2023

ENGINEERING CURRICULUM

B. Tech. Regular / Honors

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE

(AUTONOMOUS)

(Approved by AICTE, Permanently Affiliated to JNTUK, Kakinada

Odalarevu, Allavaram Mandal, Andhra Pradesh, INDIA - 533210

Bonam Venkata Chalamayya Engineering College

Autonomous

Odalarevu, Allavaram Mandal,

Andhra Pradesh, INDIA - 533210.

Permanently affiliated to

Jawaharlal Nehru Technological University Kakinada,
Kakinada

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B. Tech (Regular-Full time)

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

&

B.Tech.(Lateral Entry Scheme)

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

Academic Regulations (BR23) for B. Tech (Regular-Full time)

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

1. **Award of the Degree**
   (a) Award of the B.Tech. Degree / B.Tech. Degree with a Minor if he/she fulfils 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 be 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 fulfils the following:
      (i) Student secures an additional 15 credits, fulfilling all the requisites of a B.Tech. degree i.e., 160 credits.
      (ii) Registering for Honors is optional.
      (iii) Honors is to be completed simultaneously with B.Tech. degree.

2. Students who fail to fulfil 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. degree and their admission stands cancelled. This clause shall be read along with clause 1 a) i).

3. **Admissions**
   Admission to the B. Tech Program shall be made subject to the eligibility, qualifications, and specialization prescribed by the UGC/AICTE/A.P. State Government/University 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 State Government/University or any other order of merit approved by the A.P. State Government/ University subject to reservations as prescribed by the UGC/AICTE/A.P.State Government/ University 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

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) An academic year is divided into two semesters, and each semester comprises 90 working days.

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. 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 (Total 160)	Percentage of total credits	AICTE Recommendation (%)
1.	Humanities and Social Science including Management (HM)	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 (OE); Domain Specific Skill Enhancement Courses (SC)	33	21 %	19 - 23%
6.	Internships & Project work (PR)	16	10 %	8 – 11%
7.	Mandatory Courses (MC)	Non-credit	Non-credit	-

7. 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 (SC)	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

8. Programme Pattern

i. Total duration of the 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 a mandatory student induction program for freshers, 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 /NCC /Scouts & Guides / Community service activities are made mandatory as credit courses for all the undergraduate students.

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

vii. Design Thinking for Innovation & Tinkering Labs are 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 skill 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 the second and third year of the program. The internship at the end of the second year shall be community oriented and the industry internship at the end of the third year.

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

xv. Undergraduate degree with Honors is introduced by the BVCEC (A) for the students having good academic record.

xvi. Each department 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 concepts through remote experimentation. Student shall be made to work on virtual lab experiments during the regular labs.

xvii. Each department shall assign a faculty advisor/mentor after admission to a group of students from the same department to provide guidance in course 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.

9. 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, 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 for 05 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 questions. 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 examination questions.
- The subjective paper shall contain 3 either or type questions of equal weightage of 10 marks. Any fraction shall be rounded off to the next higher mark.
- The objective paper shall be conducted by the respective department on the day of the 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.

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% weightage 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% weightage 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.
a) 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.

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

i) Question paper shall be in two parts viz., Part A and Part B with equal weightage of 35 marks each.
ii) In each part, question 1 shall contain 5 compulsory short answer questions for a total of 5 marks such that each question carries 1mark.
iii) 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.
iv) 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**

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

c) 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.

d) 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.

e) 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 weightage of 80% to better mid marks and 20% for the other. The subjective paper shall contain 3 either or type questions of equal weightage 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.

f) 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.

g) The laboratory records and mid semester test papers shall be preserved for a minimum of 3 years as per the BVCEC(A) norms and shall be produced to the Audit Committees as and when the same are asked for.

10. 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 department at the beginning of the semester. The Head of the respective departments shall forward such proposals to the Chief Controller of Examinations 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 department.

11. Massive Open Online Courses (MOOCs):

A Student has to pursue and complete one course compulsorily through MOOCs approved by the department. 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 institution.

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

12. Credit Transfer Policy

Adoption of MOOCs is mandatory, to enable Blended model of teaching-learning as also envisaged in the NEP 2020. (As per University Grants Commission Credit Framework for Online Learning Courses through SWAYAM) Regulation, 2016, BVCEC(A) 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 BVCEC (A) shall offer credit mobility for MOOCs and give the equivalent credit weightage 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 BVCEC (A), 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 BVCEC (A) shall notify the list of online learning courses eligible for credit transfer at the beginning of the semester.
vi) The BVCEC (A) 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 BVCEC (A) shall ensure no overlap of MOOC exams with that of the BVCEC (A) examination schedule. In case of delay in results, the BVCEC (A) 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 departments shall submit the following to the examination section of the BVCEC (A):

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 departments 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 BVCEC (A) from time to time.

13. Academic Bank of Credits (ABC)

The BVCEC(A) 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.

14. 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 / JNTUK, Kakinada 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% weightage 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 BVCEC (A).

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 Chief Controller of Examinations 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.

15. 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.
i) 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.
ii) 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.

16. 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 Principal of the college shall arrange separate class work and timetable of the courses offered under Honors program.

v) Courses that are used to fulfil 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 Honors to be eligible for attending semester end examinations.

ix) **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.

x) 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.

xi) 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. An advisor/mentor from parent department shall be assigned to a group of students to monitor the progress.
iv) There is no fee for registration of subjects for Honors program offered in offline at BVCEC (A).

17. Attendance Requirements:

i) A student shall be eligible to appear for the BVCEC (A)'s external examinations if he/she acquires a minimum of 40% attendance in each subject and 75% of attendance in aggregate of all the subjects. 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 BVCEC (A).
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 fulfils 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.

18. Promotion Rules:

The following academic requirements must be satisfied in addition to the attendance requirements mentioned in section 17.

i) A student shall be promoted from first year to second year if he/she fulfils the minimum attendance requirement as per BVCEC (A) norms.

ii) A student will be promoted from II to III year if he/she fulfils 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 fulfils 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 fulfilment of academic regulations. In such case, he/she shall be in the academic regulations into which he/she is readmitted.

19. 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	S (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 GradePoint Average (CGPA):

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

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

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

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.,

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

where "Si" is the SGPA of the i^{th} semester and 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

20. With–holding of Results

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

21. 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 Institution 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, State government and JNTUK.

22. Gap Year Concept:

Gap year concept for Student Entrepreneur in Residence is introduced and outstanding students who wish to pursue entrepreneurship / become entrepreneurs are allowed to take a break of one year at any time after the II year to pursue full-time entrepreneurship programme/to establish startups. This period may be extended to two years at the most, and these two years would not be counted as the time for the maximum time for graduation. The Heads of the respective Departments shall forward such proposals submitted by the students to the Head of the Institution. An evaluation committee constituted by the Chief Controller of Examinations 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.

23. Transitory Regulations

Discontinued, detained, or failed candidates are eligible for readmission as and when the semester is offered after fulfilment of academic regulations. Candidates who have been detained for want of attendance or have not fulfilled academic requirements who have failed after having undergone the course in earlier regulations or who 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.

24. Minimum Instruction Days for a Semester:

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

25. 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.

26. Student Transfers:

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

27. General Instructions:

i. The academic regulations should be read as a whole for the purpose of any interpretation.
ii. Malpractice rules-nature and punishments are appended.
iii. Where the words "he", "him", and "his", occur in the regulations, they also include "she", "her", and "hers", respectively.
iv. The Institution 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 Institution.
v. In the case of any doubt or ambiguity in the interpretation of the guidelines given, the decision of the Head of the Institution is final.

*** *** ***

ACADEMIC REGULATIONS (BR23)

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 fulfils 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 be 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 fulfils the following:

(i) Student secures an additional 15 credits fulfilling all the requisites of a B.Tech. program i.e., 120 credits.

(ii) Registering for Honors is optional.

(iii) Honors is to be completed simultaneously with B.Tech. programme.

2. Students, who fail to fulfil 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.**2**

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 fulfils 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 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 fulfilment 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).

******

1. HOD - Civil
2. HOD – EEE
3. HOD – ME
4. HOD-ECE
5. HOD-CSE
6. HOD – CSE (Allied Branches)
7. HOD – S&H
8. DEAN
9. Head of the Institution
10. Controller of Examinations

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE (A)
ODALAREVU
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
B. TECH APPROVED COURSE STRUCTURE AND SYLLABUS
BR23 REGULATIONS

B.Tech.– I Year I Semester

S. No.	Category of course	Course Code	Subjects	L	T	P	C
1	HM	23HM1T01	Communicative English	2	0	0	2
2	BS	23BS1T01	Linear Algebra & Calculus	3	0	0	3
3	BS	23BS1T02	Engineering Physics	3	0	0	3
4	ES	23ES1T02	Basic Electrical & Electronics Engineering	3	0	0	3
5	ES	23ES1T04	Introduction to Programming	3	0	0	3
6	HM	23HM1L01	Communicative English Lab	0	0	2	1
7	BS	23BS1L01	Engineering Physics Lab	0	0	2	1
8	ES	23ES1L01	Electrical & Electronics Engineering Workshop	0	0	3	1.5
9	ES	23ES1L04	Computer Programming Lab	0	0	3	1.5
10	BS	23BS1L04	Health & Wellness, Yoga & Sports	0	0	1	0.5
Total Credits							**19.5**

B.Tech.– II Year I Semester

S. No.	Category of course	Course Code	Subjects	L	T	P	C
1	BS	23BS2T03	Chemistry	3	0	0	3
2	BS	23BS2T01	Differential Equations & Vector Calculus	3	0	0	3
3	ES	23ES2T01	Basic Civil & Mechanical Engineering	3	0	0	3
4	ES	23ES2T03	Engineering Graphics	1	0	4	3
5	PC	23EE2T02	Network Analysis	3	0	0	3
6	BS	23BS2L02	Chemistry Lab	0	0	2	1
7	ES	23ES2L02	Engineering Workshop	0	0	3	1.5
8	ES	23ES2L03	IT Workshop	0	0	2	1.0
9	PC	23EE2L02	Network Analysis & Simulation Laboratory	0	0	3	1.5
10	BS	23BS2L05	NSS/NCC/Scouts & Guides/Community Service	0	0	1	0.5
Total Credits							**20.5**

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE (A)
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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
B. TECH APPROVED COURSE STRUCTURE AND SYLLABUS
BR23 REGULATIONS

B.Tech.– II Year I Semester

S.No.	Category	Subject Code	Subject Name	L	T	P	Credits
1	BSC	23BS3T08	Probability theory and stochastic Process	3	0	0	3
2	HSMC	23HM3T02	Universal Human Values–Understanding Harmony andEthical Human Conduct	2	1	0	3
3	ESC	23ES3T08	Signals and Systems	3	0	0	3
4	PCC	23EC3T01	Electronic Devices and Circuits	3	0	0	3
5	PCC	23EC3T02	Switching Theory and Logic Design	3	0	0	3
6	PCC	23EC3L01	Electronic Devices and Circuits Lab	0	0	3	1.5
7	PCC	23EC3L02	Switching Theory and Logic Design Lab	0	0	3	1.5
8	SEC	23CS3S02	Data Structures using Python	0	1	2	2
9	AC	23AC3T01	Environmental Science	2	0	0	0
Total				**16**	**2**	**08**	**20**

B.Tech. II Year II Semester

S.No.	Category	Subject Code	Subject Name	L	T	P	Credits
1	HSMC	23HM4T03	Managerial Economics and Financial Analysis	2	0	0	2
2	ESC	23ES4T14	Linear Control Systems	3	0	0	3
3	PCC	23EC4T03	Electromagnetic Waves and Transmission Lines	3	0	0	3
4	PCC	23EC4T04	Electronic Circuit Analysis	3	0	0	3
5	PCC	23EC4T05	Analog Communications	3	0	0	3
6	PCC	23EC4L03	Signals and Systems Lab	0	0	3	1.5
7	PCC	23EC4L04	Electronic Circuit Analysis lab	0	0	3	1.5
8	SEC	23HM4S01	Soft Skills	0	1	2	2
9	ESC	23ES4L06	Design Thinking & Innovation	1	0	2	2
Total				**15**	**1**	**10**	**21**
		23BS5P01	Mandatory Community Service Project Internship of 08 weeks duration during summer Vacation				

COMMUNICATIVE ENGLISH
(Common to all branches)

COURSE CODE:
23HM1T01 (CE, ME, ECE, EEE)
23HM2T01 (CSE, AIDS, AIML, CSE(AIML))

L	T	P	C
2	-	-	2

Introduction

In view of the growing importance of English as a tool for global communication and the consequent emphasis on training the students to acquire communicative competence, the syllabus has been designed to develop linguistic and communicative competence of the students of Engineering. As far as the detailed textbooks are concerned, the focus should be on the skills of listening, speaking, reading and writing.

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

A.D. Madhuri
(Charman-BOS)

Prof. K. Sree Ramesh
(University Nominee)

Prof. T. Ashok
(Subject Expert)

B. Aseesh Babu
Dr. B. Aseesh Babu
(Subject Expert)

Dr. A. Nageswara Rao
(Member of BOS)

LISTENING SKILLS:

Objectives:

1. To enable the students to appreciate the role of listening skill and improve their pronunciation.
2. To enable the students to comprehend the speech of people belonging to different backgrounds and regions.
3. To enable the students to listen for general content, to fill up information and for specific information.

SPEAKING SKILLS:

Objectives:

1. To make the students aware of the importance of speaking for their personal and professional communication.
2. To enable the students to express themselves fluently and accurately in social and professional success.
3. To help the students describe objects, situations and people.
4. To make the students participate in group activities like role-plays, discussions and debates.
5. To make the students participate in just a minute talks.

READING SKILLS:

Objectives:

1. To enable the students to comprehend a text through silent reading.
2. To enable the students to guess the meanings of words, messages and inferences of texts in given contexts.
3. To enable the students to skim and scan a text.
4. To enable the students to identify the topic sentence.
5. To enable the students to identify discourse features.
6. To enable the students to make intensive and extensive reading.

WRITING SKILLS:

Objectives:

1. To make the students understand that writing is an exact formal skills.
2. To enable the students to write sentences, paragraphs, e-mails and essays.
3. To make the students identify and use appropriate vocabulary.
4. To enable the students to narrate and describe.
5. To enable the students to write coherently and cohesively.

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Course Outcomes:

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

CO 1: Understand the context, topic and pieces of specific information from social or transactional dialogues.
CO 2: Apply grammatical structures to formulate sentences and correct word forms.
CO 3: Analyze discourse markers to speak clearly on a specific topic in informal discussions.
CO 4: Evaluate reading/listening texts and to write summaries based on global comprehension of these texts.
CO 5: Create a coherent paragraph, essay, and resume.

Methodology:

1. The class is to be learner-centred where the learners are to read the texts to get a comprehensive idea of those texts on their own with the help of the peer group and the teacher.
2. Integrated skill development methodology has to be adopted with focus on individual language skills as per the tasks/exercise.
3. The tasks/exercises at the end of each unit should be completed by the learners only and the teacher intervention is permitted as per the complexity of the task/exercise.
4. The teacher is expected to use supplementary material wherever necessary and also generate activities/tasks as per the requirement.
5. The teacher is permitted to use lecture method when a completely new concept is introduced in the class.

Recommended Topics:

UNIT –I

Lesson: **HUMAN VALUES: Gift of 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 –II

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 structured 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 –III

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;
Vocabulary: Compound words, Collocations

UNIT –IV

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, and communicate processesor display complicated
Writing: Letter Writing: Official Letters, Resumes
Grammar: Reporting verbs, Direct & Indirect speech, Active & Passive Voice
Vocabulary: Words often confused

UNIT –V

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 Jargons

Textbooks:

1. Pathfinder: Communicative English for Undergraduate Students, 1st Edition, Orient Black Swan, 2023 (Units 1,2 & 3)

2. Empowering English by Cengage Publications, 2023 (Units 4 & 5)

Reference Books:

1. Dubey, Sham Ji & Co. English for Engineers, Vikas Publishers, 2020
2. Bailey, Stephen. Academic writing: A Handbook for International Students. Rout ledge, 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

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I B.TECH.I SEMESTER

LINEAR ALGEBRA AND CALCULUS

Course Code: 23BS1T01

L	T	P	C
3	0	0	3

Course Objectives:

- To equip the students with standard concepts and tools at an intermediate to advanced level mathematics to develop the confidence and ability among the students to handle various real-world problems and their applications.

Course Outcomes:

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

CO1: Develop and use of matrix algebra techniques that are needed by engineers for practical applications.
CO2: Utilize mean value theorems to real life problems.
CO3: Familiarize with functions of several variables which is useful in optimization.
CO4: Learn important tools of calculus in higher dimensions.
CO5: Familiarize with double and triple integrals of functions of several variables in two dimensions using Cartesian and polar coordinates and in three dimensions using cylindrical and spherical coordinates.

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Dr.U. Venu Gopalam
(Subject Expert)

Mr. P. Ganga Raju
(Member, BOS)

UNIT I:- Matrices

Linear Transformation, Rank of a matrix by echelon form, normal form. Finding two Non Singular matrices when PAQ is in 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, Electrical Circuits(Application).

UNIT II:- Eigenvalues, Eigenvectors and Orthogonal Transformation

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 canonicalforms by Orthogonal Transformation.

UNIT III:- Calculus

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 on the above theorems.

UNIT IV:- Partial differentiation and Applications (Multi variable calculus)

Functions of several variables: Continuity and Differentiability, Partial derivatives, totalderivatives, chain rule, Taylor's and Maclaurin's series expansion of functions of two variables. Jacobians, Functional dependence, maxima and minima of functions of two variables, method of Lagrange multipliers.

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UNIT V:- Multiple Integrals (Multi variable Calculus)

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)

Textbooks:-

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

Reference Books:-

1. **Thomas Calculus**, George B. Thomas, Maurice D. Weir and Joel Hass, PearsonPublishers, 2018, 14th Edition.
2. **Advanced Engineering Mathematics**, R. K. Jain and S. R. K. Iyengar, AlphaScienceInternational Ltd., 2021 5th Edition(9th reprint).
3. **Advanced Modern Engineering Mathematics**, Glyn James, Pearson publishers, 2018, 5thEdition.
4. **Advanced Engineering Mathematics**, Micheael Greenberg, , Pearson publishers, 9thedition
5. **Higher Engineering Mathematics**, H. K Das, Er. Rajnish Verma, S. Chand Publications,2014, Third Edition (Reprint 2021)

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Course Code:23BS1T02(CIV, MEC, ECE & EEE)
23BS2T02(CSE, AIDS, AIML & CSM)

L	T	P	C
3	0	0	3

ENGINEERING PHYSICS
(Common for all branches of Engineering)

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:
- Analyse the intensity variation of light due to polarization, interference and diffraction.
- Familiarize with the basics of crystals and their structures.
- Summarize various types of polarization of dielectrics and classify the magnetic materials.
- Explain fundamentals of quantum mechanics and apply to one dimensional motion of particles.
- Identify the type of semiconductor using Hall Effect.

UNIT I Wave Optics **8hrs**

Interference: Introduction - Principle of superposition –Interference of light - Interference in thin films (Reflection Geometry) & applications –Colors in thin films- Newton's Rings- Determination of wavelength and refractive index.
Diffraction & Polarisation:
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 II Crystallography and X-ray diffraction **8hrs**
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.

A.C. Madhuri (Chairperson –BOS)	Dr.G.Padmaja Rani (University Nominee)	Dr.T.N.K.V Prasad (Subject Expert)
K. Mohan Kant Dr. K.Mohan kant (Subject Expert)	S.T.N Mr. S.T.Naidu (Member, BOS)	

UNIT III Dielectric and Magnetic Materials **10hrs**

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 of Ferromagnetism & Domain walls (Qualitative) - Hysteresis - soft and hard magnetic materials.

UNIT IV Quantum Mechanics and Free electron theory **7hrs**

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.

A.D. Madhuri
(Chairperson –BOS)

Dr.G.Padmaja Rani
(University Nominee)

TNVKVprasad
Dr.T.N.K.V Prasad
(Subject Expert)

K. Mohan Kant
Dr. K.Mohan kant
(Subject Expert)

Mr. S.T.Naidu
(Member, BOS)

UNIT V Semiconductors: **9hrs**

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.

Textbooks:

1. A Text book of Engineering Physics - M. N. Avadhanulu, P.G.Kshirsagar & TVS Arun Murthy, S.Chand Publications, 11th Edition 2019, P.K.Palanasami.
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
2. Engineering Physics - Shatendra Sharma, Jyotsna Sharma, Pearson Education, 2018.
3. Engineering Physics" - Sanjay D. Jain, D. Sahasrabudhe and Girish, University Press.
4. Engineering Physics - M.R. Srinivasan, New Age international publishers (2009).

A.D. Madhuri
(Chairperson –BOS)

Dr.G.Padmaja Rani
(University Nominee)

Dr.T.N.K.V Prasad
(Subject Expert)

Dr. K.Mohan kant
(Subject Expert)

Mr. S.T.Naidu
(Member, BOS)

L	T	P	C
3	0	0	3

BASIC ELECTRICAL & ELECTRONICS ENGINEERING

(Common to all branches of engineering)

Subject Code: 23ES1T02
Subject Code: 23ES2T02

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

- Understand the basic electrical circuits, AC machines.
- Analyze different electrical circuits, performance of AC machines.
- Explain the theory, construction, and operation of electronic devices.
- Apply the concept of science and mathematics to explain the working of diodes, transistors, and their applications.
- Analyze different number systems and logic gates.

PART A: BASIC ELECTRICAL ENGINEERING

UNIT I DC & AC Circuits

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(for sine wave), 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 II Machines and Measuring Instruments

Machines: Construction, principle and operation of (i) Single Phase Transformer, (ii) Three Phase Induction Motor and (iii) 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

Dr. S.Srikanth Professor & HOD	Dr.T.Murali Mohan, **University Nominee**	Dr.K.Siva Kumar **Subject expert**	Dr.G.Siva Kumar **Subject expert**	Ch.Mahadev Kumar **Representative from Industry**	D.Lakshman Kumar **Alumni Member**

UNIT III Energy Resources, Electricity Bill & Safety Measures

Energy Resources: Conventional and non-conventional energy resources; Layout and operation of various Power Generation systems: Hydel & Solar 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, Earthling and its types, Safety Precautions to avoid shock.

Textbooks:

1. Basic Electrical Engineering by D C Kulshreshtha, Tata McGraw Hill, First Edition 2019.
2. Basic Electrical Engineering by S. N. Singh, PHI Publishers, 2011
3. Fundamentals of Electrical Engineering by Rajendra Prasad, PHI publishers, Third Edition, 2014.

Reference Books:

1. Principles of Power Systems by V.K. Mehtha, S.Chand Technical Publishers, 2020.
2. A textbook of Electrical Technology by B.L. Theraja, S. Chand and Company, reprint edition, 2014.
3. S. K. Bhatacharya, Basic Electrical and Electronics Engineering, Second Edition, Person Publications, 2018.

S.No.	Members	Name & Institution	Signature of member
1	Chairman	Dr. S.Srikanth , Professor & HOD	
2	University Nominee	Dr. T. Murali Mohan , Professor, Dept. of EEE, UCEK, JNTU Kakinada	
3	Subject expert from outside the college	Dr. K.Siva Kumar , Professor, Dept. of EE, IIT Hyderabad	
4	Subject expert from outside the college	Dr. G.Siva Kumar , Asst. professor , Dept. of EE, NIT Warangal	
5	Representative from Industry	Ch.Mahadev Kumar ,Dy. Manager Oil rigs B H E L , R C Puram Hyderabad	
6	Alumni Member	D.Lakshman Kumar, Asst. professor, Dept. of EEE,Sri Vishnu Engineering College for Women(A), WG Dist.	

PART B: BASIC ELECTRONICS ENGINEERING

UNIT I **Semiconductor Devices**

Introduction - Characteristics of PN Junction Diode - Zener Diode and its Characteristics. Bipolar Junction Transistor - CB, CE, CC Configurations and Characteristics.

UNIT II **Basic Electronic Circuits And Instrumentation**

Rectifiers and power supplies: Block diagram description of a dc power supply, working of a full wave bridge rectifier, capacitor filter (no analysis), RC Coupled amplifier.

Electronic Instrumentation: Block diagram of an electronic instrumentation system.

UNIT III **Digital Electronics**

Overview of binary number system, BCD codes, Excess-3 code. Boolean Algebra, Basic Theorems and properties of Boolean Algebra, Truth Tables and simple Logic Gates including Universal Gates - AND,OR,NOT, NOR, NAND, XOR and XNOR. Simple combinational circuits–Half and Full Adders.

Textbooks:

1. R.L.Boylestad& Louis Nashlesky, Electronic Devices &Circuit Theory, PearsonEducation, 2021.
2. R. P. Jain, Modern Digital Electronics, 4thEdition, Tata Mc Graw Hill, 2009
3. Switching Theory and Logic Design by A.Anand Kumar,PHI Learning, 3rd Edition.

Reference Books:

1. R. S. Sedha, A Textbook of Electronic Devices and Circuits, S.Chand& Co,2010.
2. SantiramKal, 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.

S.No.	Members	Name & Institution	Signature of member
1	Chairman	Dr. S.Srikanth , Professor & HOD	
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5	Representative from Industry	Ch.Mahadev Kumar ,Dy. Manager Oil rigs B H E L , R C Puram Hyderabad	
6	Alumni Member	D.Lakshman Kumar, Asst. professor, Dept. of EEE,Sri Vishnu Engineering College for Women(A), WG Dist.	

I Year - I Semester	Code: 23ES1T04	L	T	P	C
		3	0	0	3

INTRODUCTION TO PROGRAMMING
(Common to All branches of Engineering)

Course Objectives:

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

Course Outcomes:

A student after completion of the course will be able to

CO1: Understand basics of computers, the concept of algorithm and algorithmic thinking.
CO2: Analyze a problem and develop an algorithm to solve it.
CO3: Implement various algorithms using the C programming language.
CO4: Understand more advanced features of C language.
CO5: Develop problem-solving skills and the ability to debug and optimize the code

UNIT-I: Introduction to Programming and Problem Solving: Computer System: History of Computers, Introduction to Components of Computer System, compilation and execution, Program Counter
Basics of a Computer Program-. Programming Languages and History of C, Basics Structure of a Computer Program, Software Development Process: Characteristics Algorithm, Flowchart, Pseudo Code, Header file, Errors in compilation time, Primitive Data Types, Formatted I/O's, Format Modifiers. Variable Rules, Keywords, Constants, String and Operators. Type Conversions, Priority Table
Problemsolving strategies: Top-down and Bottom-up approach, Time and space complexities.

UNIT -II: Control Structures (Flow of Controls):
Decision Branching Statement (Selection): **Two-way selection**: if, if-else, nested if
Multi-way selection: switch, else-if ladder
Decision Looping Statement (Repetition/Iterative): while (Pretest/Condition-Controlled Loops) and do-while (Post test) Loops, for loop (Counter Controlled) and Unconditional statements, Nested Loops

UNIT-III Arrays & Pointers:
Arrays: Arrays definition and indexing, Types of Arrays
One-Dimensional Arrays: Initialization, declaration and accessing, input and output of array
Two-Dimensional Arrays: Initialization, declaration, accessing, input and output of array
Case Study: Matrices, Larger Dimensional Arrays
Pointers: Concept of a pointer, Initialization of pointer variables and access, Pointer dereferencing and address operators, array manipulation using pointers, Dynamic Memory Management functions, pointers to pointers, command line arguments

N.R.tic	online	online	online	online	
Dr. N Ramakrishnaiah, Professor of CSE. UCEK, JNTUK Kakinada.	Dr. C Krishna Mohan, Professor of CSE, IIT Hyderabad.	Dr. P Radha Krishna, Professor of CSE, NIT Warangal.	Narayana Rao Routhu, Technology Manager, Hidden Brains, Ahmadabad.	Dr. S Rao Chintalapudi, Professor and HoD, CSE(AIML) CMR Technical Campus, Hyd	Dr. B S N Murthy Professor of CSE, BVCEC.

Professor
Department of CSE

UNIT-IV: Functions & Strings: **Functions:** Definition of Function, Categorization of User define functions, Local, Global variables and Actual and Formal parameters, Scope life time variables, pass by value and reference, Recursive function Case Study: Factorial, Fibonacci Series, Basics of Sorting/and Searching **Strings:** Introduction to String, String Handling Functions
UNIT-V: User Defined Data Types & File Handling: **User Defined Data Types: Structures:** declaration, Initialization, accessing, nested structures, self-referential structure, structures to array, pointer and functions, Union, typedef and enum **File Handling**: Basics of File Handling (only if time is available, otherwise should be done as part of the lab). **Note:** The syllabus is designed with C Language as the fundamental language of implementation.
Text Books: 1. The C Programming Language", Brian W. Kernighan and Dennis M. Ritchie, Prentice-Hall, Second Edition 2015. 2. Schaum's Outline of Programming with C, Byron S Gottfried, McGraw-Hill, Second Edition. 3. Problem Solving and Programming in C by RS Salaria, Khanna Book Publishing, Fifth Edition.
Reference Books: 1.Computing fundamentals and C Programming, E Balagurusamy, McGraw- HillEducation. 2. Programming in C, Rema Theraja, Oxford, 2016, 2nd edition 3. C Programming-A Problem Solving Approach, Forouzan, Gilberg, Cengage 4. C Programming- A Beginners Guide by Prof. Mangesh, Dr. D R Shashirag, Prof. Bodapati Narasimha Rao, Prof. B P N Madhu Kumar.

N. Ramakrishnaiah	online	online	online	online	
Dr. N Ramakrishnaiah, Professor of CSE. UCEK, JNTUK Kakinada.	Dr. C Krishna Mohan, Professor of CSE, IIT Hyderabad.	Dr. P Radha Krishna, Professor of CSE, NIT Warangal.	Narayana Rao Routhu, Technology Manager, Hidden Brains, Ahmadabad.	Dr. S Rao Chintalapudi, Professor and HoD, CSE(AIML) CMR Technical Campus, Hyd	Dr. B S N Murthy Professor of CSE, BVCEC.

Professor
Department of CSE
University College of Engg.
JNTUK Kakinada.

COMMUNICATIVE ENGLISH LAB

(Common to all branches)

COURSE CODE:-
23HSILO1 (CE, ME, ECE, EEE)
23HS2LO1 (CSE, AIDS, AIML, CSE(AIML))

L	T	P	C
-	-	2	1

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 students will get trained in the basic communication skills and also make them ready to face job interviews.

OUT COMES

CO 1: Understand the different aspects of the English language proficiency with emphasis on LSRW skills.

CO 2: Apply communication skills through various language learning activities.

CO3: Analyze the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension.

CO4: Evaluate and exhibit professionalism in participating in debates and group discussions.

CO5: Create effective resonate and prepare themselves to face interviews in future.

List of Topics:

1. Vowels & Consonants
2. Neutralization/Accent Rules
3. Communication Skills & JAM
4. Role Play or Conversational Practice
5. E-mail Writing
6. Resume Writing, Cover letter, SOP
7. Group Discussions-methods & practice
8. Debates- Methods & Practice
9. PPT Presentations/ Poster Presentation
10. Interview Skills

A.D. Madhuri
(Charman-BOS)

Prof. K. Sree Ramesh
(University Nominee)

Prof. T. Ashok
(Subject Expert)

B. Aseesh Babu

Dr. B. Aseesh Babu
(Subject Expert)

Dr. A. Nageswara Rao
(Member of BOS)

Lab Software: Globarena Technologies Ltd.,

Reference Books:

1. Meenakshi Raman, Sangeeta-Sharma. Technical Communication. Oxford Press.2018.
2. Grant Taylor: English Conversation Practice, Tata McGraw-Hill EducationIndia,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

A.D. Madhuri
(Charman-BOS)

Prof. K. Sree Ramesh
(University Nominee)

Prof. T. Ashok
(Subject Expert)

B. Aseesh Babu
Dr. B. Aseesh Babu
(Subject Expert)

Dr. A. Nageswara Rao
(Member of BOS)

Course Code:23BS1L01(CIV, MEC, ECE & EEE)
23BS2L01(CSE, AIDS, AIM & CSM)

L	T	P	C
0	0	2	1

ENGINEERING PHYSICS LAB
(Common to All Branches of Engineering)

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: The students will be able to

- Operate optical instruments like travelling microscope and spectrometer.
- Estimate the wavelengths of different colors using diffraction grating.
- Plot the intensity of the magnetic field of circular coil carrying current with distance.
- Evaluate dielectric constant and magnetic susceptibility for dielectric and magnetic materials respectively.
- Calculate the band gap of a given semiconductor
- Identify the type of semiconductor using Hall Effect.
- Identify the different types of semiconductor diodes and their applications.
- Analyse the experimental data on Planck's constant and compare it to theoretical predictions.

List of Experiments:

1. Determination ofradius of curvatureofagiven planoconvexlens byNewton's rings.
2. Determination ofwavelengthsofdifferentspectral lines in mercury spectrum using diffraction grating in normal incidence configuration.
3. Verification ofBrewster's law
4. Determination ofdielectric constant using charging and discharging method.
5. Study thevariation ofB versus Hby magnetizingthe magneticmaterial (B-H curve).
6. Determination ofwavelengthof Laser lightusingdiffraction grating.
7. Estimation of Planck's constant using photoelectric effect.
8. Determination of the resistivity of semiconductors by four probemethods.
9. Determination ofenergy gap of asSemiconductorusing p-n junction diode.
10. Magneticfieldalongtheaxisofacurrentcarryingcircularcoilby StewartGee's Method.

Ms.A.D. Madhuri (Chairperson –BOS)	Dr.G.Padmaja Rani (University Nominee)	Dr.T.N.K.V Prasad (Subject Expert)
Dr.K.Mohankant (Subject Expert)	Mr. S.T.Naidu (Member, BOS)	

L	T	P	C
0	0	3	1.5

ELECTRICAL & ELECTRONICS ENGINEERING WORKSHOP

(Common to All branches of Engineering)

Subject Code: 23ES1L01
Subject Code: 23ES2L01

Course Objectives:

- To impart knowledge on the fundamental laws & theorems of electrical circuits, functions of electrical machines and energy calculations.
- To impart knowledge on the principles of digital electronics and fundamentals of electron devices.

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

- Get an exposure to common electrical& electronic components and their ratings.
- Understand the usage of common electrical& electronic measuring instruments.
- Understand the basic characteristics of electrical machines and perform energy calculations.
- Plotand discuss the characteristics of various electron devices.
- Explain the operation of a digital circuit.

Activities:

1. Familiarization of commonly used Electrical & Electronic Workshop Tools: Bread board,Solder, cables, relays, switches, connectors, fuses, Cutter, plier, screwdriver set, wirestripper, flux, knife/blade, soldering iron, de-soldering pump etc.
   - Provide some exercises so that hardware tools and instruments arelearned to be used by the students.

2. Familiarization of Measuring Instruments like Voltmeters, Ammeters,multimeter, LCR-Q meter, Power Supplies, CRO, DSO, Function Generator,Frequency counter.
   - Provide some exercises so that measuring instruments are learned to beused by the students.

3. Components:
   - Familiarization/Identification of components (Resistors, Capacitors,Inductors, Diodes, transistors, IC's etc.) – Functionality, type, size, colour codingpackage, symbol, cost etc.
   - Testing of components like Resistor, Capacitor, Diode, Transistor, ICs etc. - Compare values of components like resistors, inductors, capacitors etc with themeasured values by using instrument.

Dr. S.Srikanth Professor & HOD	Dr.T.Murali Mohan, **University Nominee**	Dr.K.Siva Kumar **Subject expert**	Dr.G.Siva Kumar **Subject expert**	Ch.Mahadev Kumar **Representative from Industry**	D.Lakshman Kumar **Alumni Member**

PART A: BASIC ELECTRICAL ENGINEERING LAB

List of experiments:

(Any 5 of the following experiments are to be conducted)

1. Verification of KCL and KVL
2. Verification of Superposition theorem
3. Measurement of Resistance using Wheat stone bridge
4. O.C & S.C Characteristics of Single Phase Transformer
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

References:

1.Basic Electrical Engineering by D C Kulshreshtha, Tata McGraw Hill, First Edition 2019.
2.Basic Electrical Engineering by S. N. Singh, PHI Publishers, 2011
3.Fundamentals of Electrical Engineering by Rajendra Prasad, PHI publishers, Third Edition, 2014.

PART B: BASIC ELECTRONICS ENGINEERING LAB

List of Experiments:

(Any 5 of the following experiments are to be conducted

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 with and without filter.
4. Implementation of full wave rectifier with and without filter.
5. Plot Input & Output characteristics of BJT in CE configuration.
6. Plot Input & Output characteristics of BJT in CB configuration.
7. Verification of Truth Table of AND, OR, NOT, NAND, NOR, Ex-OR, Ex-NOR gates using ICs.

Tools / Equipment Required: DC Power supplies, Multi meters, DC Ammeters, DC Voltmeters, ACVoltmeters, CROs, all the required active devices.

References:

1.R.L.Boylestad& Louis Nashlesky, Electronic Devices &Circuit Theory, PearsonEducation, 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

S.No.	Members	Name & Institution	Signature of member
1	Chairman	Dr. S.Srikanth , Professor & HOD	
2	University Nominee	Dr. T. Murali Mohan , Professor, Dept. of EEE, UCEK, JNTU Kakinada	
3	Subject expert from outside the college	Dr. K.Siva Kumar , Professor, Dept. of EE, IIT Hyderabad	
4	Subject expert from outside the college	Dr. G.Siva Kumar , Asst. professor , Dept. of EE, NIT Warangal	
5	Representative from Industry	Ch.Mahadev Kumar ,Dy. Manager Oil rigs B H E L , R C Puram Hyderabad	
6	Alumni Member	D.Lakshman Kumar, Asst. professor, Dept. of EEE,Sri Vishnu Engineering College for Women(A), WG Dist.	

I Year - I Semester	Code: 23ES1L04	L	T	P	C
		0	0	3	1.5

COMPUTER PROGRAMMING LAB
(Common to All branches)

Course Objectives:

The course aims to give students hands – on experience and train them on the concepts of the C- programming language.

Course Outcomes:

CO1: Read, understand, and trace the execution of programs written in C language.
CO2: Select the right control structure for solving the problem.
CO3: Develop C programs which utilize memory efficiently using programming constructs like pointers.
CO4: Develop, Debug and Execute programs to demonstrate the applications of arrays, functions, basic concepts of pointers in C.

UNIT I

WEEK 1:

Objective: Getting familiar with the programming environment on the computer and writing the first program.

Suggested Experiments/Activities:

Tutorial 1: Problem-solving using Computers.

Lab1: 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:

Objective: Getting familiar with how to formally describe a solution to a problem in a series of finite steps both using textual notation and graphic notation.

Suggested Experiments /Activities:

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

Lab 2: 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
ii) Simple interest calculation

WEEK 3:

Objective: Learn how to define variables with the desired data-type, initialize them with appropriate values and how arithmetic operators can be used with variables and constants.

Suggested Experiments/Activities:

Tutorial 3: Variable types and type conversions:

Lab 3: 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

	online	online	online	online	
Dr. N Ramakrishnaiah	Dr. C Krishna Mohan	Dr. P Radha Krishna	Narayana Rao Routhu,	Dr. S Rao Chintalapudi,	Dr. B S N Murthy

UNIT II

WEEK 4:

Objective: Explore the full scope of expressions, type-compatibility of variables & constants and operators used in the expression and how operator precedence works.

Suggested Experiments/Activities:

Tutorial 4: Operators and the precedence and as associatively:

Lab4: 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:

Objective: Explore the full scope of different variants of "if construct" namely if-else, null-else, if-else if*-else, switch and nested-if including in what scenario each one of them can be used and how to use them. Explore all relational and logical operators while writing conditionals for "if construct".

Suggested Experiments/Activities:

Tutorial 5: Branching and logical expressions:

Lab 5: 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:

Objective: Explore the full scope of iterative constructs namely while loop, do-while loop and for loop in addition to structured jump constructs like break and continue including when each of these statements is more appropriate to use.

Suggested Experiments/Activities:

Tutorial 6: Loops, while and for loops

Lab 6: 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.

N.Ramakrishnaiah	online	online	online	online	
Dr. N Ramakrishnaiah, Professor of CSE. UCEK, JNTUK Kakinada.	Dr. C Krishna Mohan, Professor of CSE, IIT Hyderabad.	Dr. P Radha Krishna, Professor of CSE, NIT Warangal.	Narayana Rao Routhu, Technology Manager, Hidden Brains, Ahmadabad.	Dr. S Rao Chintalapudi, Professor and HoD, CSE(AIML) CMR Technical Campus, Hyderabad.	Dr. B S N Murthy Professor of CSE, BVCEC.

Professor
Department of CSE

UNIT IV

WEEK 10:

Objective: Explore the Functions, sub-routines, scope and extent of variables, doing some experiments by parameter passing using call by value. Basic methods of numerical integration

Suggested Experiments/Activities:

Tutorial 10: Functions, call by value, scope and extent,

Lab 10: Simple functions using call by value, solving differential equations using Eulers theorem.

i) Concatenate two strings without built-in functions
ii) Reverse a string using built-in and without built-in string functions
iii) Write a C function to find the length of a string.
iv) Write a C function to transpose of a matrix.
v) Write a C function to demonstrate numerical integration of differential equations using Euler's method

WEEK 11:

Objective: Explore how recursive solutions can be programmed by writing recursive functions that can be invoked from the main by programming at-least five distinct problems that have naturally recursive solutions.

Suggested Experiments/Activities:

Tutorial 11: Recursion, recursive calls

Lab 11: 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 12:

Objective: Explore the basic difference between normal and pointer variables, Arithmetic operations using pointers and passing variables to functions using pointers

Suggested Experiments/Activities:

Tutorial 12: Call by reference, dangling pointers

Lab 12: 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.

	Online	Online	Online	Online	
Dr. N Ramakrishnaiah, Professor of CSE. UCEK, JNTUK Kakinada.	Dr. C Krishna Mohan, Professor of CSE, IIT Hyderabad.	Dr. P Radha Krishna, Professor of CSE, NIT Warangal.	Narayana Rao Routhu, Technology Manager, Hidden Brains, Ahmadabad.	Dr. S Rao Chintalapudi, Professor and HoD, CSE(AIML) CMR Technical Campus, Hyderabad.	Dr. B S N Murthy Professor of CSE, BVCEC.

Professor
Department of CSE
University College of Engg.

UNIT V

WEEK 13:

Objective: Experiment with C Structures, Unions, bit fields and self-referential structures (Singly linked lists) and nested structures

Suggested Experiments/Activities:

Tutorial 13: Structure, Bitfields, Self-Referential Structures, Linked lists

Lab13: Structure, Self-Referential Structures, 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) Write a C program to find the total, average of n students using structures
ii) Read student name and marks from the command line and display the student details along with the total.
iii) Create and display a singly linked list using self-referential structure.
iv) Demonstrate the differences between structures and unions using a C program.
v) Write a C program to shift/rotate using bitfields.
vi) Write a C program to copy one structure variable to another structure of the same type.

WEEK14:

Objective: To understand data files and file handling with various file I/O functions. Explore thedifferences between text and binary files.

Suggested Experiments/Activities:

Tutorial 14: File handling

Lab 14: 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.

Text Books:

1. Programming in C - A practical approach by Ajay Mittal, Pearson Education, First Edition.
2. Schaum's Outline of Programming with C by Byron S. Gottfried, McGraw Hill, Second Edition.

Reference Books:

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

N. Ramakrishnaiah	online	online	online	online	
Dr. N Ramakrishnaiah, Professor of CSE. UCEK, JNTUK Kakinada.	Dr. C Krishna Mohan, Professor of CSE, IIT Hyderabad.	Dr. P Radha Krishna, Professor of CSE, NIT Warangal.	Narayana Rao Routhu, Technology Manager, Hidden Brains, Ahmadabad.	Dr. S Rao Chintalapudi, Professor and HoD, CSE(AIML) CMR Technical Campus, Hyderabad.	Dr. B S N Murthy Professor of CSE, BVCEC.

Professor
Department of CSE
University College of Engg.
JNTUK Kakinada.

L	T	P	C
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HEALTH AND WELLNESS, YOGA AND SPORTS

(Common to All branches of Engineering)

23BS1L04(CE,EEE,MEC,ECE)

23BS2L04((CSE,AIDS,AIML,CSE(AIML))

Course Objectives:

The main objective of introducing this course is to make the students maintain their mental andphysical wellness by balancing emotions in their life. It mainly enhances the essential traits required for the development of the personality.

Course Outcomes: After completion of the course the student will be able to
CO1: Understand the importance of yoga and sports for Physical fitness and sound health.
CO2: Demonstrate an understanding of health-related fitness components.
CO3: Compareand contrast variou activities that help enhance theirhealth .
CO4: Assess current personal fitness levels.
CO5: Develop Positive Personality

UNIT I

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

Mrs.A.D. Madhuri
(Chairperson –BOS)

Dr.G.Shyam Kumar
(University Nominee)

T Durga Rao
(M P Ed)

K Satyanarayana
(B P Ed)

UNIT II

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 III

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.
Practicing general and specific warm up, aerobics
ii) Practicing cardiorespiratory fitness, treadmill, run test, 9 min walk, skipping andrunning.

Mrs.A.D.Madhuri
(Chairperson –BOS)

Dr.G.Shyam Kumar
(University Nominee)

T Durga Rao
(M P Ed)

K Satyanarayana
(B P Ed)

Reference Books:

1. Gordon Edlin, Eric Golanty. Health and Wellness, 14th Edn. Jones & Bartlett Learning,2022
2. T.K.V.Desikachar. The Heart of Yoga: Developing a Personal Practice
3. Archie J.Bahm. Yoga Sutras of Patanjali, Jain Publishing Company, 1993
4. Wiseman, John Lofty, SAS Survival Handbook: The Ultimate Guide to SurvivingAnywhere Third Edition, William Morrow Paperbacks, 2014
5. The Sports Rules Book/ Human Kinetics with Thomas Hanlon. -- 3rd ed. HumanKinetics, Inc.2014

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 manyas 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, totalling to 90 marks.
- A student shall be evaluated by the concerned teacher for 10 marks by conducting vivavoce on the subject.

Mrs.A.D. Madhuri
(Chairperson –BOS)

Dr.G.Shyam Kumar
(University Nominee)

T Durga Rao
(M P Ed)

K Satyanarayana
(B P Ed)

BR23-I-II-ECE-(1)

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CHEMISTRY
(Common to ~~EEE~~, ECE, ~~CSE, AIDS, AIML, CSE(AIML)~~

Course code : 23BS2T03 (~~EEE~~,ECE)
~~23BS1T03 (CSE,AIDS,AIML,CSE(AIML))~~

Course Objectives:

- To familiarize engineering chemistry and its applications
- To train the students on the principles and applications of electrochemistry and polymers
- To introduce instrumental methods, molecular machines and switches

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

- Compare the materials of construction for battery and electrochemical sensors.
- Explain the preparation, properties, and applications of thermoplastics & thermosetting, elastomers& conducting polymers.
- Explain the principles of spectrometry, slc in separation of solid and liquid mixtures.
- Apply the principle of Band diagrams in the application of conductors and semiconductors.

A.D. Madhuri
(Chairman - BOS)

Dr. S. Satyaveni
(University Nominee)

Dr. S. Musthafa
(Subject Expert)

Dr. A. Venkateswara Rao
(Subject Expert)

Mr. E. S. V. Subrahmanyam
(Member, BOS)

UNIT I Structure and Bonding Models: **12 Hours**

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 O2 andCO, etc. π-molecular orbitals of butadiene and benzene, calculation of bond order.

UNIT II Modern Engineering materials **12 Hours**

Semiconductors, band diagram in solids, Semiconductor devices (p-n junction diode as rectifier and transistors)
Super conductors-Introduction basic concept, applications.
Supercapacitors: Introduction, Basic Concept-Classification – Applications.
Nano materials: Introduction, classification, properties and applications of Fullerenes, carbon nano tubes and Graphines nanoparticles.

UNIT III Electrochemistry and Applications: **12 Hours**

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-oxygenfuel cell– working of the cells. Polymer Electrolyte Membrane Fuel cells (PEMFC).

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(Chairman - BOS)

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(University Nominee)

Dr. S. Musthafa
(Subject Expert)

Dr. A. Venkateswara Rao
(Subject Expert)

Mr. E. S. V. Subrahmanyam
(Member, BOS)

UNIT IV Polymer Chemistry **12 Hours**

Introduction to polymers, functionality of monomers, chain growth and step growth polymerization, coordination polymerization, with specific examples and mechanisms of polymer formation.
Plastics –Thermoand 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 V Instrumental Methods,and Applications **12 Hours**

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

A. D. Madhuri
(Chairman - BOS)

Dr. S Satyaveni
(University Nominee)

Dr. S. Musthafa
(Subject Expert)

Dr. A. Venkateswara Rao
(Subject Expert)

Mr. E. S. V. Subrahmanyam
(Member, BOS)

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.M.Lehn, Supra Molecular Chemistry, VCH Publications

A.D. Madhuri
(Chairman - BOS)

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(University Nominee)

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(Subject Expert)

Dr. A. Venkateswara Rao
(Subject Expert)

Mr. E. S. V. Subrahmanyam
(Member, BOS)

I B.TECH-II SEMESTER

DIFFERENTIAL EQUATIONS AND VECTORCALCULUS
(Common to All Branches)

Subject Code: 23BS2T01

L	T	P	C
3	0	0	3

Course Objectives:

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

Course Outcomes:

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

CO1: Solve the differential equations related to various engineering fields.
CO2: Identify solution methods for partial differential equations that model physical processes.
CO3: Interpret the physical meaning of different operators such as gradient, Curl and divergence.
CO4: Estimate the work done against a field, circulation and flux using vector calculus.

A.D. Madhuri
(Chairman-BOS)

Dr. G.V.S.R.Deekshitulu
(University Nominee)

Dr.T.S.R.Murthy
(Subject Expert)

Dr.U. VenuGopalam
(Subject Expert)

Mr. P. Ganga Raju
(Member, BOS)

UNITI Differential Equations of First Order and First Degree

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

UNITII Linear differential equations of higher order (Constant Coefficients)

differential Equations.

Definitions, homogenous and non-homogenous, complimentary function, Particular integral, General solution, Wronskian, Method of variation of parameters, Simultaneous linear equations, Applications to L-C-R Circuit problems.

UNITIII Partial Differential Equations

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 - Non homogeneous terms of the type e^{ax+by}, $\sin(ax+by)$, $\cos(ax+by)$

UNITIV Vector differentiation

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, Solenoidal, Irrotational vectors, Scalar Potential Function - Vector identities.

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(University Nominee)

Dr.T.S.R.Murthy
(Subject Expert)

U. Venugopalam
Dr.U. VenuGopalam
(Subject Expert)

Mr. P. Ganga Raju
(Member, BOS)

UNITV Vector Integration

Line integral- circulation – work done, surface integral-flux, Green's theorem in the plane (with out proof), Stoke's theorem (with out proof), volume integral, Divergence theorem (with out proof) and related problems.

Text books:

1. **Higher Engineering Mathematics,** B.S.Grewal, KhannaPublishers,2017,44thEdition
2. **Advanced Engineering Mathematics,** Erwin Kreyszig, John Wiley & Sons, 2018,10thEdition.

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 5thEdition (9th reprint).
5. **Higher Engineering Mathematics,** B.V.Ramana, McGraw HillEducation,2017

A.D. Madhuri
(Chairman-BOS)

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(University Nominee)

Dr.T.S.R.Murthy
(Subject Expert)

Dr.U. VenuGopalam
(Subject Expert)

Mr. P. Ganga Raju
(Member, BOS)

BR23 - I - II - ECE - 3(a)

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE
ODALAREVU (AUTONOMOUS)

Department of Civil Engineering

I YEAR I SEM	Course Code : 23ES2T01 [CE, EEE, MEC & ECE]	L	T	P	C
		3	0	0	3

Course Title: BASIC CIVIL AND MECHANICAL ENGINEERING

PART A: BASIC CIVIL ENGINEERING

Course Objectives:

- Get familiarized with the scope and importance of Civil Engineering sub-divisions.
- Introduce the preliminary concepts of surveying.
- Acquire preliminary knowledge on Transportation and its importance in nation's economy.
- Get familiarized with the importance of quality, conveyance and storage of water.
- Introduction to basic civil engineering materials and construction techniques.

Course Outcomes: On completion of the course, the student should be able to:

CO1: Understand various sub-divisions of Civil Engineering and to appreciate their role in ensuring better society.
CO2: Know the concepts of surveying and to understand the measurement of distances, angles and levels through surveying.
CO3: Realize the importance of Transportation in nation's economy and the engineering measures related to Transportation.
CO4: Understand the importance of Water Storage and Conveyance Structures so that the social responsibilities of water conservation will be appreciated.
CO5: Understand the basic characteristics of Civil Engineering Materials and attain knowledge on prefabricated technology.

UNIT I

Basics of Civil Engineering: Role of Civil Engineers in Society- Introduction to Civil Engineering Construction Materials-Cement - Aggregate - Bricks- Cement concrete- Steel- Bitumen-Building Planning & Construction Techniques-Introduction to Prefabricated Construction Techniques.

UNIT II

Geotechnical Engineering: Introduction to Properties of soils- Permeability &Seepage- Shear strength-Compaction and Consolidation-Soil exploration-Shallow and Deep Foundations

Structural Engineering: Introduction to Different types of structures-Framed structures- Arches-Suspension bridges-Trusses, Reinforced Concrete Structures-Steel Structures- Design philosophies-Prestressed concrete structures.

Dr. V. Lakshmi, ProfessorUCEK, JNTU Kakinada. (University Nominee)	Dr. A. Murali Krishna, Professor, IIT Tirpathi	Dr. V. Ramna murthy, Professor, NIT Warangal.	Er.B.ChandraSekhar, Director (Technical), Praneeth Engg. Dept, Hyderabad (Industrial Expert)	Dr.Venkateswarlu Hasti, Post Doctoral fellow, IISc Banglore. (Alumini)
Cancel	-online-	-online-	-online-	-online-

Professor
Department of Civil Engineering
University College of Engineering
JNTUK, KAKINADA

Head of the Department
Dept. of Civil Engineering

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE
ODALAREVU (AUTONOMOUS)

Department of Civil Engineering

Surveying: Introduction to Objectives of Surveying- Horizontal Measurements- Angular Measurements- Bearings- Levelling- Instruments used for levelling -Contour mapping.

UNIT III

Transportation Engineering Importance of Transportation in Nation's economic development- Introduction to 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 to Sources of water- Hydrology–Rainwater Harvesting-Water Storage and Conveyance Structures. Introduction to Qualityof water- Specifications- Treatment-Sewage-Disposal

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.

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, Khanna Publishers, 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 andBrothers Publications 2019. 10th Edition.
5. Indian Standard DRINKING WATER — SPECIFICATION IS 10500-2012.

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Dr. V. Lakshmi, ProfessorUCEK, JNTU Kakinada. (University Nominee)	Dr. A. Murali Krishna, Professor, IIT Tirpathi	Dr. V. Ramana murthy, Professor, NIT Warangal.	Er.B.ChandraSekhar, Director (Technical), Praneeth Engg Dept, Hyderabad (Industrial Expert)	Dr.Venkateswarlu Hasti, Post Doctoral fellow, IISc Banglore. (Alumini)
Cenb	-online-	--online--	--on line--	-- online --

PROFESSOR
Department of Civil Engineering
University College of Engineering
JNTUK KAKINADA

(10)

Head of the Department
Dept. of Civil Engineering
BVC ENGINEERING COLLEGE

I YEAR I SEM **I YEAR II SEM**	**Course Code:23ES1T01** *(for CSE & Allied Branches)* **Course Code: 23ES2T01** *(for CE, EEE, ME & ECE Branches)*	**L**	**T**	**P**	**C**
		3	**0**	**0**	**3**

BASIC CIVIL AND MECHANICAL ENGINEERING
(Common to All branches of Engineering)

PART B: BASIC MECHANICAL ENGINEERING

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

COB1: Get familiarize with the scope and importance of Mechanical Engineering in different sectors & industries. COB2: Explain different engineering materials and different manufacturing processes.

COB3: Provide an overview of different thermal and mechanical transmission systems and introduce basics of robotics and its applications.

Course Outcomes:

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

CO1: Understand the different manufacturing processes.

CO2: Explain the basics of thermal engineering and its applications.

CO3: Describe the working of different mechanical power transmission systems and power plants.

CO4: Describe the basics of robotics and its applications.

UNIT I

UNIT I 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 II

UNIT II Thermal Engineering – Basic Laws of Thermodynamics, working principle of Boilers, Otto cycle, Diesel cycle, Refrigeration and air-conditioning cycles: Air Refrigeration and Vapour Compression Refrigeration-Working Principles only. Introduction to Pumps and Compressors (Basics, Classification and Applications only), IC engines, 2-Stroke and 4-Stroke engines, SI/CI Engines, Components of Electric and Hybrid Vehicles. Power plants – working principle of Steam, Diesel, Hydro, Nuclear and Combined Cycle power plants (Layout, Working)

UNIT III

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

Textbooks:

1. Internal Combustion Engines by V.Ganesan, By Tata McGraw Hill publications (India) Pvt. Ltd.

2. A Tear book of Theory of Machines by S.S. Rattan, Tata McGraw Hill Publications, (India) Pvt. Ltd.

3. An introduction to Mechanical Engg by Jonathan Wicker and Kemper Lewis, Cengage learning 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. Thermal Engineering by Mahesh M Rathore Tata McGraw Hill publications (India) Pvt. Ltd.

4. G. Shanmugam and M.S.Palanisamy, Basic Civil and the Mechanical Engineering, Tata McGraw Hill publications (India) Pvt. Ltd.

I YEAR I SEM /	**Course Code : 23ES1T03** *(for CSE & Allied Branches)*	**L**	**T**	**P**	**C**
I YEAR II SEM	**Course Code : 23ES2T03** *(for CE, EEE, ME & ECE Branches)*	**1**	**0**	**4**	**3**

ENGINEERING GRAPHICS

UNIT I

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

Curves: construction of ellipse, parabola and hyperbola by general method only, Cycloids, Involutes, Normal and tangent to Curves.

Scales: Plain scales, diagonal scales

UNIT II

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

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.

UNIT III

Projections of Solids: Types of solids: Polyhedra and Solids of revolution. Projections of solids 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 IV

Basic Concept of Sections of Solids: Sections of Solids in simple positions (Cone, Prism, Pyramid)

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

UNIT V

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

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

Text Books:

1. N. D. Bhatt, Engineering Drawing, Charotar Publishing House, 2016.

Reference Books:

1. Engineering Drawing, K.L. Narayana and P. Kannaiah, Tata McGraw Hill, 2013.
2. Engineering Drawing, M.B.Shah and B.C. Rana, Pearson Education Inc, 2009.
3. Engineering Drawing with an Introduction to AutoCAD, Dhananjay Jolhe, TataMcGraw Hill, 2017.

L T P C
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NETWORK ANALYSIS
(ECE)

Subject Code: 23EE2T02

Course Objectives:

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

Course Outcomes: At the end of this course students will demonstrate the ability to

- Understand basic electrical circuits with nodal and mesh analysis.
- Analyze the electrical circuit using Network simplification theorems.
- Analyze electrical networks in the Laplace domain and transient analysis
- Infer and evaluate Transient response and Steady state response of a network..
- Compute the parameters of a two-port network.

UNIT I Classification of Sources & Network Theorems

Classification of Sources, Source Transformation techniques, Mesh, Nodal Analysis and Star-Delta conversion.

Network Theorems (D.C circuits): Thevenin's, Norton's, Milliman's, Reciprocity, Max Power Transfer, Tellegen's theorems.

UNIT II Single phase A.C Circuits

Steady State Analysis of A.C Circuits: Impedance concept, phase angle, series R-L, R-C, R-L-C circuits problem solving. Complex impedance and phasor notation for R-L, R-C, R-L-C problem.

UNIT III Laplace transformation & Transient analysis

Laplace transform: Introduction to Laplace Transforms, Problem solving using Laplace transforms Partial Expansion Method (Inverse Laplace Transforms)

Transients: Definition of time constants, R-L circuit, R-C circuit and R-L-C circuit with DC excitation using differential equation approach and Laplace transform approach.

Dr. S.Srikanth Professor & HOD	Dr.T.Murali Mohan, **University Nominee**	Dr.K.Siva Kumar **Subject expert**	Dr.G.Siva Kumar **Subject expert**	Ch.Mahadev Kumar **Representative from Industry**	D.Lakshman Kumar **Alumni Member**

UNIT IV Resonance & Magnetic circuits

Resonance: Introduction, Definition of Q, Series resonance, Bandwidth of series resonance, Parallel resonance.

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 V Two-port networks

Two-port Networks: Relationship of two port networks, Z-parameters, Y-parameters, Transmission line parameters, h- parameters, Relationships Between parameter Sets, cascading of two port networks.

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. Fundamentals of Electric Circuits by Charles K. Alexander and Matthew N. O. Sadiku, McGraw-Hill Education.
4. Network lines and Fields by John. D. Ryder 2nd Edition, PHI

Reference Books:

1. D. Roy Choudhury, Networks and Systems, New Age InternationalPublications, 2013.
2. Joseph Edminister and Mahmood Nahvi, Electric Circuits, Schaum's Outline Series, 7th Edition, Tata McGraw Hill Publishing Company, New Delhi, 2017

S.No.	Members	Name & Institution	Signature of member
1	Chairman	Dr. S.Srikanth , Professor & HOD	
2	University Nominee	Dr. T. Murali Mohan , Professor, Dept. of EEE, UCEK, JNTU Kakinada	
3	Subject expert from outside the college	Dr. K.Siva Kumar , Professor, Dept. of EE, IIT Hyderabad	
4	Subject expert from outside the college	Dr. G.Siva Kumar , Asst. professor , Dept. of EE, NIT Warangal	
5	Representative from Industry	Ch.Mahadev Kumar ,Dy. Manager Oil rigs B H E L , R C Puram Hyderabad	
6	Alumni Member	D.Lakshman Kumar, Asst. professor, Dept. of EEE,Sri Vishnu Engineering College for Women(A), WG Dist.	

BR23-I-II-ECE-(6)

L T P C
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CHEMISTRY LAB
(Common to ~~EEE~~, ECE, ~~CSE& Allied, IT~~)

23BS2L02

Course Objectives:
- Verify the fundamental concepts with experiments.

Course Outcomes: At the end of the course, the students will be able to
- Determine the cell constant and conductance of solutions.
- Prepare advanced polymer Bakelite materials.
- Measure the strength of an acid present in secondary batteries.
- Analyzethe IR spectra of some organic compounds.

List of Experiments:
1. Measurement of 10Dq by spectrophotometric method
2. Conductometrictitration of strong acid vs. strong base
3. Conductometrictitration 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

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

A.D. Madhuri (Chairman - BOS)

Dr. S. Satyaveni (University Nominee)

Dr. S. Musthafa (Subject Expert)

Dr. A. Venkateswara Rao (Subject Expert)

Mr. E. S. V. Subrahmanyam (Member, BOS)

I YEAR I SEM / I YEAR II SEM	Course Code : 23ES1L02 *(for CSE & Allied Branches)*	L	T	P	C
	Course Code : 23ES2L02 *(for CE, EEE, ME & ECE Branches)*	0	0	3	1.5

ENGINEERING WORKSHOP

(Common to All branches of Engineering)

1. Demonstration: Safety practices and precautions to be observed in workshop.

2. Wood Working: 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 and c) Corner Dovetail joint or Bridle joint

3. Sheet Metal Working: Familiarity with different types of tools used in sheet metal working, Developments of following sheet metal jobs from GI sheets:

a) Tapered tray b) Elbow pipe c) Brazing

4. Fitting: Familiarity with different types of tools used in fitting and do the following fitting exercises:

a) V-fit b) Semi-circular fit c) Bicycle tyre puncture and change of two-wheeler tyre.

5. Electrical Wiring: Familiarity with different types of basic electrical circuits and make the following connections:

a) Parallel and series b) Two-way switch c) Godown lighting d) Tube Light e) Soldering of wires

6. Foundry Trade: Demonstration and practice on Moulding tools and processes, Preparation of Green Sand Moulds for given Pattern.

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

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

Text Books:

1. Basic Workshop Technology: Manufacturing Process, Felix W.; Independently Published,2019.

2. Workshop Processes, Practices and Materials; Bruce J. Black, Routledge publishers, 5th Edn. 2015.

3. A Course in Workshop Technology Vol I. & II, B.S. Raghuwanshi, Dhanpath Rai & Co., 2015 & 2017.

Reference Books:

Elements of Workshop Technology, Vol. I by S. K. Hajra Choudhury & Others, Media Promoters and Publishers, Mumbai. 2007, 14th edition

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

I Year - II Semester	Code: 23ES2L03	L	T	P	C
		0	0	2	1

IT WORKSHOP
(Common to CE/EEE/ME/ECE)

Course Objectives:

- To introduce the internal parts of a computer, peripherals, I/O ports, connecting cables
- To demonstrate configuring the system as Dual boot both Windows and other Operating Systems Viz. Linux, BOSS
- To teach basic command line interface commands on Linux.
- To teach the usage of Internet for productivity and self-paced life-long learning
- To introduce Compression, Multimedia and Antivirus tools and Office Tools such as Word processors, Spread sheets and Presentation tools

Course Outcomes:

CO1: Perform Hardware troubleshooting.
CO2: Understand Hardware components and inter dependencies.
CO3: Safeguard computer systems from viruses/worms.
CO4: Document/ Presentation preparation. CO5: Perform calculations using spreadsheets

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 through the 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 configured as 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

Task1: 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. Finally students should demonstrate, to the instructor, how to access the websites and email. If there is no internet connectivity preparations need to be made by the instructors to simulate the WWW on the LAN.

Dr. R ...	online	online	online	online	...
Dr. N Ramakrishnaiah, Professor of CSE. UCEK, JNTUK Kakinada.	Dr. C Krishna Mohan, Professor of CSE, IIT Hyderabad.	Dr. P Radha Krishna, Professor of CSE, NIT Warangal.	Narayana Rao Routhu, Technology Manager, Hidden Brains, Ahmadabad.	Dr. S Rao Chintalapudi, Professor and HoD, CSE(AIML) CMR Technical Campus,Hyd.	Dr. B S N Murthy Professor of CSE, BVCEC.

Professor
Department of CSE
University College of Engg.

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 how to 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 TeXand word – Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter in word.

Task 2: Using LaTeX 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 TeX and 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 help and 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

	online	online	online	online	
Dr. N Ramakrishnaiah, Professor of CSE. UCEK, JNTUK Kakinada.	Dr. C Krishna Mohan, Professor of CSE, IIT Hyderabad.	Dr. P Radha Krishna, Professor of CSE, NIT Warangal.	Narayana Rao Routhu, Technology Manager, Hidden Brains, Ahmadabad.	Dr. S Rao Chintalapudi, Professor and HoD, CSE(AIML) CMR Technical Campus, Hyd.	Dr. B S N Murthy Professor of CSE, BVCEC.

Professor
Department of CSE

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 model responds. Try asking questions, starting conversations, or even providing incomplete sentences to 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 fun way 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 to see how accurate and fluent the translations are.

Ex:Prompt: "Translate the following English sentence to French: 'Hello, how are you doing today?'"

Text Books:

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

Reference Books:

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

Dr. N Ramakrishnaiah, Professor of CSE. UCEK, JNTUK Kakinada.	Dr. C Krishna Mohan, Professor of CSE, IIT Hyderabad.	Dr. P Radha Krishna, Professor of CSE, NIT Warangal.	Narayana Rao Routhu, Technology Manager, Hidden Brains, Ahmadabad.	Dr. S Rao Chintalapudi, Professor and HoD, CSE(AIML) CMR Technical Campus, Hyderabad.	Dr. B S N Murthy Professor of CSE, BVCEC.

Professor
Department of CSE
iversity College of Engg.
JNTUK Kakinada

L	T	P	C
0	0	3	1.5

NETWORK ANALYSIS & SIMULATION LABORATORY
(ECE)

Subject Code: 23EE2L02

Course Objectives:

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

Course Outcomes:

- Verify Kirchoff's laws and network theorems.
- Measure time constants of RL & RC circuits.
- Analyze behavior of RLC circuit for different cases.
- Design resonant circuit for given specifications.
- Characterize and model the network in terms of all network parameters.

The following experiments need to be performed using both Hardware and simulation Software.
List of Experiments:

(Any 10 of the following experiments are to be conducted)

1. Verification of Network Reduction Techniques.
2. Verification of mesh and nodal analysis
3. Verification of Thevenin's & Norton theorems
4. Verification of maximum power transfer theorem
5. Verification of Reciprocity and Millimans theorems
6. Verification of Tellegen's theorem for two networks of the same topology.
7. Determination Self, Mutual Inductance and Coefficient of Coupling
8. Simulation of RL & RC networks
9. Simulation of RLC network
10. Find the Q Factor and Bandwidth of a Series and Parallel Resonance circuit.
11. Determination of open circuit (Z) and short circuit (Y) parameters
12. Determination of hybrid (H) and transmission (ABCD) parameters

Dr. S.Srikanth Professor & HOD	Dr.T.Murali Mohan, **University Nominee**	Dr.K.Siva Kumar **Subject expert**	Dr.G.Siva Kumar **Subject expert**	Ch.Mahadev Kumar **Representative from Industry**	D.Lakshman Kumar **Alumni Member**

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

References:

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.

S.No.	Members	Name & Institution	Signature of member
1	Chairman	Dr. S.Srikanth , Professor & HOD	
2	University Nominee	Dr. T. Murali Mohan , Professor, Dept. of EEE, UCEK, JNTU Kakinada	
3	Subject expert from outside the college	Dr. K.Siva Kumar , Professor, Dept. of EE, IIT Hyderabad	
4	Subject expert from outside the college	Dr. G.Siva Kumar , Asst. professor , Dept. of EE, NIT Warangal	
5	Representative from Industry	Ch.Mahadev Kumar ,Dy. Manager Oil rigs B H E L , R C Puram Hyderabad	
6	Alumni Member	D.Lakshman Kumar, Asst. professor, Dept. of EEE,Sri Vishnu Engineering College for Women(A), WG Dist.	

L	T	P	C
0	0	1	0.5

NSS/NCC/SCOUTS & GUIDES/COMMUNITY SERVICE
(Common to All branches of Engineering)

23BS1L05((CSE,AIDS,AIML,CSE(AIML))

23BS2L05 (CE,EEE,MEC,ECE)

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: After completion of the course the student will beable

CO1: Understand the importance of discipline, character and service motto
CO2: Solve some societal issues by applying acquired knowledge, facts, and techniques.
CO3: Explore human relationships by analyzing social problems.
CO4: Determine to extend their help for the fellow beings and downtrodden people.
CO5: Develop leadership skills and civic responsibilities.

UNIT I Orientation
General Orientation on NSS/NCC/ Scouts & Guides/Community Service activities, careerguidance.

Activities:

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

Mrs.A.D. Madhuri
(Chairperson –BOS)

Dr.G.Shyam Kumar
(University Nominee)

S T Naidu
(NSS Programme Officer)

E S V Subrahmanyam
(BOS Member)

UNIT II

Natur

e & CareActivities:

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 III

Communit

y ServiceActivities:

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 PopulationEducation.
v) Any other programmes in collaboration with local charities, NGOs etc.

Mrs.A. D. Madhuri
(Chairperson –BOS)

Dr.G.Shyam Kumar
(University Nominee)

S T Naidu

E S V Subrahmanyam

(NSS Programme Office) (BOS Member)

Reference Books:

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

General Guidelines:

1. Institutes must assign slots in the Timetable for the activities.
2. Institutes are required to provide instructor 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, totalling to 90 marks.
- A student shall be evaluated by the concerned teacher for 10 marks by conducting vivavoce on the subject.

Mrs A.D. Madhuri
(Chairperson –BOS)

Dr.G.Shyam Kumar
(University Nominee)

S T Naidu
(NSS Programme Office)

E S V Subrahmanyam
(BOS Member)

II Year-I Semester					
23BS3T08	PROBABILITY THEORY AND STOCHASTIC PROCESS	L	T	P	C
		3	0	0	3

Course Objectives:

- This gives basic understanding of random variables and operations that can be performed on them.
- To know the Spectral and temporal characteristics of Random Process.
- To Learn the Basic concepts of Information theory Noise sources and its representation for understanding its characteristics

UNIT – I: Probability & Random Variable [10 Hrs]

Probability introduced through Sets and Relative Frequency: Experiments and Sample Spaces, Discrete and Continuous Sample Spaces, Events, Probability Definitions and Axioms, Joint Probability, Conditional Probability, Total Probability, Bay's Theorem, Independent Events, Random Variable-Definition, Conditions for a Function to be a Random Variable, Discrete, Continuous and Mixed Random Variable, Distribution and Density functions, Properties, Binomial, Poisson, Uniform, Gaussian, Exponential, Rayleigh, Methods of defining Conditioning Event, Conditional Distribution, Conditional Density and their Properties.

UNIT – II: Operations on Single & Multiple Random Variables [12 Hrs]

Expectations: Expected Value of a Random Variable, Function of a Random Variable, Moments about the Origin, Central Moments, Variance and Skew, Chebychev's Inequality, Characteristic Function, Moment Generating Function, Transformations of a Random Variable: Joint Distribution Function and its Properties, Marginal Distribution Functions, Conditional Distribution and Density – Point Conditioning, Conditional Distribution and Density – Interval conditioning, Statistical Independence. Sum of Two Random Variables, Sum of Several Random Variables, Central Limit Theorem, (Proof not expected). Unequal Distribution, Equal Distributions. Expected Value of a Function of Random Variables: Joint Moments about the Origin, Joint Central Moments, Joint Characteristic Functions, Jointly Gaussian Random Variables: Two Random Variables case, N Random Variable case, Properties, Transformations of Multiple Random Variables, Linear Transformationsof Gaussian Random Variables

UNIT – III: Random Processes – Temporal Characteristics [10 Hrs]

The Random Process Concept, Classification of Processes, Deterministic and Nondeterministic Processes, Distribution and Density Functions, concept of Stationarity and Statistical Independence. First-Order Stationary Processes, Second Order and Wide- Sense Stationarity, (N-Order) and Strict-Sense Stationarity, Time Averages and Ergodicity, Mean-Ergodic Processes, Correlation-Ergodic Processes, Autocorrelation Function and Its Properties, Cross-Correlation Function and Its Properties, Covariance Functions, Gaussian Random Processes, Poisson Random Process. Random Signal Response of Linear Systems: System Response – Convolution, Mean and Mean-squared Value of System Response, autocorrelation Function of Response, Cross-Correlation Functions of Input and Output.

UNIT – IV: Random Processes – Spectral Characteristics [10 Hrs]

The Power Spectrum: Properties, Relationship between Power Spectrum and Autocorrelation Function,

The Cross-Power Density Spectrum, Properties, Relationship between Cross-Power Spectrum and Cross-Correlation Function. Spectral Characteristics of System Response: Power Density Spectrum of Response, Cross-Power Density Spectrums of Input and Output.

UNIT – V: Noise Sources & Information Theory [8Hrs]

Resistive/Thermal Noise Source, Arbitrary Noise Sources, Effective Noise Temperature, Noise equivalent bandwidth, Average Noise Figures, Average Noise Figure of cascaded networks, Narrow Band noise, Quadrature representation of narrow band noise & its properties. Entropy, Information rate, Source coding: Huffman coding, Shannon Fano coding, Mutual information, Channel capacity of discrete channel, Shannon-Hartley law.

TEXT BOOKS:

1. Peyton Z. Peebles - Probability, Random Variables & Random Signal Principles, 4 th Ed, TMH, 2001.
2. Taub and Schilling - Principles of Communication systems, TMH, 2008
3. B Prabhakara Rao, T S R Murthy, Probability Theory and Stochastic Process, BS Publications 2012

REFERENCE BOOKS:

1. Bruce Hajck - Random Processes for Engineers, Cambridge uni press, 2015
2. Athanasios Papoulis and S. Unni krishna Pillai - Probability, Random Variables and Stochastic Processes, 4th Ed., PHI, 2002.
3. B.P. Lathi - Signals, Systems & Communications, B.S. Publications, 2003.
4. Y Mallikarjuna Reddy, Probability Theory and Stochastic Process, 4th edition, Universities press,2013

Online Learning Resources:

- https://onlinecourses.nptel.ac.in/noc21_ma66/preview2.http://www.egwald.ca/statistics/
- https://www.youtube.com/watch?v=ofPv2NiTJ1E
- https://www.slideshare.net/slideshow/ptsp-pptpdf/255856157

Course Outcomes:

COs	Statements	BL
CO1	Understand the Mathematical model theory and phenomena of probabilistic problems and concepts of Random Variables	BL2
CO2	Perform operations on single and multiple Random variables.	BL4
CO3	Determine the Temporal characteristics of Random Signals.	BL2/BL3
CO4	Determine the Spectral characteristics of Random Signals.	BL2/BL3
CO5	Understand the concepts of Noise and Information theory in Communication systems	BL2

II Year - I Semester	Code: 23HM3T02	L	T	P	C

		2	**1**	**0**	**3**

UNIVERSAL HUMAN VALUES-UNDERSTANDING HARMONY AND ETHICAL HUMAN CONDUCT
(Common to all)

Course Objectives:

The learning objectives of this course are to:

- To help the students appreciate the essential complementary between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.
- To facilitate the development of a Holistic perspective among students towards lifeand profession as well as towards happiness and prosperity based on a correct understanding of the Human reality and the rest of existence. Such holisticperspective forms the basis of Universal Human Values and movement towards value-based living in a natural way.
- To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually fulfilling human behaviour and mutually enriching interaction with Nature.

Course Outcomes: Students are able to

CO Number	Course Outcome	Blooms Level
CO1	Define the terms like Natural Acceptance, Happiness and Prosperity	BL1,2
CO2	Identify one's self, and one's surroundings (family, society nature).	BL1,2
CO3	Apply what they have learnt to their own self in different day-to-day settings inreal life	BL3
CO4	Relate human values with human relationship and human society.	BL4
CO5	Justify the need for universal human values and harmonious existence	BL5
CO6	Develop as socially and ecologically responsible engineers	BL3,6

Course Topics

The course has 28 lectures and 14 tutorials in 5 modules. The lectures and tutorials are of 1- hour duration. Tutorial sessions are to be used to explore and practice what has been proposed during the lecture sessions.

The Teacher's Manual provides the outline for lectures as well as practice sessions. The teacher is expected to present the issues to be discussed as propositions and encourage the students to have a dialogue

UNIT I Introduction to Value Education (6 lectures and 3 tutorials for practicesession)

Lecture 1: Right Understanding, Relationship and Physical Facility (Holistic Development and the Role of Education)

Lecture 2: Understanding Value Education
Tutorial 1: Practice Session PS1 Sharing about Oneself Lecture
3: self-exploration as the Process for Value Education
Lecture4: Continuous Happiness and Prosperity – the Basic HumanAspirations
Tutorial 2: Practice Session PS2 Exploring Human Consciousness
Lecture 5: Happiness and Prosperity – Current Scenario
Lecture 6: Method to Fulfill the Basic Human Aspirations
Tutorial 3: Practice Session PS3 Exploring Natural Acceptance

UNIT II Harmony in the Human Being (6 lectures and 3 tutorials for practice session)

Lecture 7: Understanding Human being as the Co-existence of the self and the body.
Lecture 8: Distinguishing between the Needs of the self and the body
Tutorial 4: Practice Session PS4 Exploring the difference of Needs of self and body.
Lecture 9: The body as an Instrument of the self
Lecture 10: Understanding Harmony in the self
Tutorial 5: Practice Session PS5 Exploring Sources of Imagination in the self
Lecture 11: Harmony of the self with the body
Lecture 12: Programme to ensure self-regulation and Health
Tutorial 6: Practice Session PS6 Exploring Harmony of self with the body

UNIT I11

Harmony in the Family and Society (6 lectures and 3 tutorials for practicesession)
Lecture 13: Harmony in the Family – the Basic Unit of Human Interaction
Lecture 14: 'Trust' – the Foundational Value in Relationship
Tutorial 7: Practice Session PS7 Exploring the Feeling of TrustLecture
15: 'Respect' – as the Right Evaluation
Tutorial 8: Practice Session PS8 Exploring the Feeling of Respect Lecture
16: Other Feelings, Justice in Human-to-Human Relationship
Lecture 17: Understanding Harmony in the Society
Lecture 18: Vision for the Universal Human Order
Tutorial 9: Practice Session PS9 Exploring Systems to fulfil Human Goal

UNIT I V Harmony in the Nature/Existence (4 lectures and 2 tutorials for practicesession)
Lecture 19: Understanding Harmony in the Nature
Lecture 20: Interconnectedness, self-regulation and Mutual Fulfilment amongthe Four Orders of Nature
Tutorial 10: Practice Session PS10 Exploring the Four Orders of Nature
Lecture 21: Realizing Existence as Co-existence at All Levels
Lecture 22: The Holistic Perception of Harmony in Existence
Tutorial 11: Practice Session PS11 Exploring Co-existence in Existence.

UNIT V Implications of the Holistic Understanding – a Look at Professional Ethics (6lectures and 3 tutorials for practice session)

Lecture 23: Natural Acceptance of Human Values Lecture 24: Definitiveness of (Ethical) Human Conduct
Tutorial 12: Practice Session PS12 Exploring Ethical Human Conduct
Lecture 25: A Basis for Humanistic Education Humanistic Constitution and Universal Human Order
Lecture 26: Competence in Professional Ethics
Tutorial 13: Practice Session PS13 Exploring Humanistic Models in Education
Lecture 27: Holistic Technologies, Production Systems and Management Models-Typical Case Studies
Lecture 28: Strategies for Transition towards Value-based Life and Profession
Tutorial 14: Practice Session PS14 Exploring Steps of Transition towards Universal Human Order

Practice Sessions for UNIT I – Introduction to Value EducationPS1 Sharing about Oneself

PS2 Exploring Human ConsciousnessPS3 Exploring Natural Acceptance

Practice Sessions for UNIT II – Harmony in the Human BeingPS4 Exploring the difference of Needs of self and body

PS5 Exploring Sources of Imagination in the selfPS6 Exploring Harmony of self with the body

Practice Sessions for UNIT III – Harmony in the Family and SocietyPS7 Exploring the Feeling of Trust

PS8 Exploring the Feeling of Respect

PS9 Exploring Systems to fulfil Human Goal

Practice Sessions for UNIT IV – Harmony in the Nature (Existence)PS10 Exploring the Four Orders of Nature

PS11 Exploring Co-existence in Existence

Practice Sessions for UNIT V – Implications of the Holistic Understanding – a Look at Professional Ethics

PS12 Exploring Ethical Human Conduct

PS13 Exploring Humanistic Models in Education

PS14 Exploring Steps of Transition towards Universal Human Order

Text Books:

The Textbook

R R Gaur, R Asthana, G P Bagaria, *A Foundation Course in Human Values and Professional Ethics*, 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-47-1

The Teacher's Manual

R R Gaur, R Asthana, G P Bagaria, *Teachers' Manual for A Foundation Course in Human Values and Professional Ethics*, 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-53-2

Reference Books:

1. *JeevanVidya: EkParichaya*, A Nagaraj, JeevanVidyaPrakashan, Amarkantak, 1999.
2. *Human Values*, A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004.
3. *The Story of Stuff* (Book).
4. *The Story of My Experiments with Truth* - by Mohandas Karamchand Gandhi
5. *Small is Beautiful* - E. F Schumacher.
6. *Slow is Beautiful* - Cecile Andrews
7. *Economy of Permanence* - J C Kumarappa
8. *Bharat Mein Angreji Raj* – PanditSunderlal
9. *Rediscovering India* - by Dharampal
10. *Hind Swaraj or Indian Home Rule* - by Mohandas K. Gandhi
11. *India Wins Freedom* - Maulana Abdul Kalam Azad
12. *Vivekananda* - Romain Rolland (English)
13. *Gandhi* - Romain Rolland (English)

Mode of Conduct:

Lecture hours are to be used for interactive discussion, placing the proposals about the topics at handand motivating students to reflect, explore and verify them.

Tutorial hours are to be used for practice sessions.

While analyzing and discussing the topic, the faculty mentor's role is in pointing to essential elements to help in sorting them out from the surface elements. In other words, help the students explore the important or critical elements.

In the discussions, particularly during practice sessions (tutorials), the mentor encourages the student to connect with one's own self and do self-observation, self-reflection and self-exploration.

Scenarios may be used to initiate discussion. The student is encouraged to take up "ordinary" situations rather than" extra-ordinary" situations. Such observations and their analyses are shared and discussed with other students and faculty mentor, in a group sitting. Tutorials (experiments or practical) are important for the course. The difference is that the laboratory is everyday life, and practical are how you behave and work in real life. Depending on the nature of topics, worksheets, home assignment and/or activity are included. The practice sessions (tutorials) would also provide support to a student in performing actions commensurate to his/her beliefs. It is intended that this would lead to development of commitment, namely behaving and working based on basic human values.It is recommended that this content be placed before the student as it is, in the form of a basic foundation course, without including anything else or excluding any part of this content. Additional content may be offered in separate, higher courses. This course is to be taught by faculty from every teaching department, not exclusively by any one department.

Teacher preparation with a minimum exposure to at least one 8-day Faculty Development Program onUniversal Human Values is deemed essentia

Online Resources:

1. https://fdp-si.aicte-india.org/UHV-II%20Class%20Notes%20&%20Handouts/UHV%20Handout%201-Introduction%20to%20Value%20Education.pdf
2. https://fdp-si.aicte-india.org/UHV-II%20Class%20Notes%20&%20Handouts/UHV%20Handout%202-Harmony%20in%20the%20Human%20Being.pdf
3. https://fdp-si.aicte-india.org/UHV-II%20Class%20Notes%20&%20Handouts/UHV%20Handout%203-Harmony%20in%20the%20Family.pdf
4. https://fdp-si.aicte-india.org/UHV%201%20Teaching%20Material/D3- S2%20Respect%20July%2023.pdf
5. https://fdp-si.aicte-india.org/UHV-II%20Class%20Notes%20&%20Handouts/UHV%20Handout%205-Harmony%20in%20the%20Nature%20and%20Existence.pdf
6. https://fdp-si.aicte-india.org/download/FDPTeachingMaterial/3-days%20FDP-SI%20UHV%20Teaching%20Material/Day%203%20Handouts/UHV%203D%20D3- S2A%20Und%20Nature-Existence.pdf
7. https://fdp-si.aicte-india.org/UHV%20II%20Teaching%20Material/UHV%20II%20Lecture%2023- 25%20Ethics%20v1.pdf

II Year-I Semester					
23ES3T08	SIGNALS AND SYSTEMS	L	T	P	C
		3	0	0	3

Course Objectives:

- To study about signals and systems.
- To analyze the spectral characteristics of signal using Fourier series and Fouriertransforms.
- To understand the characteristics of systems.
- To introduce the concept of sampling process
- To know various transform techniques to analyze the signals and systems.

UNIT- I: INTRODUCTION

[8 Hrs]

Definition of Signals and Systems, Classification of Signals, Classification of Systems, Operations on signals: time-shifting, time- scaling, amplitude-shifting, amplitude-scaling. Problems on classification and characteristics of Signals and Systems. Complex exponential and sinusoidal signals, Singularity functions and related functions: impulse function, step function signum function and ramp function. Analogy between vectors and signals, orthogonal signal space, Signal approximation using orthogonal functions, Mean square error, closed or complete set of orthogonal functions, Orthogonality in complex functions. Related problems.

UNIT–II: FOURIER SERIES AND FOURIER TRANSFORM

[12 Hrs]

Fourier series representation of continuous time periodic signals, properties of Fourier series, Dirichlet's conditions, Trigonometric Fourier series and Exponential Fourier series, Relation between Trigonometric and Exponential Fourier series, Complex Fourier spectrum. Deriving Fourier transform from Fourier series, Fourier transform of arbitrary signal, Fourier transform of standard signals, Fourier transform of periodic signals, properties of Fourier transforms, Fourier transforms involving impulse function and Signum function. Introduction to Hilbert Transform, Related problems.

UNIT-III: ANALYSIS OF LINEAR SYSTEMS

[8 Hrs]

Introduction, Linear system, impulse response, Response of a linear system, Linear time invariant (LTI) system, Linear time variant(LTV)system, Concept of convolution in time domain and frequency domain, Graphical representation of convolution, Transfer function of a LTI system, Related problems. Filter characteristics of linear systems. Distortion less transmission through a system, Signal band width, system band width, Ideal LPF, HPF and BPF characteristics, Causality and Poly-Wiener criterion for physical realization, relationship between bandwidth and rise time.

UNIT–IV:CORRELATION

[10 Hrs]

Auto-correlation and cross-correlation of functions, properties of correlation function, Energy density spectrum, Parseval's theorem, Power density spectrum, Relation between Convolution and correlation,

Detection of periodic signals in the presence of noise by correlation, Extraction of signal from noise by filtering.

SAMPLING THEOREM: Graphical and analytical proof for Band Limited Signals, impulse sampling, Natural and Flat top Sampling, Reconstruction of signal from its samples, effect of under sampling – Aliasing, Introduction to B and Pass sampling, Related problems.

UNIT–V:LAPLACE TRANSFORMS:
[12 Hrs]

Introduction, Concept of region of convergence (ROC) for Laplace transforms, constraints on ROC for various classes of signals, Properties of L.T's, Inverse Laplace transform, Relation between L.T's, and F.T. of a signal. Laplace transform of certain signals using waveform synthesis.

Z–TRANSFORMS: Concept of Z-Transform of a discrete sequence. Region of convergence in Z-Transform, constraints on ROC for various classes of signals, Inverse Z- transform, properties of Z-transforms. Distinction between Laplace, Fourier and Z- transforms.

TEXTBOOKS:

1.Signals, Systems & Communications-B.P. Lathi, BSPublications,2003.
2.Signals and Systems-A.V. Oppenheim, A.S. Willsky and S.H. Nawab, PHI, 2nd Edn,1997
3.Signals & Systems-Simon Haykin and Van Veen, Wiley,2ndEdition,2007

REFERENCEBOOKS:

1.Principles of Linear Systems and Signals–BP Lathi, Oxford University Press,2015
2.Signals and Systems–TK Rawat, Oxford University press,2011
3. Signals and Systems- Anand Kumar, PHI 3rd edition 2015.

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Online Learning Resources:

- http://nptel.ac.in/courses/117106114/
- https://www.tutorialspoint.com/signals_and_systems

Course Outcomes:

COs	Statements	BL
CO1	Differentiate the various classifications of signals and systems	BL2
CO2	Analyze the frequency domain representation of signals using Fourier concepts	BL4
CO3	Classify the systems based on their properties and determine the response of LTISystems.	BL2
CO4	Define the sampling process and various types of sampling techniques.	BL1
CO5	Apply Laplace and z-transforms to analyze signals and Systems(continuous & discrete).	BL3

II Year-I Semester					
23EC3T01	ELECTRONIC DEVICES AND CIRCUITS	L	T	P	C
		3	0	0	3

Course Objectives:

- To learn and understand the basic concepts of semiconductor physics.
- Study the physical phenomena such as conduction, transport mechanism and electrical characteristics of different diodes.
- To learn and understand the application of diodes as rectifiers with their operation and characteristics with and without filters are discussed.
- Acquire knowledge about the principle of working and operation of Bipolar Junction Transistor and Field Effect Transistor and their characteristics.
- To learn and understand the purpose of transistor biasing and its significance.
- Small signal equivalent circuit analysis of BJT and FET transistor amplifiers and compare different configurations.

UNIT-I: Review of Semiconductor Physics

[10Hrs]

Mobility and Conductivity, Intrinsic and extrinsic semiconductors, continuity equation, law of junction, Fermi Dirac function, Fermi level in intrinsic and extrinsic Semiconductors. (Text book: 1)

Junction Diode Characteristics: Energy band diagram of PN junction Diode, Open circuited p-n junction, Biased p-n junction, p-n junction diode, current components in p-n junction Diode, Diode equation, V-I Characteristics, temperature dependence on V-I characteristics, Diode resistance, Diode capacitance. (Text book: 1)

UNIT-II: Special Semiconductor Devices

[10Hrs]

Zener Diode, Breakdown mechanisms, Zener diode applications, Varactor Diode, LED, Photodiode, Tunnel Diode, UJT, SCR, Construction, operation and V-I characteristics. (Text book: 1)

Diode Circuits: The Piecewise Linear Diode model, Clipping (limiting) circuits, Clipping at Two Independent Levels, Peak Detector, Clamping circuits, Comparators, Sampling Gate, Basic Rectifier setup, half wave rectifier, full wave rectifier, bridge rectifier, derivations of characteristics of rectifiers, Filters, Inductor filter, Capacitor filter, π-section Filter, comparison of various filter circuits in terms of ripple factors. (Text book: 1, 2)

UNIT- III: Transistor Characteristics

[14Hrs]

Junction transistor, transistor current components, transistor equation in CB configuration, transistor as an amplifier, characteristics of transistor in Common Base, Common Emitter and Common Collector configurations, punch through/ reach through, Photo transistor, typical transistor junction voltage values. (Text book: 1)

Transistor Biasing and Thermal Stabilization: Need for biasing, operating point, load line analysis, BJT biasing- methods, basic stability, fixed bias, collector to base bias, self bias,

Stabilization against variations in VBE, Ic, and β, Stability factors, (S,S',S''), Bias compensation, Thermal runaway, Thermal stability. (Text book: 1)

UNIT- IV: **Small Signal Low Frequency Transistor Amplifier Models BJT**

[6Hrs]

Two port network, Transistor hybrid model, determination of h-parameters, conversion of h-parameters, generalized analysis of transistor amplifier model using h-parameters, Analysis of CB, CE and CC amplifiers using exact and approximate analysis, Comparison of transistor amplifiers. (Text book: 1, 2)

UNIT- V: FET

[10Hrs]

FET types, JFET operation, characteristics, small signal model of JFET. (Text book: 1)

MOSFET: MOSFET Structure, Operation of MOSFET: operation in triode region, operation in saturation region, MOSFET as a variable resistor, derivation of V-I characteristics of MOSFET, Channel length modulation, MOS transconductance, MOS device models: MOS small signal model, PMOS Transistor, CMOS Technology, Comparison of Bipolar and MOS devices. (Text book: 3)CMOS amplifiers: General Considerations, Common Source Stage, Common Gate Stage, Source Follower, comparison of FET amplifiers. (Text book: 3)

Text Books:

1. Millman's Electronic Devices and Circuits- J. Millman, C. C. Halkias and Satya brata Jit, Mc-Graw Hill Education, 4th edition, 2015.
2. Millman's Integrated Electronics-J. Millman, C. Halkias, and Ch. D. Parikh, Mc-Graw Hill Education, 2nd Edition, 2009.
3. Fundamentals of Microelectronics-Behzad Razavi, Wiley, 3rd edition, 2021.

References:

1. Basic Electronics-Priciples and Applications, Chinmoy Saha, Arindam Halder, Debarati Ganguly, Cambridge University Press.
2. Electronics devices & circuit theory- Robert L. Boylestad and Loui Nashelsky, Pearson, 11th edition, 2015.
3. Electronic Devices and Circuits - David A. Bell, Oxford University Press, 5th edition, 2008.
4. Electronic Devices and Circuits- S. Salivahanan, N. Suresh Kumar, Mc-Graw Hill, 5th edition, 2022.

Online Learning Resources:

- https://nptel.ac.in/courses/117/103/117103063/
- https://nptel.ac.in/courses/108/108/108108122/

Course Outcomes:

COs	Statements	BL
CO1	Apply the basic concepts of semiconductor physics.	BL2
CO2	Understand the formation of p-n junction and how it can be used as a p-n junction as diode in different modes of operation.	BL2
CO3	Analyze the construction, working principle of Semiconductor Devices and Diode Circuits	BL3
CO4	Know the need of transistor biasing, various biasing techniques for BJT and FET and stabilization concepts with necessary expressions	BL3
CO5	Apply small signal low frequency transistor amplifier circuits using BJT and FET in different configurations	BL3

II Year-I Semester					
23EC3T02	SWITCHING THEORY AND LOGIC DESIGN	L	T	P	C
		3	0	0	3

Course Objectives:

- To solve a typical number base conversion and analyze new error coding techniques.
- Theorems and functions of Boolean algebra and behavior of logic gates
- To optimize logic gates for digital circuits using various techniques.
- Boolean function simplification using Karnaugh maps and Quine-McCluskey methods
- To understand concepts of combinational circuits.
- To develop advanced sequential circuits.

UNIT – I : REVIEW OF NUMBER SYSTEMS & CODES
[12 Hrs]

Representation of numbers of different radix, conversation from one radix to another radix, r- 1's compliments and r's compliments of signed members. Gray code ,4 bit codes; BCD, Excess-3, 2421, 8 4-2-1 code etc. Error detection & correction codes: parity checking, even parity, odd parity, Hamming code.

BOOLEAN THEOREMS AND LOGIC OPERATIONS

Boolean theorems, principle of complementation & duality, De-morgan theorems. Logic operations ; Basic logic operations -NOT, OR, AND, Universal Logic operations, EX-OR, EX- NOR operations. Standard SOP and POS Forms, NAND-NAND and NOR-NOR realizations, Realization of three level logic circuits.

UNIT – II: MINIMIZATION TECHNIQUES
[12 Hrs]

Minimization and realization of switching functions using Boolean theorems, K-Map (up to 6 variables) and tabular method(Quine-McCluskey method) with only four variables and single function.

COMBINATIONAL LOGIC CIRCUITS DESIGN:

Design of Half adder, full adder, half subtractor, full subtractor, applications of full adders; 4- bit adder-subtractor circuit, BCD adder circuit, Excess 3 adder circuit and carry look-a- head adder circuit, Design code converts using Karnaugh method and draw the complete circuit diagrams.

UNIT – III: COMBINATIONAL LOGIC CIRCUITS DESIGN USING MSI &LSI
[10 Hrs]

Design of encoder , decoder, multiplexer and de-multiplexers, Implementation of higher order circuits using lower order circuits . Realization of Boolean functions using decoders and multiplexers. Design of Priority encoder, 4-bit digital comparator and seven segment decoder.

INTRODUCTION OF PLD's

PLDs: PROM, PAL, PLA -Basics structures, realization of Boolean functions, Programming table.

UNIT – IV : SEQUENTIAL CIRCUITS I
[10 Hrs]

Classification of sequential circuits (synchronous and asynchronous) , operation of NAND & NOR Latches and flip-flops; truth tables and excitation tables of RS flip-flop, JK flip- flop, T flip-flop, D flip-flop with reset and clear terminals. Conversion from one flip-flop to another flip- flop. Design of 5ripple

counters, design of synchronous counters, Johnson counter, ring counter. Design of registers - Buffer register, control buffer register, shift register, bi- directional shift register, universal shift register

Study the following relevant ICs and their relevant functions 7474, 7475, 7476, 7490, 7493, 74121.

UNIT – V : SEQUENTIAL CIRCUITS II

[8 Hrs]

Finite state machine; state diagrams, state tables, reduction of state tables. Analysis of clocked sequential circuits Mealy to Moore conversion and vice-versa. Realization of sequence generator, Design of Clocked Sequential Circuit to detect the given sequence (with overlapping or without overlapping)

TEXT BOOKS:

1. Switching and finite automata theory Zvi. KOHAVI, Niraj. K.Jha 3rdEdition,Cambridge University Press,2009
2. Digital Design by M. Morris Mano, Michael D Ciletti,4th editionPHIpublication,2008
3. Switching theory and logic design by Hill and Peterson, Mc-Graw Hill TMH edition, 2012.

REFERENCES:

1. Fundamentals of Logic Design by Charles H. Roth Jr,JaicoPublishers,2006
2. Digital electronics by R S Sedha. S. Chand &companylimited,2010
3. Switching Theory and Logic Design by A. Anand Kumar, PHI Learningpvtltd,2016.
4. Digital logic applications and design by John M Yarbough, Cengagelearning,2006.
5. TTL 74-Series data book.

Online Learning Resources:

- https://nptel.ac.in/courses/108/105/108105132/
- https://nptel.ac.in/courses/117/106/117106086/

Course Outcomes:

COs	Statements	BL
CO1	Classify different number systems and apply to generate various codes.	BL2
CO2	Use the concept of Boolean algebra in minimization of switching functions	BL3
CO3	Design different types of combinational logic circuits.	BL3
CO4	Apply knowledge of flip-flops in designing of Registers and counters	BL3
CO5	The operation and design methodology for synchronous sequential circuits and algorithmic state machines	BL3
CO5	Produce innovative designs by modifying the traditional design techniques.	BL4

II Year-I Semester					
23EC3L01	ELECTRONIC DEVICES AND CIRCUITS LAB	L	T	P	C
		0	0	3	1.5

Course Objectives:

- T o analyse the modelling, characteristics and electrical parameters of Diode, BJT, and JFET.
- T o illustrate the concepts of biasing in BJT, JFET.
- T o illustrate the application of diode in rectifiers and regulated power supply.
- T o analyze single stage amplifier circuits using equivalent circuits.

Note: The students are required to perform the experiment to obtain the V-I characteristics and to determine the relevant parameters from the obtained graphs.

List of Experiments:(Minimum of Ten Experiments has to be performed)

1. Clipper circuit using diode
2. Clamping circuit using diode
3. Rectifiers (without and with c-filter)
   i. Part A:Half-wave Rectifier
   ii. Part B: Full-wave Rectifier
4. BJT Characteristics (CEConfiguration)
   i. Part A: Input Characteristics
   ii. Part B: Output Characteristics
5. FET Characteristics(CSConfiguration)
   i. Part A: Drain Characteristics
   ii. Part B: Transfer Characteristics
6. SCR Characteristics
7. UJT Characteristics
8. Transistor Biasing
9. CRO Operation and its Measurements
10. BJT-CE Amplifier
11. Emitter Follower-CC Amplifier
12. FET-CS Amplifier

Equipment required:

1. Regulated Power supplies
2. Analog/ Digital Storage Oscilloscopes
3. Analog/ Digital Function Generators
4. Digital Multi-meters

5. Decade Resistance Boxes/Rheostats
6. Decade Capacitance Boxes
7. Ammeters(Analog or Digital)
8. Voltmeters(Analog or Digital)
9. Active& Passive Electronic Components.

Note: Students supposed to do an Experiment beyond the Syllabus / Lab oriented mini-Project / Case Study and submit it for internal Evaluation.

Course Outcomes:

COs	Statements	BL
CO1	Apply the concepts of different electronic devices to verify their characteristics and measure the important parameters.	BL2
CO2	Analyze the performance of rectifier circuits with and without filters.	BL3
CO3	Analyze the performance of BJT and FET amplifier circuits.	BL3
CO4	Design and verify clipping and clamping circuits operation.	BL4

II Year-I Semester					
23EC3L02	SWITCHING THEORY AND LOGIC DESIGN LAB	L	T	P	C
		0	0	3	1.5

Course Objectives:

- To outline the basics of Digital electronics, Boolean algebra and basic logic gates.
- Able to design the simple logic circuits and verify the functionality.
- Design combinational and sequential logic circuits using digital ICs.
- Students use a digital trainer kit and Vivado emulator to test their electronic designs. (for additional experiments)

List of Experiments: (Minimum of Ten Experiments has to be performed)

1. Verification of truth tables of the following Logic gates
   Two input (i) OR (ii) AND (iii) NOR (iv) NAND (v) Exclusive-OR (vi) Exclusive-NOR
2. Design a simple combinational circuit with four variables and obtain minimal SOPexpression and verify the truth table using Digital Trainer Kit.
3. Verification of functional table of 3 to 8-line Decoder /De-multiplexer
4. 4 variable logic function verification using 8 to1 multiplexer.
5. Design full adder circuit and verify its functional table.
6. Verification of functional tables of (i) JK Edge triggered Flip–Flop (ii) D Flip-Flop
7. Design a four-bit ring counter using D Flip–Flops/JK Flip Flop and verify output.
8. Design a four-bit Johnson's counter using D Flip-Flops/JK Flip Flops and verify output
9. Verify the operation of 4-bit Universal Shift Register for different Modes ofoperation.
10. Draw the circuit diagram of MOD-8 ripple counter and construct a circuit using T-Flip- Flops and Test It with a low frequency clock and sketch the output waveforms.
11. Design MOD–8 synchronous counter using T Flip-Flop and verify the result and sketchthe output waveforms.
12. (a) Draw the circuit diagram of a single bit comparator and test the output
    (b) Construct 7 Segment Display Circuit Using Decoder and7 Segment LED and test it.

Additional Experiments:

1. Design BCD Adder Circuit and Test the Same using Relevant IC
2. Design Excess-3 to 9- Complement convertor using only four Full Adders and test theCircuit.
3. Design an Experimental model to demonstrate the operation of 74154 De-Multiplexerusing LEDs for outputs.
4. Design of any combinational circuit using Hardware Description Language
5. Design of any sequential circuit using Hardware Description Language

Note: Students supposed to do an Experiment beyond the Syllabus / Lab oriented mini-Project / Case Study and submit it for internal Evaluation.

Course Outcomes:

COs	Statements	BL
CO1	Analyze and design basic combinational logic circuits using Digital IC's.	BL3
CO2	Analyze and design basic Sequential logic circuits using Digital IC's.	BL3
CO3	Implement basic combinational and sequential logic circuits using HDL programming. (for additional experiments)	BL3

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Autonomous

Regulation	**BR23**				
II Year I Semester	**Course Code: 23AC3T01**	**L**	**T**	**P**	**C**
		2	**0**	**0**	**--**
Course Title:	**ENVIRONMENTAL SCIENCE**				

Course Objectives:

1. To make the students to get awareness on environment
2. To understand the importance of protecting natural resources, ecosystems for future
3. generations and pollution causes due to the day-to-day activities of human life
4. To save earth from the inventions by the engineers

Course Outcomes:

COs	Statements	Blooms Level
CO1	Graspmulti-disciplinarynatureofenvironmentalstudiesandvarious renewableandnon-renewableresources.	L2
CO2	Understandflow and bio-geo- chemical cycles and ecological pyramids.	L2
CO3	Understandvariouscausesofpollutionandsolidwastemanagement andrelatedpreventivemeasures.	L2
CO4	Understandtherainwaterharvesting,watershedmanagement,ozone layerdepletionandwastelandreclamation.	L2
CO5	Illustratethecausesofpopulationexplosion,valueeducationand welfareprogrammes.	L3

UNIT – I

Multidisciplinary Nature of Environmental Studies: – Definition, Scope and Importance – Need for Public Awareness.

Natural Resources : Renewable and non-renewable resources – Natural resources and associated problems – Forest resources – Use and over – exploitation, deforestation, case studies – Timber extraction – Mining, dams and other effects on forest and tribal people – Water resources – Use and over utilization of surface and ground water – Floods, drought, conflicts over water, dams – benefits and problems – Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies – Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. – Energy resources:

UNIT – II

Ecosystems: Concept of an ecosystem. – Structure and function of an ecosystem – Producers,

Ch.Sivanarayana HOD &BOS , Department of Civil Engineering, BVCEC Odalarevu.	Dr.V.Lakshmi, Professor, Department of Civil Engineering UCEK,JNTU Kakinada. (University Nominee)	Dr.A.Murali Krishna, Professor, Department of Civil Engineering, IIT Tirupathi.	Dr. B. RaghuramKadali Assistant Professor Department of Civil Engineering NIT Warangal.	Er. P. Rajesh, Sr. Engineer(P) SDVVL Survey& Constructions, Kakinada	Mr. P. Chakradhar Prasad Asst. Professor Department of Civil Engineering DNR College of Engineering Technology
				P. Rajesh	

Regulation	BR23				
II Year I Semester	Course Code: 23AC3T01	L	T	P	C
		2	0	0	–
Course Title:	ENVIRONMENTAL SCIENCE				

consumers and decomposers – Energy flow in the ecosystem – Ecological succession – Food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the following ecosystem:

a. Forest ecosystem.
b. Grassland ecosystem
c. Desert ecosystem
d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

Biodiversity and Its Conservation: Introduction and Definition: genetic, species and ecosystem diversity – Bio-geographical classification of India – Value of biodiversity: consumptive use, Productive use, social, ethical, aesthetic and option values – Biodiversity at global, National and local levels.

UNIT – III

Environmental Pollution: Definition, Cause, effects and control measures of: Air Pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, Nuclear hazards

UNIT – IV

Social Issues and the Environment: From Unsustainable to Sustainable development – Urban problems related to energy – Water conservation, rain water harvesting, watershed management – Resettlement and rehabilitation of people; its problems and concerns.

Case studies – Environmental ethics: Issues and possible solutions – Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies – Wasteland reclamation. – Consumerism and waste products. – Environment Protection Act. – Air (Prevention and Control of Pollution) Act. – Water (Prevention and control of Pollution) Act – Wildlife Protection Act – Forest Conservation Act – Issues involved in enforcement of environmental legislation – Public awareness.

UNIT – V

Human Population And The Environment: Population growth, variation among nations. Population explosion – Family Welfare Programmes. – Environment and human health – Human Rights – Value Education – HIV/AIDS – Women and Child Welfare – Role of information Technology in Environment and human health.

Ch.Sivanarayana HOD &BOS , Department of Civil Engineering, BVCEC Odalarevu.	Dr.V.Lakshmi, Professor, Department of Civil Engineering UCEK,JNTU Kakinada. (University Nominee)	Dr.A.Murali Krishna, Professor, Department of Civil Engineering, IIT Tirupathi.	Dr. B. RaghuramKadali Assistant Professor Department of Civil Engineering NIT Warangal.	Er. P. Rajesh, Sr. Engineer(P) SDVVL Survey& Constructions, Kakinada	Mr. P. Chakradhar Prasad Asst. Professor Department of Civil Engineering DNR College of Engineering Technology
				P. Rajesh	

BONAMVENKATACHALAMAYYAENGINEERINGCOLLEGE,
ODALAREVU-533 210, Andhra Pradesh, India
Autonomous

Regulation	BR23				
II Year I Semester	Course Code: 23AC3T01	L	T	P	C
		2	0	0	--
Course Title:	ENVIRONMENTAL SCIENCE				

Textbooks:

1. ErachBharucha,Text book of Environmental Studies for Undergraduate Courses,Universities Press (India) Private Limited, 2019.
2. Palaniswamy, Environmental Studies, 2/e, Pearson education, 2014.
3. S.AzeemUnnisa, Environmental Studies, Academic Publishing Company, 2021.
4. K.RaghavanNambiar, "Text book of Environmental Studies for Undergraduate Courses as per UGC model syllabus", SciTech Publications (India), Pvt. Ltd, 2010.

Reference Books:

1. Deeksha Dave and E.Sai Baba Reddy, Textbook of Environmental Science, 2/e, Cengage Publications, 2012.
2. M.Anji Reddy, "Textbook of Environmental Sciences and Technology", BS Publication, 2014.
3. J.P. Sharma, Comprehensive Environmental studies, Laxmi publications, 2006.
4. J. Glynn Henry and Gary W. Heinke, Environmental Sciences and Engineering, Prentice Hall of India Private limited, 1988.
5. G.R. Chatwal, A Text Book of Environmental Studies, Himalaya Publishing House, 2018.
6. Gilbert M. Masters and Wendell P. Ela, Introduction to Environmental Engineering and Science, 1/e, Prentice Hall of India Private limited, 1991.

Online Learning Resources:

- https://onlinecourses.nptel.ac.in/noc23_hs155/preview
- https://www.edx.org/learn/environmental-science/rice-university-ap-r-environmentalscience part-3-pollution-and-resources?index=product&objectID=course-3a6da9f2-d84c-4773-8388-1b2f8f6a75f2&webview=false&campaign=AP%C2%AE+Environmental+Science+-+Part+3%3A+Pollution+and+Resources&source=edX&product_category=course&placement_url=https%3A%2F%2Fwww.edx.org%2Flearn%2Fenvironmental-science
- http://ecoursesonline.iasri.res.in/Courses/Environmental%20Science-I/Data%20Files/pdf/lec07.pdfhttps://www.youtube.com/watch?v=5QxxaVfgQ3k

Ch.Sivanarayana HOD &BOS , Department of Civil Engineering, BVCEC Odalarevu.	Dr.V.Lakshmi, Professor, Department of Civil Engineering UCEK,JNTU Kakinada. (University Nominee)	Dr.A.Murali Krishna, Professor, Department of Civil Engineering, IIT Tirupathi.	Dr. B. RaghuramKadali Assistant Professor Department of Civil Engineering NIT Warangal.	Er. P. Rajesh, Sr. Engineer(P) SDVVL Survey& Constructions, Kakinada	Mr. P. Chakradhar Prasad Asst. Professor Department of Civil Engineering DNR College of Engineering Technology
				P.Rajesh	

II Year-I Semester					
23CS3S02	DATA STRUCTURES USING PYTHON	L	T	P	C
		0	1	2	2

Courese Objectives

- To Introduce the Students about tha concept of Class,Method and DataType in Python
- To understand the concepts of Method overloading and Method overriding in python
- To make the students practice sorting techniques in Python
- To implement and oparate over Data structures in Python
- To practice different searching techniques in Python

List of Experiments:

1.Write a Python program for class, Flower, that has three instance variables of type str, int, and float that respectively represent the name of the flower, its number of petals, and its price. Your class must include a constructor method that initializes each variable to an appropriate value, and your class should include methods for setting the value of each type, and retrieving the value of each type.

2.Develop an inheritance hierarchy based upon a Polygon class that has abstract methods area( ) and perimeter( ). Implement classes Triangle, Quadrilateral, Pentagon, that extend this base class, with the obvious meanings for the area( ) and perimeter( ) methods. Write a simple program that allows users to create polygons of the various types and input their geometric dimensions, and the program then outputs their area and perimeter

3.Write a python program to implement Method Overloading and Method Overriding.

4.Write a Python program to illustrate the following comprehensions: a) List Comprehensions b) 5.Dictionary Comprehensions c) Set Comprehensions d) Generator Comprehensions

6.Write a Python program to generate the combinations of n distinct objects taken from the elements of a given list. Example: Original list: [1, 2, 3, 4, 5, 6, 7, 8, 9] Combinations of 2 distinct objects: [1, 2] [1, 3] [1, 4] [1, 5] [7, 8] [7, 9] [8, 9].

7.Write a program for Linear Search and Binary search.

8.Write a program to implement Bubble Sort and Selection Sort.

Write a program to implement Merge sort and Quick sort.

9.Write a program to implement Stacks and Queues.

10.Write a program to implement Singly Linked List.

11.Write a program to implement Doubly Linked list.

12.Write a program to implement Binary Search Tree.

Course Outcomes:

COs	Statements	BL
CO1	Understand the concepts of Class,Method and DataTypes	BL1
CO2	Differentiate between Method Overloading and Method Overriding	BL2
CO3	Write programme by using the concept of sorting.	BL4
CO4	Operate over different data structures in python.	BL4
CO5	Write programme by using the concept of searching.	BL4

II Year-II Semester					
23ES4T14	LINEAR CONTROL SYSTEMS	L	T	P	C
		3	0	0	3

Course objectives:

- To introduce the concepts of open loop and closed loop systems, mathematical models of mechanical and electrical systems, and concepts of feedback
- To study the characteristics of the given system in terms of the transfer function and introducing various approaches to reduce the overall system for necessary analysis
- To develop the acquaintance in analyzing the system response in time-domain and frequency domain in terms of various performance indices
- To analyze the system in terms of absolute stability and relative stability by different approaches
- To design different control systems for different applications as per givenspecifications
- To introduce the concepts of state variable analysis, design and also the concepts of controllability and observability.

UNIT- I: INTRODUCTION
[10 Hrs]

Concepts of System, Control Systems: Open Loop and closed loop control systems and their differences. Different examples of control systems, Feed-Back Characteristics, Effects of feedback. Mathematical models, Differential equations, Impulse Response and transfer functions. Translational and Rotational mechanical systems

UNIT- II: TRANSFER FUNCTION REPRESENTATION
[10 Hrs]

Transfer Function of DC Servo motor - AC Servo motor- Synchro-transmitter and Receiver, Block diagram representation of systems considering electrical systems as examples –Block diagram algebra– Representation by Signal flow graph-Reduction using mason's gain formula.

TIME RESPONSE ANALYSIS: Standard test signals – Time response of first order systems – Characteristic Equation of Feedback control systems, Transient response of second order systems – Time domain specifications – Steady state response - Steady state errors and error constants.

UNIT-III: STABILITY ANALYSIS IN S-DOMAIN
[10 Hrs]

The concept of stability – Routh's stability criterion – qualitative stability and conditionalstability – limitations of Routh's stability100

Root Locus Technique: The root locus concept - construction of root loci-effects of adding poles and zeros to G(s)H(s) on the root loci.

UNIT- IV: FREQUENCY RESPONSE ANALYSIS
[10Hrs]

Introduction, Correlation between time and frequencyresponse, Polar Plots, Bode Plots, Nyquist Stability Criterion

UNIT-V: CLASSICAL CONTROL DESIGN TECHNIQUES
[10Hrs]

Compensation techniques – Lag, Lead, Lead-Lag Controllers design infrequency Domain, PID

Controllers. State Space Analysis of Continuous Systems Concepts of state, state variables and state model, derivation of state models from block diagrams, Diagonalization- Solving the Time invariant state Equations- State Transition Matrix and it's Properties – Concepts of Controllability and Observability.

TEXT BOOKS:

1. Automatic Control Systems 8th edition– by B.C. Kuo – John wiley and son's, 2003.
2. Control Systems Engineering –by I. J. Nagrath and M. Gopal, New Age International (P) Limited, Publishers, 2nd edition, 2007
3. Modern Control Engineering–by Katsuhiko Ogata–Pearson Publications, 5th edition, 2015.

REFERENCE BOOKS:

1. Control Systems by A. Nagoorkani, RBA publications, 3 edition, 2017.
2. Control Systems by A. Anand kumar, PHI, 2 Edition, 2014.

Online Learning Resources:

- http://nptel.ac.in/courses/108101037/
- http://ocw.mit.edu/courses/aeronautics-and-astronautics/16-30-feedback-control-systems-fall-2010/

Course Outcomes:

COs	Statements	BL
CO1	Understand the concepts of open loop and closed loop systems, mathematical modelsof mechanical and electrical systems, and concepts of feedback	BL2
CO2	Find the transfer function and to design the control system in time-domain	BL1
CO3	Analyze the system in terms of absolute stability and relative stability by different approaches	BL4
CO4	Analyze the system response in frequency domain in terms of various performance indices.	BL4
CO5	Understand the state space approach for the analysis ofcontrol systems	BL2

II Year-II Semester					
23EC4T03	ELECTROMAGNETIC WAVES AND TRANSMISSION LINES	L	T	P	C
		3	0	0	3

Course Objectives:

The main objectives of this course are to:

- Study the equivalent circuit of transmission lines and parameters of the transmissionlines
- Learn the working of smith chart and its usage in the calculation of transmission line parameters
- Understand the fundamentals of electric fields, coulomb's law and gauss law
- Familiar with of Biot-Savart Law, Ampere's Circuital Law and Maxwell equations
- Aware of electromagnetic wave propagation in dielectric and conducting media

UNIT- I: Transmission Lines – I

[8 Hrs] Types, Parameters, T & π Equivalent Circuits, Transmission Line Equations, Primary & Secondary Constants, Expressions for Characteristic Impedance, Propagation Constant, Phase and Group Velocities, Infinite Line, Lossless lines, distortion less lines, Illustrative Problems.

UNIT- II: Transmission Lines – II

[8 Hrs] Input Impedance Relations, Reflection Coefficient, VSWR, Shorted Lines, Open Circuited Lines, and Matched Lines, Low loss radio frequency and UHF Transmission lines, UHF Lines as Circuit Elements, Smith Chart – Construction and Applications, Quarter wave transformer, Single Stub Matching, Illustrative Problems.

UNIT - III: Electrostatics

[12 Hrs] Review of Co-ordinate Systems, Coulomb's Law, Electric Field Intensity, Electric Flux Density, Gauss Law and Applications, Electric Potential, Maxwell's Two Equations for Electrostatic Fields, Energy Density, Illustrative Problems. Convection and Conduction Currents, Dielectric Constant, Poisson's and Laplace's Equations; Capacitance – Parallel Plate, Coaxial Capacitors, Illustrative Problems.

UNIT - IV: Magnetostatics

[10 Hrs]

Biot's-Savart Law, Ampere's Circuital Law and Applications, Magnetic Flux Density, Maxwell's Two Equations for Magnetostatic Fields, Magnetic Scalar and Vector Potentials, Forces due to Magnetic Fields, Ampere's Force Law, Inductances, Magnetic Energy, Illustrative Problems.

Maxwell's Equations (Time Varying Fields): Faraday's Law and Transformer EMF, Inconsistency of Ampere's Law and Displacement Current Density, Maxwell's Equations in Different Final Forms and Word Statements, Conditions at a Boundary Surface, Illustrative Problems.

UNIT- V: EM Wave Characteristics

[12 Hrs] Wave Equations for Conducting and Perfect Dielectric Media, Uniform Plane Waves – Definition, All Relations Between E & H, Sinusoidal Variations, Wave Propagation in Lossy dielectrics, lossless dielectrics, free space, wave propagation in good conductors, skin depth, Polarization & Types, Illustrative Problems. Reflection and Refraction of Plane Waves – Normal and Oblique Incidences, for both Perfect Conductor and Perfect Dielectrics, Brewster Angle, Critical Angle and Total Internal Reflection, Surface Impedance, Poynting Vector and Poynting Theorem, Illustrative Problems.

TEXT BOOKS:

1. Elements of Electromagnetic – Matthew N. O. Sadiku, Oxford University Press, 7th edition, 2018.
2. Electromagnetic Waves and Radiating Systems – E.C. Jordan and K.G. Balmain, PHI, 2nd Edition, 2008.

REFERENCE BOOK:

1. Engineering Electromagnetics – William H. Hayt, John A. Buck, Jaleel M. Akhtar,TMH, 9th edition, 2020.
2. Electromagnetic Field Theory and Transmission Lines –G. S. N. Raju, PearsonEducation 2006
3. Electromagnetic Field Theory and Transmission Lines: G Sasi Bhushana Rao, Wiley India2013.
4. Networks, Lines and Fields John D. Ryder, Second Edition, Pearson Education, 2015.

Online Learning Resources:

- https://www.youtube.com/watch?v=0zWFU0Bvtqg
- https://www.slideshare.net/slideshow/electrostaticscoulombs-law-electric-field-problems/244505962
- https://www.slideshare.net/slideshow/electromagnetic-theory-and-transmission-lines-by-dr-r-prakash-rao/147744274
- https://archive.nptel.ac.in/courses/108/104/108104087/

Course Outcomes:

COs	Statements	BL
CO1	Extract the primary and secondary constants of different types of transmission lines.	BL2
CO2	Derive the expressions for input impedance, reflection coefficient, and VSWR of transmission lines and calculate these parameters using smith chart.	BL3
CO3	Determine electric field intensity using coulomb's law and Gauss law.	BL1
CO4	Determine magnetic field intensity using Biot's-Savarts Law and Ampere's Circuital Law and Maxwell's Equations.	BL1
CO5	Analyze the electromagnetic wave propagation in dielectric and conducting media.	BL4

II Year-II Semester					
23EC4T04	ELECTRONIC CIRCUIT ANALYSIS	L	T	P	C
		3	0	0	3

Course Objectives:

The main objectives of this course are:

- To learn hybrid- π parameters at high frequency and compare with low frequency parameters.
- Learn and understand the purpose of cascading of single stage amplifiers and derivethe overall voltage gain.
- Analyze the effect of negative feedback on amplifier characteristics and derive thecharacteristics.
- Learn and understand the basic principle of oscillator circuits and perform the analysisof different oscillator circuits.
- Compare and analyze different Power amplifiers like Class A, Class B, Class C, ClassAB and other types of amplifiers.
- Analyze different types of tuned amplifier circuits.

UNIT-I : Small Signal High Frequency Transistor Amplifier models
[10 Hrs]

BJT: Transistor at high frequencies, Hybrid- π common emitter transistor model, Hybrid π conductance, Hybrid π capacitances, validity of hybrid π model, determination of high- frequency parameters in terms of low-frequency parameters, CE short circuit current gain, current gain with resistive load, cut-off frequencies, frequency response and gain bandwidth product.

FET: Analysis of common Source and common drain Amplifier circuits at high frequencies.

UNIT-II : Multistage Amplifiers:
[10 Hrs]

Classification of amplifiers, methods of coupling**, c**ascaded transistor amplifier and its analysis, analysis of two stage RC coupled amplifier, high input resistance transistor amplifier circuits and their analysis-Darlington pair amplifier, Cascode amplifier, Boot-strap emitter follower, Differential amplifier using BJT.

UNIT-III: Feedback Amplifiers
[10 Hrs]

Feedback principle and concept, types of feedback, classification of amplifiers, feedback topologies, Characteristics of negative feedback amplifiers, Generalized analysis of feedback amplifiers, Performance comparison of feedback amplifiers, Method of analysis of feedback amplifiers.

Unit-IV: Oscillators
[10 Hrs]

Oscillator principle, condition for oscillations, types of oscillators, RC- phase shift and Wien bridge oscillators with BJT and FET and their analysis, Generalized analysis of LC Oscillators, Hartley and Colpitt's oscillators using BJT, Frequency and amplitude stability of oscillators.

UNIT-V : Power Amplifiers
[10 Hrs]

Classification of amplifiers (A to H), Class A power Amplifiers, Distortions in Amplifiers, Class B Push-pull amplifiers, Complementary symmetry push pull amplifier, Class AB power amplifier, Class-C

power amplifier, Thermal stability and Heat sinks.

Tuned Amplifiers: Introduction, Q-Factor, small signal tuned amplifier, capacitance single tuned amplifier, double tuned amplifiers,Staggered tuned amplifiers

Text Books:

1. Integrated Electronics- J. Millman and C. C. Halkias, Tata McGraw-Hill, 1972.
2. Electronic Devices and Circuits Theory –Robert L. Boylestad and Louis Nashelsky,Pearson/ Prentice Hall, Tenth Edition, 2009.
3. Electronic Devices and Integrated Circuits – B.P. Singh, Rekha, Pearson publications,2006

References:

1. Electronic Circuit Analysis and Design –Donald A.Neaman, McGrawHill, 2010.
2. Micro electronic Circuits-Sedra A.S. and K.C. Smith, Oxford University Press, SixthEdition, 2011.
3. Electronic Circuit Analysis-B. V. Rao, K. R. Rajeswari, P. C. R. Pantulu, K. B. R. Murthy,Pearson Publications.

Online Learning Resources:

- https://nptel.ac.in/courses/117/103/117103063/
- https://nptel.ac.in/courses/108/108/108108122/

Course Outcomes:

COs	Statements	BL
CO1	Design and analysis of small signal high frequency transistor amplifier using BJT and FET.	BL4
CO2	Design and analysis of multistage amplifiers using BJT and FET and Differentialamplifier using BJT.	BL3
CO3	Derive the expressions for frequency of oscillation and condition for oscillation of RCand LC oscillators and their amplitude and frequency stability concept.	BL3
CO4	Know the classification of the power amplifiers and their analysis withperformance comparison	BL3
CO5	Know the classification of the tuned amplifiers and their analysis withperformance comparison	BL3

II Year-II Semester					
23EC4T05	ANALOG COMMUNICATIONS	L	T	P	C
		3	0	0	3

Course Objectives:

The main objectives of this course are to

- Learn and understand the concept of Modulation and Demodulation of standard AM.
- Learn about the generation and detection of Angle Modulated waves.
- Develop an ability to classify and understand various functional blocks of radio transmitters and receivers.
- Familiarise with basic techniques for generating and demodulating various pulse modulated signals.

UNIT– I : Amplitude Modulation
[10 Hrs]

Introduction to communication system, Need for modulation, Frequency Division Multiplexing, Amplitude Modulation, Time domain and Frequency domain descriptions, Single tone modulation, Power relations in AM waves, Generation of AM waves: Square law Modulator, Switching modulator, Detection of AM Waves: Square law detector, Envelope detector, Related problems.

UNIT– II : DSB & SSB Modulation
[10 Hrs]

Double sideband suppressed carrier modulator: Time domain and frequency domain description, Generation of DSBSC Waves: Balanced Modulator, Ring Modulator, Detection of DSBSC Waves: Coherent detection, Quadrature Null Effect, COSTAS Loop, Squaring Loop.

Single sideband suppressed carrier modulator: Time domain and Frequency domain description, Generation of SSBSC Waves: Frequency discrimination method, Phase discrimination method, Demodulation of SSB Waves: Coherent Detection.

Vestigial sideband modulation: Time domain description, Frequency domain description, Generation of VSB Modulated wave, Envelope detection of a VSB Wave pulse Carrier, Comparison of different AM Techniques, Applications of different AM Systems, Related problems.

UNIT– III :Angle Modulation
[10 Hrs]

Introduction, Basic concept of phase modulation, Frequency Modulation: Single tone frequency modulation, Spectrum Analysis of Sinusoidal FM Wave, Narrow band FM, Wide band FM, Constant Average Power, Transmission bandwidth of FM Wave, Generation of FM Waves: Direct Method, Indirect Method, Detection of FM Waves: Balanced Frequency discriminator, Zero crossing detector, Phase locked loop, Comparison of FM & AM, Related problems.

UNIT– IV :Radio Transmitters
[10 Hrs]

Classification of Transmitters, AM Transmitter, Effect of feedback on performance of AM Transmitter, FM Transmitter: Variable reactance type and Phase modulated FM Transmitter, Frequency stability in FM Transmitter.

Radio Receivers: Receiver Types: Tuned radio frequency receiver, Super heterodyne receiver, RF section and Characteristics, Frequency changing and tracking, Intermediate frequency, AGC, FM Receiver, Amplitude limiting, Comparison of FM & AM Receivers, Communication Receivers,

Extension of super heterodyne principle and additional circuits.

UNIT– V :Noise
[10 Hrs]

Review of noise and noise sources, Noise figure, Noise in Analog communication Systems: Noise in DSB & SSB Systems, Noise in AM System and Noise in Angle Modulation Systems, Threshold effect in Angle Modulation System, Pre-emphasis & De-emphasis.

Pulse Analog Modulation: Types of Pulse modulation, PAM (Single polarity, double polarity), PWM: Generation & Detection of PWM, PPM: Generation and Detection of PPM, Time Division Multiplexing, TDM Vs FDM.

Text Books:

1. Communication Systems, Simon Haykin, Michael Moher, Wiley, 5th Edition, 2009.
2. Principles of Communication Systems, H Taub, D L Schilling, Gautam Sahe, TMH, 4th Edition,2017.
3. Modern Digital and Analog Communication Systems, B.P.Lathi, Zhi Ding, Hari Mohan Gupta,Oxford University Press, 4th Edition, 2017.

Reference Books:

1. Electronics & Communication Systems, George Kennedy, Bernard Davis, S R M Prasanna, TMH, 6th Edition, 2017.
2. Communication Systems, R P Singh, S D Sapre, TMH, 3nd Edition, 2017.
3. Communication Systems (Analog and Digital), Dr. Sanjay Sharma, Katson Books, 7th ReprintEdition, 2018

Online Learning Resources:

- http://nptel.ac.in/courses/117102059/ Prof. Surendra Prasad.
- https://ict.iitk.ac.in/wp-content/uploads/EE320A-Principles-Of-Communication- Communication Systems-4ed-Haykin.pdf.
- https://www.scribd.com/document/266137872/sanjay-sharma-pdf.
- http://bayanbox.ir/view/914409083519889086/Book-Modern-Digital-And-Analog Communication- Systems-4th-edition-by-Lathi.pdf.
- https://soaneemrana.org/onewebmedia/ELECTRONICS%20COMMUNICATION%20SYSTEM%20 BY%20GEORGE%20KENNEDY.pdf

Course Outcomes:

COs	Statements	BL
CO1	Describe the Modulation and Demodulation techniques of standard AM.	BL1
CO2	Compare different types of Amplitude Modulation and Demodulation techniques.	BL2
CO3	Analyze the concepts of generation and detection of Angle Modulated signals.	BL3
CO4	Interpret the Radio Transmitters and Receivers.	BL2
CO5	Illustrate the noise performance in Analog Modulation techniques and also the concepts ofPulse Analog Modulation and Demodulation techniques	BL4

II Year-II Semester					
23ES4L06	DESIGN THINKING & INNOVATION	L	T	P	C
		1	0	2	2

Course Objectives:

The objectives of the course are to

- Bring awareness on innovative design and new product development.
- Explain the basics of design thinking.
- Familiarize the role of reverse engineering in product development.
- Train how to identify the needs of society and convert into demand.
- Introduce product planning and product development process.

UNIT – I : Introduction to Design Thinking

Introduction to elements and principles of Design, basics of design-dot, line, shape, form as fundamental design components. Principles of design. Introduction to design thinking, history of Design Thinking, New materials in Industry.

UNIT – II: Design Thinking Process

Design thinking process (empathize, analyze, idea & prototype), implementing the process in driving inventions, design thinking in social innovations. Tools of design thinking - person, costumer, journey map, brainstorming, product development

Activity: Every student presents their idea in three minutes, Every student can present design process in the form of flow diagram or flow chart etc. Every student should explain about product development.

UNIT – III: Innovation

Art of innovation, Difference between innovation and creativity, role of creativity and innovation in organizations. Creativity to Innovation. Teams for innovation, Measuring the impact and value of creativity.

Activity: Debate on innovation and creativity, Flow and planning from idea to innovation, Debate on value-based innovation.

UNIT – IV: Product Design

Problem formation, introduction to product design, Product strategies, Product value, Product planning, product specifications. Innovation towards product design Case studies.

Activity: Importance of modeling, how to set specifications, Explaining their own product design.

UNIT – V: Design Thinking in Business Processes

Design Thinking applied in Business & Strategic Innovation, Design Thinking principles that redefine business – Business challenges: Growth, Predictability, Change, Maintaining Relevance, Extreme competition, Standardization. Design thinking to meet corporate needs. Design thinking for Startups. Defining and testing Business Models and Business Cases. Developing & testing prototypes.

Activity: How to market our own product, about maintenance, Reliability and plan for startup.

Textbooks:

1. Tim Brown, Change by design, 1/e, Harper Bollins, 2009.
2. Idris Mootee, Design Thinking for Strategic Innovation, 1/e, Adams Media, 2014.

Reference Books:

1. David Lee, Design Thinking in the Classroom, Ulysses press, 2018.
2. Shrrutin N Shetty, Design the Future, 1/e, Norton Press, 2018.
3. William lidwell, Kritinaholden, &Jill butter, Universal principles of design, 2/e,Rockport Publishers, 2010.
4. Chesbrough.H, The era of open innovation, 2003.

Online Learning Resources:

- https://nptel.ac.in/courses/110/106/110106124/
- https://nptel.ac.in/courses/109/104/109104109/
- https://swayam.gov.in/nd1_noc19_mg60/preview
- https://onlinecourses.nptel.ac.in/noc22_de16/preview

Course Outcomes:

COs	Statements	BL
CO1	Define the concepts related to design thinking.	BL1
CO2	Explain the fundamentals of Design Thinking and innovation.	BL2
CO3	Apply the design thinking techniques for solving problems in various sectors.	BL3
CO4	Analyse to work in a multidisciplinary environment.	BL4
CO5	Evaluate the value of creativity.	BL5

II Year-II Semester					
23EC4L03	SIGNALS AND SYSTEMS LAB	L	T	P	C
		0	0	3	1.5

Course Objectives:

- Introduce the basics of MATLAB
- Understand the time domain and frequency domain signals.
- Understand the concept of Fourier ,Laplace and Z- Transforms.
- Understand the concept of Correlation and convolution.
- Understand the concept of Frequency Spectrum.

List of Experiments: (Minimum of Ten Experiments has to be performed)

1. Generation of Basic Signals (Analog and Discrete)
   a. Unit step b. Unit impulse c. Unit Ramp d. Sinusoidal e. Signum
2. Operations on signals
   a. Addition & Subtraction b. Multiplication & Division c. Maximum & minimum
3. Energy and power of signals , even and odd signals
4. Transformation of the independent variable
5. Shifting (Delay & Advance)
6. Reversing
7. Scaling
8. Convolution & Deconvolution
9. Correlation
10. Fourier Series Representation
11. Fourier Transform and Analysis of Fourier Spectrum
12. Laplace Transforms
13. Z-Transforms

Equipment required: Software:

i. MATLAB Tools.

ii. Computer Systems with required specifications

Note: Students supposed to do an Experiment beyond the Syllabus / Lab oriented mini-Project / Case Study and submit it for internal Evaluation.

Course Outcomes:

COs	Statements	BL
CO1	Understand the basics operation of MATLAB	BL2
CO2	Analysis the time domain and frequency domain signals	BL4
CO3	Implement the concept of Fourier series ,Fourier transforms, Laplace transforms and Z-transforms	BL4
CO4	Find cross correlation, autocorrelation of sequence & impulse response, step response of a system	BL3
CO5	Design frequency response of the system	BL4

II Year-II Semester					
23EC4L04	ELECTRONIC CIRCUIT ANALYSIS LAB	L	T	P	C
		0	0	3	1.5

Course Objectives:

- To prepare students to perform the analysis of any Analog electronics circuit.
- To empower students to understand the design and working of BJT / FET amplifiers, oscillators.
- To evaluate the use of computer based analysis tools to review performance of semiconductor device circuits.
- Model the electronic circuits using tools such as SPICE and Multisim.

Note: The students are required to design the circuit and perform the simulation using Multisim/ Equivalent Industrial Standard Licensed simulation software tool**.** Further they are required to verify the result using necessary hardware equipment.

List of Experiments: (Minimum of Ten Experiments has to be performed)

1. Determination of Ft of a given transistor.
2. Voltage-Series Feedback Amplifier
3. Current-Shunt Feedback Amplifier
4. RC Phase Shift/Wien Bridge Oscillator
5. Hartley/Colpitt's Oscillator
6. Two Stage RC Coupled Amplifier
7. Darlington Pair Amplifier
8. Boots trapped Emitter Follower
9. Class A Series-fed Power Amplifier
10. Transformer-coupled Class A Power Amplifier
11. Class B Push-Pull Power Amplifier
12. Complementary Symmetry Class B Push-Pull Power Amplifier
13. Single Tuned Voltage Amplifier
14. Double Tuned Voltage Amplifier

Equipment required: Software:

i. Multisim/Equivalent Industrial Standard Licensed simulation software tool.
ii. Computer Systems with required specifications

Hardware Required:

1. Regulated Power supplies
2. Analog/Digital Storage Oscilloscopes
3. Analog/Digital Function Generators
4. Digital Multimeters
5. Decade Resistance Boxes/Rheostats
6. Decade Capacitance Boxes

7. Ammeters (Analog or Digital)
8. Voltmeters (Analog or Digital)
9. Active & Passive Electronic Components

Note: Students supposed to do an Experiment beyond the Syllabus / Lab oriented mini-Project / Case Study and submit it for internal Evaluation.

Course Outcomes:

COs	Statements	BL
CO1	Apply the concepts of amplifier analysis to verify their characteristics and measure the important parameters.	BL3
CO2	Analyze the performance of power amplifiers.	BL4
CO3	Analyze the frequency response and characteristics of amplifiers.	BL4
CO4	Simulation and Design of different amplifiers and oscillator circuits.	BL4

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