) and R-C (C Variable) series circuits.
9. Verification of Superposition theorem.
10. Verification of Thevenin’s and Norton’s Theorem.
11. Verification of Maximum power transfer theorem.
12. Verification of Compensation theorem.
13. Verification of Reciprocity and Millman’s Theorem.

Reference Books:

1. Engineering Circuits Analysis, Jack Kemmerly, William Hayt and Steven Durbin, Tata Mc Graw Hill Education, 2005, sixth edition.
2. Network Analysis, M. E. Van Valkenburg, Pearson Education, 2019, Revised Third Edition

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long learning
23A0221L.1	3	-	3	2	-	-	-	-	-	-	-	-
23A0221L.2	3	-	3	2	-	-	-	-	-	-	-	-
23A0221L.3	1	-	1	2	-	-	-	-	-	-	-	-
23A0221L.4	3	-	3	2	-	-	-	-	-	-	-	-
23A0221L.5	2	-	3	2	-	-	-	-	-	-	-	-

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
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Title of the Course: Network Analysis
Category: PC
Couse Code: 23A0421T
Year: I Year
Semester: II Semester
Branch/es: ECE

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	-	-	3

Course Objectives:
1. To introduce basic laws, mesh & nodal analysis techniques for solving electrical circuits.
2. To impart knowledge on applying appropriate theorem for electrical circuit analysis.
3. To explain transient behavior of circuits in time and frequency domains.
4. To teach concepts of resonance.
5. To introduce open circuit, short circuit, transmission, hybrid parameters and their interrelationship.

Course Outcomes:
At the end of the course, the student will be able to
1. understand basic electrical circuits with nodal and mesh analysis.
2. analyze the circuit using network simplification theorems.
3. find Transient response and Steady state response of a network.
4. analyze electrical networks in the Laplace domain.
5. compute the parameters of a two-port network.

Unit 1 Types of circuit components, Network Theorems 9

Types of circuit components, Types of Sources and Source Transformations, Mesh analysis and Nodal analysis, problem solving with resistances only including dependent sources also. Principal of Duality with examples.

Network Theorems: Thevenin's, Norton's, Milliman's, Reciprocity, Compensation, Substitution, Superposition, Max Power Transfer, Tellegens - problem solving using dependent sources also

Unit 2 Transients, Laplace transform Types of circuit components 9

Transients: First order differential equations, Definition of time constants, R-L circuit, R-C circuit with DC excitation, evaluating initial conditions procedure, second order differential equations, homogeneous, non-homogenous, problem-solving using R-L-C elements with DC excitation and AC excitation, Response as related to s-plane rotation of roots.

Laplace transform: introduction, Laplace transformation, basic theorems, problem solving using Laplace transform, partial fraction expansion, Heaviside's expansions, problem solving using Laplace transform..

Unit 3 Steady State Analysis of A.C Circuits: 9

Steady State Analysis of A.C Circuits: Impedance concept, phase angle, series R-L, R-C, R-LC circuits problem solving. Complex impedance and phasor notation for R-L, R-C, R-L-C problem solving using mesh and nodal analysis, Star-Delta conversion, problem solving using Laplace transforms also.

Unit 4 Resonance and Coupled Circuits 9

Resonance: Introduction, Definition of Q, Series resonance, Bandwidth of series resonance, Parallel resonance, general case-resistance present in both branches, anti-resonance at all frequencies.

Coupled Circuits: Coupled Circuits: Self-inductance, Mutual inductance, Coefficient of coupling, analysis of coupled circuits, Natural current, Dot rule of coupled circuits, conductively coupled equivalent circuits-

problem solving.

Unit 5 Two-port Networks, Image and iterative impedances 9

Two-port Networks: Relationship of two port networks, Z-parameters, Y-parameters, Transmission line parameters, h- parameters, Relationships Between parameter Sets, Parallel & series connection of two port networks, cascading of two port networks, problem solving using dependent sources also.

Image and iterative impedances. Image and iterative transfer constants. Insertion loss. Attenuators and pads. Lattice network and its parameters. Impedance matching networks

Prescribed Textbooks:

1. Network Analysis – ME Van Valkenburg, Prentice Hall of India, revised 3rd Edition, 2019.
2. Engineering Circuit Analysis by William H. Hayt, Jack Kemmerly, Jamie Phillips, Steven M. Durbin, 9th Edition 2020.
3. Network lines and Fields by John. D. Ryder 2nd Edition, PHI

Reference Books:

1. D. Roy Choudhury, Networks and Systems, New Age International Publications, 2013.
2. Joseph Edminister and Mahmood Nahvi, Electric Circuits, Schaum's Outline Series, 7th Edition, Tata McGraw Hill Publishing Company, New Delhi, 2017
3. Fundamentals of Electric Circuits by Charles K. Alexander and Matthew N. O. Sadiku, McGraw-Hill Education.

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long learning
23A0421T.1	3	3	3	2	2	-	-	-	2	-	-	3
23A0421T.2	3	3	3	2	2	-	-	-	2	-	-	3
23A0421T.3	3	3	3	3	2	-	-	-	3	-	3	3
23A0421T.4	3	3	3	3	2	-	-	-	3	-	3	3
23A0421T.5	3	3	3	3	2	-	-	-	3	-	3	3

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
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Title of the Course: Network Analysis and Simulation Lab
Category: PC
Couse Code: 23A0421L
Year: I
Semester: II Semester
Branch/es: ECE

Lecture Hours	Tutorial Hours	Practice Hours	Credits
-	-	3	1.5

Course Objectives:

1. To gain hands on experience in verifying Kirchoff's laws and network theorems
2. To analyze transient behavior of circuits
3. To study resonance characteristics
4. To determine 2-port network parameters

Course Outcomes:

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

1. verify Kirchoff's laws and network theorems.
2. measure time constants of RL & RC circuits.
3. analyze behavior of RLC circuit for different cases.
4. design resonant circuit for given specifications.
5. characterize and model the network in terms of all network parameters.

The following experiments need to be performed using both Hardware and simulation Software. The experiments need to be simulated using software and the same need to be verified using the hardware.

List of Experiments:

Perform any ten experiments out of the following

1. Study of components of a circuit and Verification of KCL and KVL.
2. Verification of mesh and nodal analysis for AC circuits
3. Verification of Superposition, Thevenin's & Norton theorems for AC circuits
4. Verification of maximum power transfer theorem for AC circuits
5. Verification of Tellegan's theorem for two networks of the same topology.
6. Study of DC transients in RL, RC and RLC circuits
7. To study frequency response of various 1st order RL & RC networks
8. To study the transient and steady state response of a 2nd order circuit by varying its various parameters and studying their effects on responses
9. Find the Q Factor and Bandwidth of a Series and Parallel Resonance circuit.
10. Determination of open circuit (Z) and short circuit (Y) parameters
11. Determination of hybrid (H) and transmission (ABCD) parameters
12. To measure two port parameters of a twin-T network and study its frequency response.

Hardware Requirements: Regulated Power supplies, Analog/Digital Function Generators, Digital Multimeters, Decade Resistance Boxes/Rheostats, Decade Capacitance Boxes, Ammeters (Analog or Digital), Voltmeters (Analog or Digital), Active & Passive Electronic Components
Software Requirements: Multisim/ Pspice/Equivalent simulation software tool, Computer Systems with required specifications

Reference Books:

1. Network Analysis – ME Van Altenburg, Prentice Hall of India, revised 3rd Edition, 2019
2. Engineering Circuit Analysis by William H. Hayt, Jack Kemmerly, Jamie Phillips, Steven M. Durbin, 9th Edition 2020.

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long learning
23A0421L.1	3	3	3	3	3	-	-	-	2	-	3	3
23A0421L.2	3	3	3	3	3	-	-	-	2	-	3	3
23A0421L.3	3	3	3	3	3	-	-	-	2	-	3	3
23A0421L.4	3	3	3	3	3	-	-	-	2	-	3	3
23A0421L.5	3	3	3	3	3	-	-	-	2	-	3	3

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
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Title of the Course:	Introduction to Programming
Category:	ES
Couse Code:	23A0511T
Branch/es:	Common to All Branches of Engineering
Year:	I Year
Semester:	I Semester

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	0	0	3

Course Objectives:

1. To introduce students to the fundamentals of computer programming.
2. To provide hands-on experience with coding and debugging.
3. To foster logical thinking and problem-solving skills using programming.
4. To familiarize students with programming concepts such as data types, control structures,functions, and arrays.
5. To encourage collaborative learning and teamwork in coding projects.

Course Outcomes:

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

1. summarize the basics of computers, the concept of algorithm and algorithmic thinking**.**
2. analyze a problem and develop an algorithm to solve it**.**
3. implement various algorithms using the C programming language**.**
4. analyze more advanced features of C language**.**
5. develop problem-solving skills and the ability to debug and optimize the code**.**

Unit 1 Introduction to Programming and Problem Solving 9

History of Computers, Basic organization of a computer: ALU, input-output units, memory, program counter, Introduction to Programming Languages, Basics of a Computer Program- Algorithms, flowcharts (Using Dia Tool), pseudo code.

Problem solving techniques: Algorithmic approach, characteristics of algorithm, Problem solving strategies:

Top-down approach, Bottom-up approach, Time and space complexities of algorithms.

Introduction to C: Introduction to Compilation and Execution, Primitive Data Types, Variables,and Constants, Basic Input and Output, Operators, Type Conversion and Casting.

Unit 2 Control Structures 9

Control Structures: Simple sequential programs, Conditional Statements (if, if-else, switch), Loops (for, while, do-While), Break and Continue.

Unit 3 Arrays and Strings 9

Arrays indexing, memory model, programs with array of integers, two dimensional arrays, Introduction to Strings and string handling functions.

Unit 4 Pointers and User Defined Data types 9

Pointers, dereferencing and address operators, pointer and address arithmetic, array manipulation using pointers, dynamic memory allocation functions.

User-defined data types-Structures and Unions.

Unit 5 Functions and File Handling 9

Introduction to Functions, Function Declaration and Definition, Function call Return Types and Arguments,modifying parameters inside functions using pointers, arrays as parameters. Storage classes, Basics of File Handling

Prescribed Textbooks:

1. The C Programming Language, Brian W. Kernighan and Dennis M. Ritchie, Prentice- Hall, 1988
2. Schaum's Outline of Programming with C, Byron S Gottfried, McGraw-Hill Education, 1996

Reference Books:

1. Computing fundamentals and C Programming, Balagurusamy, E., McGraw-Hill Education, 2008.
2. Programming in C, Rema Theraja, Oxford, 2016, 2nd edition.
3. C Programming, A Problem Solving Approach, Forouzan, Gilberg, Prasad, CENGAGE, 3rd edition

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long learning
23A0511T.1	2	2	1	1	2	-	-	-	3	1	1	-
23A0511T.2	3	3	2	2	2	-	-	-	3	-	-	-
23A0511T.3	3	2	1	2	3	-	-	-	3	-	-	3
23A0511T.4	2	3	2	2	2	-	-	-	2	-	-	3
23A0511T.5	3	3	2	3	3	-	-	-	2	-	-	3

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES: RAJAMPET
(An Autonomous Institution)

Title of the Course: Computer Programming Lab
Category: ES
Couse Code: 23A0511L
Branch/es: Common to all branches of engineering
Year: I B. Tech
Semester: I Semester

Lecture Hours	Tutorial Hours	Practice Hours	Credits
-	-	3	1.5

Course Objectives:

1. Getting familiar with how to formally describe a solution to a problem in a series of finite steps and learn how to define variables with the desired data-type, initialize them with appropriate values
2. Explore the full scope of expressions, type-compatibility of variables & constants and operators used in the expression and how operator precedence works.
3. Understand the full scope of different variants of decision-making constructs and iterative constructs.
4. Analyze the full scope of Arrays construct namely 1-D, 2-D and bubble sort.
5. Explore pointers to manage dynamic array of integers, including memory allocation and file handling with various file I/O functions.

Course Outcomes:

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

1. read, understand, and trace the execution of programs written in C language.
2. select the right control structure for solving the problem.
3. compare C programs which utilize memory efficiently using programming constructs like pointers.
4. prepare, Debug and Execute programs to demonstrate the applications of arrays, functions, basic concepts of pointers in C.
5. create, read from and write text into a file using various file operations.

Unit1 Introduction to programming and problem solving

WEEK 1: Suggested Experiments/Activities:

Tutorial 1: Problem-solving using Computers.

Familiarization with programming environment i) Basic Linux environment and its editors like Vi, Vim &Emacs etc. ii) Exposure to Turbo C, gcc iii) Writing simple programs using printf(), scanf()

WEEK 2: Suggested Experiments /Activities:

Tutorial 2: Problem-solving using Algorithms and Flow charts.

Converting algorithms/flow charts into C Source code. Developing the algorithms/flowcharts for the following sample programs i) Sum and average of 3 numbers ii) Conversion of Fahrenheit to Celsius and vice versa iii) Simple interest calculation.

WEEK 3: Suggested Experiments/Activities:

Tutorial 3: Variable types and type conversions:

Simple computational problems using arithmetic expressions. i) Finding the square root of a given number ii) Finding compound interest iii) Area of a triangle using heron's formulae iv) Distance travelled by an object.

Unit 2 Control structures

WEEK 4: Suggested Experiments/Activities

Tutorial4: Operators and the precedence and as associativity:

Simple computational problems using the operator' precedence and associativity
i) Evaluate the following expressions.

a. A+B*C+(D*E) + F*G
b. A/B*C-B+A*D/3
c. A+++B---A
d. J= (i++) + (++i)
ii) Find the maximum of three numbers using conditional operator iii) Take marks of 5 subjects in integers, and find the total, average in float

WEEK 5: Suggested Experiments/Activities:

Tutorial 5: Branching and logical expressions: Problems involving if-then-else structures. i) Write a C program to find the max and min of four numbers using if-else. ii) Write a C program to generate electricity bill. iii) Find the roots of the quadratic equation. iv) Write a C program to simulate a calculator using switch case. v) Write a C program to find the given year is a leap year or not.

WEEK 6: Suggested Experiments/Activities:

Tutorial 6: Loops, while and for loops

Iterative problems e.g., the sum of series i) Find the factorial of given number using any loop. ii) Find the given number is a prime or not. iii) Compute sine and cos series iv) Checking a number palindrome v) Construct a pyramid of numbers.

Unit 3 Arrays and Strings

WEEK 7: Suggested Experiments/Activities:

Tutorial 7: 1 D Arrays: searching.

1D Array manipulation, linear search i) Find the min and max of a 1-D integer array. ii) Perform linear search on1D array. iii) The reverse of a 1D integer array iv) Find 2's complement of the given binary number.
v) Eliminate duplicate elements in an array.

WEEK 8: Suggested Experiments/Activities:

Tutorial 8: 2 D arrays, sorting and Strings

Matrix problems, String operations, Bubble sort i) Addition of two matrices ii) Multiplication two matrices iii) Sort array elements using bubble sort iv) Concatenate two strings without built-in functions v) Reverse a string using built-in and without built-in string functions

Unit 4 Pointers & User defined Data types

WEEK 9: Suggested Experiments/Activities:

Tutorial 9: Pointers, structures and dynamic memory allocation

Pointers and structures, memory dereferences.

i) Write a C program to find the sum of a 1D array using malloc()
ii) Write a C program to find the total, average of n students using structures
iii) Enter n students data using calloc() and display failed students list
iv) Read student name and marks from the command line and display the student details along with the total.
v) Write a C program to implement realloc()

WEEK 10: Suggested Experiments/Activities:

Tutorial 10: Bitfields, Self-Referential Structures, Linked lists

Bitfields, linked lists Read and print a date using dd/mm/yyyy format using bit-fields and differentiate the same without using bit- fields i) Create and display a singly linked list using self-referential structure.
ii) Demonstrate the differences between structures and unions using a C program. iii) Write a C program to shift/rotate using bitfields. iv) Write a C program to copy one structure variable to another structure of the same type.

Unit 5 Functions & File Handling

WEEK 11: Suggested Experiments/Activities:

Tutorial 11: Functions, call by value, scope and extent

Simple functions using call by value, solving differential equations using Eulers theorem. i) Write a C function to calculate NCR value. ii) Write a C function to find the length of a string. iii) Write a C function

to transpose of a matrix. iv) Write a C function to demonstrate numerical integration of differential equations using Euler's method

WEEK 12: Suggested Experiments/Activities:

Tutorial 12: Recursion, the structure of recursive calls

Recursive functions i) Write a recursive function to generate Fibonacci series. ii) Write a recursive function to find the lcm of two numbers. iii) Write a recursive function to find the factorial of a number. iv) Write a C Program to implement Ackermann function using recursion. v) Write a recursive function to find the sum of series.

WEEK 13: Suggested Experiments/Activities:

Tutorial 13: Call by reference, dangling pointers

Simple functions using Call by reference, Dangling pointers. i) Write a C program to swap two numbers using call by reference. ii) Demonstrate Dangling pointer problem using a C program. iii) Write a C program to copy one string into another using pointer. iv) Write a C program to find no of lowercase, uppercase, digits and other characters using pointers.

WEEK14: Suggested Experiments/Activities:

Tutorial 14: File handling

File operations i) Write a C program to write and read text into a file. ii) Write a C program to write and read text into a binary file using fread() and fwrite() iii) Copy the contents of one file to another file. iv) Write a C program to merge two files into the third file using command-line arguments. v) Find no. of lines, words and characters in a file vi) Write a C program to print last n characters of a given file.

Prescribed Textbooks:

1. Programming in C: A practical approach, Ajay Mittal, Pearson.
2. Schaum' s Outline of Programming with C, Byron Gottfried, McGraw Hill

Reference Books:

1. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, PrenticeHall of India
2. C Programming, A Problem-Solving Approach, Forouzan, Gilberg, Prasad, CENGAGE

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long learning
23A0511L.1	2	2	1	1	2	-	-	-	3	1	1	-
23A0511L.2	3	3	2	2	2	-	-	-	3	-	-	-
23A0511L.3	3	2	1	2	3	-	-	-	3	-	-	3
23A0511L.4	2	3	2	2	2	-	-	-	2	-	-	3
23A0511L.5	3	3	2	3	3	-	-	-	2	-	-	3

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES: RAJAMPET
(An Autonomous Institution)

Title of the Course: Data Structures
Category: PC
Couse Code: 23A0521T
Branch/es: CSE, AIDs, AIML, CSE (AI), CSE (DS)
Year: I B. Tech.
Semester: II Semester

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	-	-	3

Course Objectives:

1. Understand the significance of linear data structures in problem-solving and basic time/space complexity analysis.
2. Create and manage linked lists to efficiently organize and manipulate data, emphasizing memory efficiency.
3. Implement and apply stacks and queues to manage program flow and solve problems involving expression evaluation and backtracking.
4. Understand the importance of non-linear data structures Tress and Graphs.
5. Explore basic concepts of hashing and apply it to solve problems requiring fast data retrieval and management.

Course Outcomes:

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

1. understand the role of linear data structures in organizing and accessing data efficiently in algorithms.
2. design, implement, and apply linked lists for dynamic data storage, demonstrating understanding of memory allocation.
3. develop programs using stacks and queues to solve related problems.
4. implement non-linear data structures such as trees and graphs.
5. recognize scenarios where hashing is advantageous, and design hash-based solutions for specific problems**.**

Unit 1 Introduction to Linear Data Structures 9

Introduction to Linear Data Structures: Definition and importance of linear data structures, Abstract data types (ADTs) and their implementation, Overview of time and space complexity analysis for linear data structures.

Unit 2 Linked Lists 9

Linked Lists: Singly linked lists: representation and operations, Doubly linked lists and circular linked lists, Comparing arrays and linked lists, Applications of linked lists.

Unit 3 Stacks, Queues and De-queues 9

Stacks: Introduction to stacks: properties and operations, Implementing stacks using arrays and linked lists, Applications of stacks in expression evaluation, backtracking, reversing list etc.

Queues: Introduction to queues: properties and operations, Implementing queues using arrays and linked lists, Applications of queues in breadth-first search, scheduling, etc.

De-queues: Introduction to De-queues (double-ended queues), Operations on De-queues and their applications.

Unit 4 Introduction to non-linear Data Structures 9

Trees: Introduction to Trees, Binary Trees, creation of binary tree, Operations on Binary Tree. Introduction to Binary Search Tree, Operations on Binary Search Trees.

Graphs: Defining graph, basic terminology, graph representation.

Unit 5 Hashing 9

Hashing: Brief introduction to hashing and hash functions, Collision resolution techniques: chaining and open addressing, Hash tables: basic implementation and operations, Applications of hashing in unique identifier generation, caching, etc.

Prescribed Text books:

1. Data Structures and algorithm analysis in C, Mark Allen Weiss, Pearson, 2nd Edition
2. Fundamentals of data structures in C, Ellis Horowitz, Sartaj Sahni, Dinesh Mehta, Silicon Press, 2008

Reference Books:

1. Algorithms and Data Structures: The Basic Toolbox by Kurt Mehlhorn and Peter Sanders
2. C Data Structures and Algorithms by Alfred V. Aho, Jeffrey D. Ullman, and John E. Hopcroft
3. Problem Solving with Algorithms and Data Structures" by Brad Miller and David Ranum
4. Introduction to Algorithms by Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein
5. Algorithms in C, Parts 1-5 (Bundle): Fundamentals, Data Structures, Sorting, Searching, and Graph Algorithms, Robert Sedge wick

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long learning
23A0521T.1	3	3	3	3	-	-	-	-	-	-	3	3
23A0521T.2	3	3	3	3	-	-	-	-	-	-	-	3
23A0521T.3	3	3	3	-	-	-	-	-	-	-	-	3
23A0521T.4	3	3	3	3	-	-	-	-	-	2	-	3
23A0521T.5	3	3	3	3	2	-	-	-	-	-	-	3

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES: RAJAMPET
(An Autonomous Institution)

Title of the Course: Data Structures Lab
Category: PC
Couse Code: 23A0521L
Branch/es: CSE, AIDS, AIML, CSE (AI), CSE (DS)
Year: I B. Tech
Semester: II Semester

Lecture Hours	Tutorial Hours	Practice Hours	Credits
-	-	3	1.5

Course Objectives: The course aims to strengthen the ability of the students to identify and apply the suitable data structure for the given real-world problem. It enables them to gain knowledge in practical applications of data structures.

Course Outcomes:
At the end of the course, the student will be able to
1. understand the role of linear data structures in organizing and accessing data efficiently in algorithms.
2. design, implement, and apply linked lists for dynamic data storage, demonstrating understanding of memory allocation.
3. develop programs using stacks to handle recursive algorithms, manage program states, and solve related problems.
4. apply queue-based algorithms for efficient task scheduling and breadth-first traversal in graphs and distinguish between de-queues and priority queues and apply them appropriately to solve data management challenges.
5. recognize scenarios where hashing is advantageous, and design hash-based solutions for specific problems.

Unit1 Introduction to Linear Data Structures
WEEK 1: Suggested Experiments/Activities:
Tutorial 1: Array Manipulation
i) Write a C program to reverse an array.
ii) C Programs to implement the Searching Techniques – Linear & Binary Search
WEEK 2: Suggested Experiments/Activities:
Tutorial 1: Sorting Techniques
i) C Programs to implement Sorting Techniques – Bubble, Selection and Insertion Sort

Unit 2 Linked Lists
WEEK 3: Suggested Experiments/Activities
Tutorial3: Linked List Implementation
i) Implement a singly linked list and perform insertion and deletion operations.
ii) Develop a program to reverse a linked list iteratively and recursively.
iii) Solve problems involving linked list traversal and manipulation
WEEK 4: Suggested Experiments/Activities:
Tutorial 4: Linked List Applications:
i) Create a program to detect and remove duplicates from a linked list.
ii) Implement a linked list to represent polynomials and perform addition.
iii) Implement a double-ended queue (de-queue) with essential operations.
WEEK 5: Suggested Experiments/Activities:
Tutorial 5: Double Linked List Implementation:

i) Implement a doubly linked list and perform various operations to understand its properties and applications.
ii) Implement a circular linked list and perform insertion, deletion, and traversal.

Unit 3 Stacks, Queues and De-queues

WEEK 6: Suggested Experiments/Activities:

Tutorial 6: Stack Operations:

i) Implement a stack using arrays and linked lists.
ii) Write a program to evaluate a postfix expression using a stack.
iii) Implement a program to check for balanced parentheses using a stack.

WEEK 7: Suggested Experiments/Activities:

Tutorial 7: Queue Operations:

i) Implement a queue using arrays and linked lists.
ii) Develop a program to simulate a simple printer queue system.
iii) Solve problems involving circular queues

WEEK 8: Suggested Experiments/Activities:

Tutorial 8: Stack and Queue Applications:

i) Use a stack to evaluate an infix expression and convert it to postfix.
ii) Create a program to determine whether a given string is a palindrome or not.
iii) Implement a stack or queue to perform comparison and check for symmetry.

Unit 4 Introduction to non-linear Data Structures

WEEK 9: Suggested Experiments/Activities:

Tutorial 9: Binary Search Tree Implementation:

i) Implementing a BST using Linked List.

WEEK 10: Suggested Experiments/Activities:

Tutorial 10: Binary Search Tree Traversing:

i) Traversing of BST.

Unit 5 Hashing

WEEK 11: Suggested Experiments/Activities:

Tutorial 11: Implementation of Hashing:

i) Implement a hash table with collision resolution techniques.

WEEK 12: Suggested Experiments/Activities:

Tutorial 12: Implementation of simple cache

i) Write a program to implement a simple cache using hashing.

Prescribed Textbooks:

1. Data Structures and algorithm analysis in C, Mark Allen Weiss, Pearson, 2nd Edition
2. Fundamentals of data structures in C, Ellis Horowitz, Sartaj Sahni, Dinesh Mehta, Silicon Press, 2008

Reference Books:

1. Algorithms and Data Structures: The Basic Toolbox by Kurt Mehlhorn and Peter Sanders
2. C Data Structures and Algorithms by Alfred V. Aho, Jeffrey D. Ullman, and John E. Hopcroft
3. Problem Solving with Algorithms and Data Structures" by Brad Miller and David Ranum
4. Introduction to Algorithms by Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein
5. Algorithms in C, Parts 1-5 (Bundle): Fundamentals, Data Structures, Sorting, Searching, and Graph Algorithms" by Robert Sedge wick

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long learning
23A0521L.1	3	3	3	3	-	-	-	-	-	-	3	3
23A0521L.2	3	3	3	3	-	-	-	-	-	-	-	3
23A0521L.3	3	3	3	-	-	-	-	-	-	-	-	3
23A0521L.4	3	3	3	3	-	-	-	-	-	2	-	3
23A0521L.5	3	3	3	3	2	-	-	-	-	-	-	3

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
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Title of the Course: IT Workshop
Category: ES
Couse Code: 23A0522L
Branch/es: Common to all branches of engineering
Year: I B. Tech
Semester: II Semester

Lecture Hours	Tutorial Hours	Practice Hours	Credits
0	0	2	1

Course Objectives:

1. To make the students know about the internal parts of a computer, assembling and dissembling a computer from the parts, preparing a computer for use by installing the operating system
2. To learn about Networking of computers and use Internet facility for browsing and searching
3. To provide technical training to the students on Productivity tools like Word processors, Spreadsheets, Presentations and LateX
4. To gain knowledge on how to eliminate the problem of traditional chatbot methods using ChatGPT

Course Outcomes:

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

1. identify various hardware components of a system and apply their knowledge about computer peripherals to identify or rectify problems onboard.
2. integrate the PCs into local area network and re-install operating system and various application programs.
3. understand the process of inserting graphics, pictures and table of contents, drop cap using Latex and word.
4. demonstrate the basic mechanics and navigation of an Excel Spreadsheet.
5. analyze formatting techniques and presentation styles and understanding of data creation, writing skills using ChatGPT.

List of Experiments

PC Hardware & Software Installation

Task 1: Identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral and submit to your instructor.

Task 2: Every student should disassemble and assemble the PC back to working condition. Lab instructors should verify the work and follow it up with a Viva. Also students need to go throughthe video which shows the process of assembling a PC. A video would be given as part of the course content.

Task 3: Every student should individually install MS windows on the personal computer. Lab instructor should verify the installation and follow it up with a Viva.

Task 4: Every student should install Linux on the computer. This computer should have windows installed. The system should be configured as dual boot (VMWare) with both Windows and Linux. Lab instructors should verify the installation and follow it up with a Viva.

Task 5: Every student should install BOSS on the computer. The system should be configuredas dual boot (VMWare) with both Windows and BOSS. Lab instructors should verify the installation and follow it up with a Viva

Internet & World Wide Web

Task 1: Orientation & Connectivity Boot Camp: Students should get connected to their Local Area Network and access the Internet. In the process they configure the TCP/IP setting. Finallystudents should demonstrate, to the instructor, how to access the websites and email. If there is internet connectivity

preparations need to be made by the instructors to simulate the WWWon the LAN.
Task 2: Web Browsers, Surfing the Web: Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and pop up blockers. Also, plug-ins like Macromedia Flash and JRE for applets should be configured.

Task 3: Search Engines & Netiquette: Students should know what search engines are and howto use the search engines. A few topics would be given to the students for which they need to search on Google. This should be demonstrated to the instructors by the student.
Task 4: Cyber Hygiene: Students would be exposed to the various threats on the internet and would be asked to configure their computer to be safe on the internet. They need to customize their browsers to block pop ups, block active x downloads to avoid viruses and/or worms.

LaTeX and WORD
Task 1: Word Orientation: The mentor needs to give an overview of La TeX and Microsoft (MS) office or equivalent (FOSS) tool word: Importance of La TeX and MS office or equivalent (FOSS) tool Word as word Processors, Details of the four tasks and features that would be covered in each, Using La TeX and word – Accessing, overview of toolbars, saving files, Usinghelp and resources, rulers, format painter in word.
Task 2: Using La TeX and Word to create a project certificate. Features to be covered: Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time option in both La TeXand Word.
Task 3: Creating project abstract Features to be covered: Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.
Task 4: Creating a Newsletter: Features to be covered: Table of Content, Newspaper columns,Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphs and Mail Merge in word.

EXCEL
Excel Orientation: The mentor needs to tell the importance of MS office or equivalent (FOSS)tool Excel as a Spreadsheet tool, give the details of the four tasks and features that would be covered in each. Using Excel – Accessing, overview of toolbars, saving excel files, Using helpand resources.
Task 1: Creating a Scheduler - Features to be covered: Gridlines, Format Cells, Summation, auto fill, Formatting Text
Task 2: Calculating GPA -. Features to be covered: Cell Referencing, Formulae in excel – average, std. deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function.
LOOKUP/VLOOKUP
Task 3: Split cells, freeze panes, group and outline, Sorting, Boolean and logical operators, Conditional formatting.

POWER POINT
Task 1: Students will be working on basic power point utilities and tools which help them create basic power point presentations. PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows in PowerPoint.
Task 2: Interactive presentations - Hyperlinks, Inserting –Images, Clip Art, Audio, Video, Objects, Tables and Charts.
Task 3: Master Layouts (slide, template, and notes), Types of views (basic, presentation, slide slotter, notes etc), and Inserting – Background, textures, Design Templates, Hidden slides.

AI TOOLS – ChatGPT
Task 1: Prompt Engineering: Experiment with different types of prompts to see how the modelresponds. Try asking questions, starting conversations, or even providing incomplete sentencesto see how the model completes them.
Ex: Prompt: "You are a knowledgeable AI. Please answer the following question: What is the capital of France?"

Task 2: Creative Writing: Use the model as a writing assistant. Provide the beginning of a story or a description of a scene and let the model generate the rest of the content. This can be a funway to brainstorm creative ideas.
Ex: Prompt: "In a world where gravity suddenly stopped working, people started floating upwards. Write a story about how society adapted to this new reality."
Task 3: Language Translation: Experiment with translation tasks by providing a sentence in one language and asking the model to translate it into another language. Compare the output tosee how accurate and fluent the translations are.
Ex: Prompt: "Translate the following English sentence to French: 'Hello, how are you doing today?'"

Reference Books:

1. Comdex Information Technology course tool kit, Vikas Gupta, WILEY Dream tech, 2003
2. The Complete Computer upgrade and repair book, Cheryl A Schmidt, WILEY Dream tech, 2013, 3rd edition
3. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education, 2012, 2nd edition
4. PC Hardware - A Handbook, Kate J. Chase, PHI (Microsoft)
5. LaTeX Companion, Leslie Lamport, PHI/Pearson.
6. IT Essentials PC Hardware and Software Companion Guide, David Anfins on and Ken Quamme. – CISCO Press, Pearson Education, 3rd edition
7. IT Essentials PC Hardware and Software Labs and Study Guide, Patrick Regan– CISCO Press, Pearson Education, 3rd edition

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long learning
22A0522L.1	3	3	-	-	-	-	-	-	-	-	-	-
23A0522L.2	3	-	3	-	-	2	-	-	3	3	-	-
23A0522L.3	3	-	2	-	-	3	-	-	3	3	-	-
23A0522L.4	3	3	-	3	2	-	-	-	-	-	-	-
23A0522L.5	3	3	-	2	2	3	-	-	-	-	-	-

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
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Title of the Course:	Health And Wellness, Yoga and Sports	
Category:	BS&H	
Couse Code:	23AHS16L	23AHS26L
Branch/es:	CSE, CE, ME, AIML, CSE-DS	ECE, EEE, AIDS, CSE-AI
Semester:	I Semester	II Semester

Lecture Hours	Tutorial Hours	Practice Hours	Credits
-	-	1	0.5

Course Objectives:

1. To maintain their mental and physical wellness upright and develop ability in them to cope up with the stress arising in the life.
2. To create space in the curriculum to nurture the potential of the students in sports/games/yoga etc.
3. To introduce a practice oriented introductory course on the subject.

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

1. perform daily routine without undue fatigue
2. be mentally alert and socially cohesive
3. consider success and failure equally
4. develop positive personality
5. improve leadership qualities

Unit 1

Concept of health and fitness, Nutrition and Balanced diet, basic concept of immunity Relationship between diet and fitness, Globalization and its impact on health, Body Mass Index (BMI) of all age groups.
Activities:

i. Organizing health awareness programmes in community
ii. Preparation of health profile
iii. Preparation of chart for balance diet for all age groups

Unit 2

Concept of yoga, need for and importance of yoga, origin and history of yoga in Indian context, classification of yoga, Physiological effects of Asanas- Pranayama and meditation, stress management and yoga, Mental health and yoga practice.
Activities: Yoga practices – Asana, Kriya, Mudra, Bandha, Dhyana, Surya Namaskar

Unit 3

Concept of Sports and fitness, importance, fitness components, history of sports, Ancient and Modern Olympics, Asian games and Commonwealth games.
Activities:

i. Participation in one major game and one individual sport viz., Athletics, Volleyball, Basketball, Handball, Football, Badminton, Kabaddi, Kho-kho, Table tennis, Cricket etc.
ii. Practicing general and specific warm up, aerobics
iii. Practicing cardiorespiratory fitness, treadmill, run test, 9 min walk, skipping and running.

General Guidelines:

1. Institutes must assign slots in the Timetable for the activities of Health/Sports/Yoga.
2. Institutes must provide field/facility and offer the minimum of five choices of as many as Games/Sports.
3. Institutes are required to provide sports instructor / yoga teacher to mentor the students.

Evaluation Guidelines:

- Evaluated for a total of 100 marks.
- A student can select 6 activities of his/her choice with a minimum of 01 activity per unit. Each activity shall be evaluated by the concerned teacher for 15 marks, totaling to 90 marks.
- A student shall be evaluated by the concerned teacher for 10 marks by conducting viva voce on the subject.

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long learning
23AHS16L/26L.1	-	-	-	-	-	-	-	3	3	3	-	3
23AHS16L/26L.2	-	-	-	-	-	-	-	3	3	3	-	3
23AHS16L/26L.3	-	-	-	-	-	-	-	3	3	3	-	3
23AHS16L/26L.4	-	-	-	-	-	-	-	3	3	3	-	3
23AHS16L/26L.5	-	-	-	-	-	-	-	3	3	3	-	3

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)

Title of the Course:	NSS/NCC/Scouts & Guides/Community Service	
Category:	BS&H	
Couse Code:	23AHS17L	23AHS27L
Branch/es:	ECE, EEE, AIDS, CSE-AI	CSE, CE, ME, AIML, CSE-DS
Semester:	I Semester	II Semester

Lecture Hours	Tutorial Hours	Practice Hours	Credits
-	-	1	0.5

Course Objectives: The objective of introducing this course is to impart discipline, character, fraternity, teamwork, social consciousness among the students and engaging them in selfless service.

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

1. understand the importance of discipline, character and service motto.
2. solve some societal issues by applying acquired knowledge, facts, and techniques.
3. explore human relationships by analyzing social problems.
4. determine to extend their help for the fellow beings and downtrodden people.
5. develop leadership skills and civic responsibilities.

Unit 1 Orientation

General Orientation on NSS/NCC/ Scouts & Guides/Community Service activities, career guidance.
Activities:

i. Conducting –ice breaking sessions-expectations from the course-knowing personal talents and skills.
ii. Conducting orientations programs for the students –future plans-activities-releasing road map etc.
iii. Displaying success stories-motivational biopics- award winning movies on societal issues etc.
iv. Conducting talent show in singing patriotic songs-paintings- any other contribution.

Unit 2 Nature & Care

i. Best out of waste competition.
ii. Poster and signs making competition to spread environmental awareness.
iii. Recycling and environmental pollution article writing competition.
iv. Organising Zero-waste day.
v. Digital Environmental awareness activity via various social media platforms.
vi. Virtual demonstration of different eco-friendly approaches for sustainable living.
vii. Write a summary on any book related to environmental issues.

Unit 3 Community Service

Activities:

i. Conducting One Day Special Camp in a village contacting village-area leaders- Survey in the village, identification of problems- helping them to solve via media- authorities experts- etc.
ii. Conducting awareness programs on Health-related issues such as General Health, Mental health, Spiritual Health, HIV/AIDS
iii. Conducting consumer Awareness. Explaining various legal provisions etc.
iv. Women Empowerment Programmes- Sexual Abuse, Adolescent Health and Population Education.
v. Any other programmes in collaboration with local charities, NGOs etc.

General Guidelines:

i. Institutes must assign slots in the Timetable for the activities.
ii. Institutes are required to provide instructor to mentor the students.

Evaluation Guidelines:

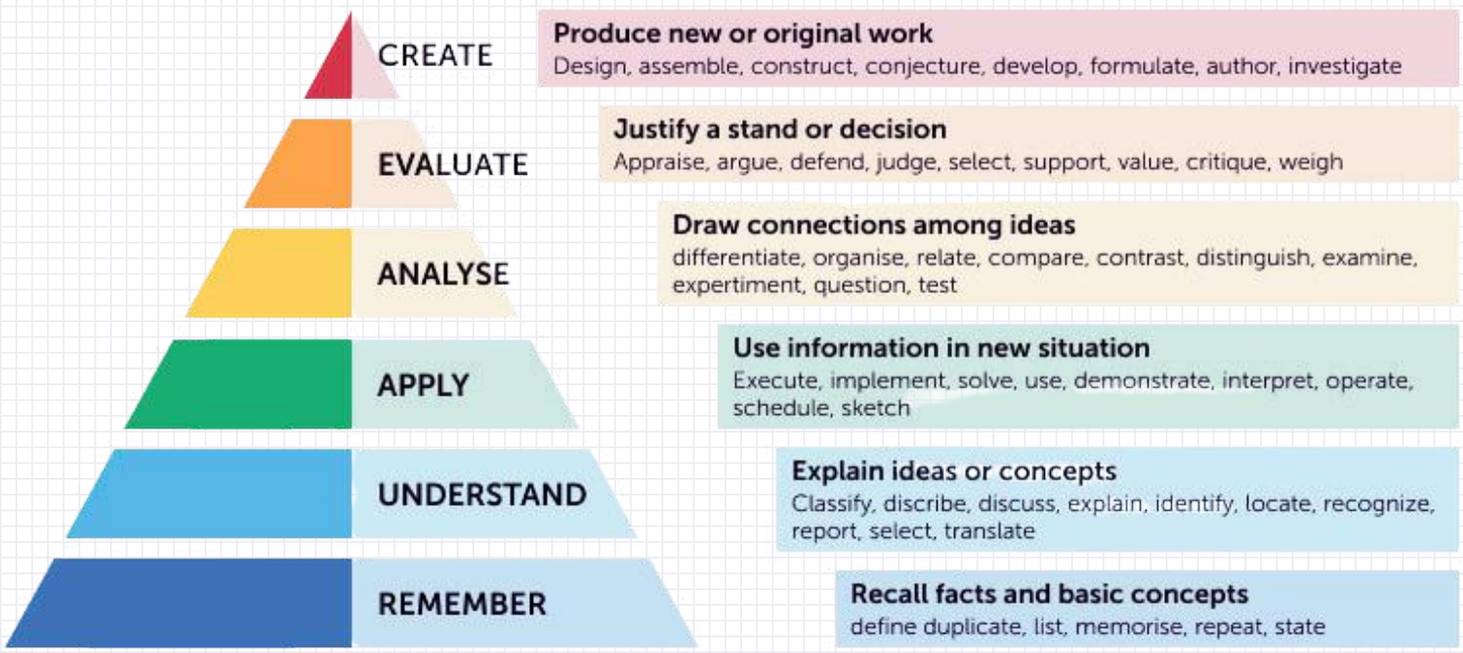
i. Evaluated for a total of 100 marks.
ii. A student can select 6 activities of his/her choice with a minimum of 01 activity per unit. Each activity shall be evaluated by the concerned teacher for 15 marks, totaling to 90 marks.
iii. A student shall be evaluated by the concerned teacher for 10 marks by conducting viva voce on the subject.

Reference Books:

1. A Text Book of National Service Scheme, Nirmalya Kumar Sinha & Surajit Majumder, Vol;.I, Vidya Kutir Publication, 2021 (ISBN 978-81-952368-8-6)
2. Red Book - National Cadet Corps – Standing Instructions Vol I & II, Directorate General of NCC, Ministry of Defence, New Delhi
3. Introduction to Environmental Engineering, Davis M. L. and Cornwell D. A., McGraw Hill, New York 4/e 2008
4. Introduction to Environmental Engineering and Science, Masters G. M., Joseph K. and Nagendran R., Pearson Education, New Delhi. 2/e 2007
5. Social Problems in India, Ram Ahuja, Rawat Publications, New Delhi.

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long learning
23AHS17L/27L.1	-	-	-	-	-	2	2	3	3	2	-	3
23AHS17L/27L.2	-	-	-	-	-	2	2	3	3	2	-	3
23AHS17L/27L.3	-	-	-	-	-	2	-	3	3	2	-	3
23AHS17L/27L.4	-	-	-	-	-	2	-	3	3	2	-	3
23AHS17L/27L.5	-	-	-	-	-	2	-	3	3	2	-	3



ANNAMACHARYA
INSTITUTE OF TECHNOLOGY AND SCIENCES

An Autonomous Institution

Etablished in 1998 Approved by AICTE, New Delhi Affiliated to JNTUA, Ananthapuramu
Accredited by NAAC with A Grade Accredited by NBA IE(I) Accredited 2(f) & 12 (B) as per UGC Act 1956
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