PRASAD V POTLURI

SIDDHARTHA INSTITUTE OF TECHNOLOGY

(Autonomous)

ACADEMIC RULES & REGULATIONS (PVP23)
and
I Year B.Tech. Course Structure, Syllabus

Applicable for the batch of students admitted from the Academic Year 2023-2024

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

PRASAD V. POTLURI

SIDDHARTHA INSTITUTE OF TECHNOLOGY

(Autonomous)

AICTE approved, NBA & NAAC A^{+} Accredited,
An ISO 9001:2015 certified Institution
Permanently Affiliated to Jawaharlal Nehru Technological University, Kakinada
Kanuru, Vijayawada -520 007, Andhra Pradesh
Phone:0866 2581699
E-Mail: principal@pvpsiddhartha.ac.in
https://www.pvpsiddhartha.ac.in

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PREFACE

PVP Siddhartha Institute of technology, established in 1998, is one of the seventeen educational institutions sponsored and run by Siddhartha Academy of General & Technical Education. The 250 members of the Academy are a group of industrialists, educationists, auditors and philanthropists with vast experience in their respective fields and above all with an ardent desire to spread quality Education. All the academic organizations of Siddhartha Academy stand symbolic of the pragmatic vision of its founders. PVP Siddhartha Institute of Technology has the advantage of inheriting the higher academic standards. The college is approved by AICTE and is permanently affiliated to JNTUK. It is certified by ISO 9001-2015 for its quality standards. The institute is accredited by NAAC with A^+ grade. The college was conferred autonomous status in 2012. The UG programs-CE,EEE,ME,ECE,CSE & IT are accredited by the National Board of Accreditation. Courses in CSM and CSD are also offered.

The curriculum is revised periodically to address the challenges of industry and academia and to foster the global competencies among the students. The curriculum has been revised five times since 2012. The present curriculum(PVP23) is designed incorporating the features such as outcome based approach, encouraging self-learning through MOOCs platforms i.e., Swayam, COURSERA, EDX, NPTEL, etc., transformation of creative ideas into a prototype through Internship & Project, enhancing depth & breadth by introducing open electives in core and multi-disciplinary areas, offering courses by industry experts to improve Industry Institute Interaction in addition to internships at industry and introduction of value added courses to enhance employability skills of students.

Institute Vision

To provide rich ambience for Academic and Professional Excellence, Research, Employability skills, Entrepreneurship and Social responsibility.

Institute Mission

To empower the students with Technical knowledge, Awareness of up-to-date technical trends, Inclination for research in the areas of human needs, Capacity building for Employment / Entrepreneurship, Application of technology for societal needs.

Quality Policy

At PVPSIT, We commit ourselves to offer Quality professional education in engineering & Management by adhering to applicable statutory and regulatory requirements and through continuous improvement in the Quality of our services by,

- Regular up gradation of knowledge and skills of faculty
- Improving the teaching methods and strategies
- Providing state of art infrastructure
- Recruiting competent faculty and maintaining prescribed Teacher Student ratio
- Improving the employability of students
- Enhanced Collaboration with industry and institutions of National Repute

DEPARTMENT OF

ELECTRICAL AND ELECTRONICS ENGINEERING

DEPARTMENT VISION

To mould young and fresh minds into well disciplined and competent engineers to excel in the field of Electrical & Electronics Engineering to cater the industrial /societal needs and compete at global level.

DEPARTMENT MISSION

- To produce competent and quality technical professionals with strong basics of electrical engineering principles and techniques

- To facilitate the students to work with modern tools, state of art technologies, innovative research capabilities besides inculcating leadership abilities and ethical values.

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PROGRAM EDUCATIONAL OBJECTIVES	
PEO	**STATEMENTS**
PEO I	Have a strong foundation in engineering fundamentals, mathematics, basic sciences, humanities and modern software tools with ability to apply them to conceive, analyze, design and implement solutions to problems in electrical engineering field.
PEO II	Have a broad based background to practice electrical engineering in the areas of control systems, machines, measurements, power systems, power electronics and their applications in industry and government sectors meeting the growing expectations of stake holders.
PEO III	Have requisite skills to excel in a multidisciplinary engineering environment with awareness of contemporary issues, professional responsibility, impact of technology on society, and the need for life-long learning.
PEO IV	Have an ability to pursue higher studies to meet the needs of global standards and participate in team oriented, open ended activities both as team members and as leaders with professional communication skills to compete in global scenario.

PROGRAM OUTCOMES (PO's)	
PO 1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	**Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO 3	**Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO 4	**Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO 5	**Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO 6	**The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO 7	**Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO 8	**Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	**Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO1 0	**Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO 11	**Project management and finance**: Demonstrate knowledge and Understanding of the engineering and management principles and apply these to ones own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO 12	**Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES (PSOs)	
PSO1	Apply the allied engineering knowledge, technical skills to analyze and solve the challenges in electrical and electronics engineering.
PSO2	Demonstrate the technical competence in development of innovative and environmental conscious technologies for industry and societal needs.

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- Improving the teaching methods and strategies
- Providing state of art infrastructure
- Recruiting competent faculty and maintaining prescribed Teacher Student ratio
- Improving the employability of students
- Enhanced Collaboration with industry and institutions of National Repute

CONTENTS

Course Structure and Syllabus

ACADEMIC REGULATIONS (PVP23) FOR B. TECH (REGULAR/HONORS)

(Effective for the students admitted into I year fromthe 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 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 additional 15 credits fulfilling all the requisites of a B.Tech. program i.e., 160 credits.

(ii) Registering for Honors is optional.

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

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. course 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 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. Government/University or any other order of merit approved by the A.P. Government/University, subject to reservations as prescribed by the 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 hoursof instruction required per week.

One credit is equivalent to one hour of teaching (Lecture/Tutorial) or two hours of practical work/field work per week.

Credit Definition:

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

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

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

5. Semester/Credits:

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

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

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

6. 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 (SEC)	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 Courses (PC) Core	Includes subjects related to the parent discipline/department/branch of Engineering
3.	Elective Courses	Professional Elective Courses (PE)	Includes elective subjects related to the parent discipline/department/ branch of Engineering
		Open Elective Courses (OE)	Elective subjects which include interdisciplinary subjects or subjects in an area outside the parent discipline/ department/ branch of Engineering
		Domain specific skill enhancement courses (SEC)	interdisciplinary/job-oriented/domain courses which are relevant to the industry
4.	Project & Internships	Project Internships	B.Tech. Project or Major Project 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 of B. Tech (Regular/Honors) Programme is four academic years.

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

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

iv. There shall be mandatory student induction program for 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 /NSS /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 skills related to the domain/interdisciplinary courses and the other shall be a soft skills course.

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

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

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

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

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

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

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 examinations 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 institution on the day of subjective paper test.

- Assignments shall be in the form of problems, mini projects, design problems, slip tests, quizzes etc., depending on the course content. It should be continuous assessment throughout the semester and the average marks shall be considered.

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.
iv) 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.
v) 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**

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

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

c) The end examination shall be evaluated for 70 marks, conducted by the concerned laboratory teacher and a senior expert in the subject from the same department.

- Procedure: 20 marks
- Experimental work & Results: 30 marks
- Viva voce: 20 marks.

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

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

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

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

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

f) The laboratory records and mid semester test papers shall be preserved for a minimum of 3 years in the respective institutions as per the University norms and shall be produced to the Committees of the University 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 University at the beginning of the semester. The principal of the respective college shall forward such proposals to the University 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 University.

11. Massive Open Online Courses (MOOCs):

A Student has to pursue and complete one course compulsorily through MOOCs approved by the University. 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 MOOC s 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 university.

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

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, the University 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 University 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 institution, it is mandatory for the student to share necessary information with the department.

iii) Credit transfer policy will be applicable to the Professional & Open Elective courses only.

iv) The concerned department shall identify the courses permitted for credit transfer.

v) The University/institution shall notify at the beginning of semester the list of the online learning courses eligible for credit transfer.

vi) The institution shall designate a faculty member as a Mentor for each course to guide the students from registration till completion of the credit course.

vii) The university shall ensure no overlap of MOOC exams with that of the university examination schedule. In case of delay in results, the university will re-issue the marks sheet for such students.

viii) Student pursuing courses under MOOCs shall acquire the required credits only after successful completion of the course and submitting a certificate issued by the competent authority along with the percentage of marks and grades.

ix) The institution shall submit the following to the examination section of the university:

a) List of students who have passed MOOC courses in the current semester along with the certificate of completion.

b) Undertaking form filled by the students for credit transfer.

x) The universities shall resolve any issues that may arise in the implementation of this policy from time to time and shall review its credit transfer policy in the light of periodic changes brought by UGC, SWAYAM, NPTEL and state government.

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

13. Academic Bank of Credits (ABC)

The University 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 / University 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 University.

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

Note: A total of 4 (Four) 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 concerned Principal of the college shall arrange separate class work and timetable of the courses offered under Honors program.

v) Courses that are used to fulfill the student's primary major may not be double counted towards the Honors. Courses with content substantially equivalent to courses in the student's primary Major may not be counted towards the Honors.

vi) Students can complete the courses offered under Honors either in the college or in online platforms like SWAYAM with a minimum duration of 12 weeks for a 3-credit course and 8 weeks duration for a 2-credit course satisfying the criteria for credit mobility. If the courses under Honors are offered in conventional mode, then the teaching and evaluation procedure shall be similar to regular B. Tech courses.

vii) The attendance for the registered courses under Honors and regular courses offered for Major degree in a semester are to be considered separately.

viii) A student shall maintain an attendance of 75% in all registered courses under 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 7.0 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 Head of the Department (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 the respective institutions.

17. Attendance Requirements:

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

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

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

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 16.

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

$$SGPA = \Sigma (Ci \times Gi)/\Sigma Ci$$

where, Ci is the number of credits of the ith subject and Gi is the grade point scored by the student in the ith 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.,

$$CGPA = \Sigma (Ci \times Si)/ \Sigma Ci$$

where "Si" is the SGPA of the ith semester and Ci is the total numberof 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 university 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 Universities shall resolve any issues that may arise in the implementation of Multiple Entry and Exit policies from time to time and shall review the policies in the light of periodic changes brought by UGC, AICTE and State government.

22. Gap Year Concept:

Gap year concept for Student Entrepreneur in Residence is introduced and outstanding students who wish to pursue entrepreneurship / become entrepreneur are allowed to take a break of one year at any time after II year to pursue full-time entrepreneurship programme /to establish startups. This period may be extended to two years at the most and these two years would not be counted for the time for the maximum time for graduation. The principal of the respective college shall forward such proposals submitted by the students to the University. An evaluation committee constituted by the University 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 fulfillment of academic regulations. Candidates who have been detained for want of attendance or not fulfilled academic requirements or who have failed after having undergone the course in earlier regulations or have discontinued and wish to continue the course are eligible for admission into the unfinished semester from the date of commencement of class work with the same or equivalent subjects as and when subjects are offered, subject to Section 2 and they will follow the academic

regulations into which they are readmitted.

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

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 Universities from time to time.

27. General Instructions:

i. The academic regulations should be read as a whole for purpose of any interpretation.
ii. Malpractices rules-nature and punishments are appended.
iii. Where the words "he", "him", "his", occur in the regulations, they also include "she", "her", "hers", respectively.
iv. The Universities may change or amend the academic regulations or syllabi at any time and the changes or amendments shall be made applicable to all the students on rolls with effect from the dates notified by the Universities.
v. The Universities should train its faculty members time to time to provide experiential education to the students.
vi. The Universities are suggested to form industry consortium for various disciplines of engineering and explore the possibility of including their skilling programs as credit courses.
vii. The Universities should collaborate with Industries/Govt. Institutions in establishing Centers of Excellence (CoEs) in potential areas with exponential growth.
viii. In the case of any doubt or ambiguity in the interpretation of the guidelines given, the decision of the Vice-Chancellor / Head of the institution is final.

ACADEMIC REGULATIONS (PVP23) FOR B.TECH. (LATERAL ENTRY SCHEME)

(Effective for the students getting admitted into II year through Lateral Entry Scheme from the Academic Year 2024-2025 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 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 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 fulfill the requirement for the award of the degree within six consecutive academic years from the year of admission, shall forfeit their seat.

3. Minimum Academic Requirements

The following academic requirements have to be satisfied in addition to the requirements mentioned in item no.**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 fulfillment of academic regulations, the student shall be in the academic regulations into which he/she is readmitted.

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

I B.Tech.
COURSE STRUCTURE

Prasad V. Potluri Siddhartha Institute of Technology (Autonomous)

Approved by AICTE and Affiliated to
JNTUK Accredited by NAAC : A+
All UG programs accredited by NBA, ISO 9001-2015 Certified Institute
Vijayawada, Andhra Pradesh, India.

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

PVP23 COURSE STRUCTURE

I B.TECH – I – SEMESTER

S.No.	Course Code	Course Title	C	L	T	P	Internals	Externals	Total
1	23HS1101	Communicative English	2	2	0	0	30	70	100
2	23BS1101	Linear Algebra and Calculus	3	3	0	0	30	70	100
3	23BS1102	Chemistry	3	3	0	0	30	70	100
4	23ES1101	Basic civil and mechanical Engineering	3	3	0	0	30	70	100
5	23ES1102	Introduction to programming	3	3	0	0	30	70	100
6	23HS1151	Communicative English Lab	1	0	0	2	30	70	100
7	23BS1151	Chemistry Lab	1	0	0	2	30	70	100
8	23ES1151	Engineering Workshop	1.5	0	0	3	30	70	100
9	23ES1152	Computer programming lab	1.5	0	0	3	30	70	100
10	23MC1142	Health and Wellness, Yoga and Sports	0.5	0	0	1	100	0	100
TOTAL			19.5	14	0	11	370	630	1000

I B.TECH - II- SEMESTER

S.No.	Course Code	Course Title	C	L	T	P	Internals	Externals	Total
1	23BS1201	Differential Equations and Vector Calculus	3	3	0	0	30	70	100
2	23BS1203	Engineering Physics	3	3	0	0	30	70	100
3	23ES1202	Basic Electrical and Electronics Engineering	3	3	0	0	30	70	100
4	23ES1203	Engineering Graphics	3	1	0	4	30	70	100
5	23EE3201	Electrical circuit analysis-I	3	3	0	0	30	70	100
6	23BS1252	Engineering Physics Lab	1	0	0	2	30	70	100
7	23ES1252	IT Workshop	1	0	0	2	30	70	100
8	23ES1253	Electrical and Electronics engineering workshop	1.5	0	0	3	30	70	100
9	23EC3251	Electrical circuit analysis-I lab	1.5	0	0	3	30	70	100
10	23MC1241	NSS/NCC/SCOUTS and Guides/Community service	0.5	0	0	1	100	0	100
TOTAL			20.5	13	0	15	370	630	1000

COMMUNICATIVE ENGLISH

Course Code	23HS1101	Year	I	Semester	I
Course Category	Humanities	Branch	EEE	Course Type	Theory
Credits	2	L-T-P	2-0-0	Prerequisites	-----
Continuous Internal Evaluation:	30	Semester End Evaluation:	70	Total Marks:	100

Course Outcomes	
Upon successful completion of the course, the student will be able to	
CO1	Interpret the text and use grammar, vocabulary to enhance LSRW skills(L2)
CO2	Apply grammatical structures and use of a wide range of vocabulary in thematic concepts(L3)
CO3	Acquire the ability to prepare resumes and official letters(L3)
CO4	Frame a coherent Paragraph, Essay and prepare note making(L4)
CO5	Examine the text/ graphical elements for global comprehension and data interpretation(L4)

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3:Substantial,2:Moderate,1:Slight)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1									2	2		2		
CO2									3	3		3		
CO3									3	3		3		
CO4									3	3		3		
CO5									3	3		3		
AVG									3	3		3		

SYLLABUS

Unit No.	Contents	Mapped CO
I	**Lesson: HUMANVALUES:** 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	**CO1,2**

	information. **Writing:** Paragraph writing, Punctuation. **Grammar:** Parts of Speech, Basic Sentence Structures-forming questions **Vocabulary:** Synonyms	
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. **Writing:** Note making. **Grammar:** use of articles and zero article, prepositions **Vocabulary:** Antonyms	**CO1,2,4**
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:** paraphrasing **Grammar:** subject-verb agreement **Vocabulary:** Prefixes & Suffixes	**CO1,2,5**
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 Englishin academic contexts (forma land informal)-asking for and giving information/ directions. **Reading:** Studying the use of graphic elements in texts to convey information, reveal trends/ patterns/ relationships, communicate processes or display complicated data. **Writing:** Letter Writing: Official Letters **Grammar:** Reporting verbs and Tenses **Vocabulary:** Root words.	**CO1,2,3,5**
V	**Lesson:** **MOTIVATION:** The Power of Intrapersonal Communication (An Essay)	**CO1,2,3,4**

	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, cover letter and resume. **Grammar:** Editing short texts–identifying and correcting common errors in grammar and usage (articles, prepositions, tenses, subject verb agreement) **Vocabulary:** One word substitutes.	

Learning Resources
Text Books:
1. Pathfinder: Communicative English for Undergraduate Students, 1stEdition, Orient Black Swan, 2023.
Reference Books:
1. Dubey, ShamJi &Co. English for Engineers,Vikas Publishers, 2020 2. Bailey,Stephen. Academic writing: A Handbook for International Students. Routledge, 2014. 3. Murphy, Raymond. English Grammarian Use, Fourth Edition, Cambridge University Press, 2019. 4. Lewis, Norman. Word Power Made Easy-The Complete Hand book for Building a Superior Vocabulary. Anchor, 2014.
E-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

LINEAR ALGEBRA & CALCULUS

Course Code	23BS1101	**Year**	I	**Semester**	I
Course Category	Basic Science	**Branch**	EEE	**Course Type**	Theory
Credits	3	**L-T-P**	3-0-0	**Prerequisites**	NIL
Continuous Internal Evaluation:	30	**Semester End Evaluation:**	70	**Total Marks:**	100

Course Outcomes	
Upon successful completion of the course, the student will be able to	
CO1	**Interpret** the basic concepts of Linear algebra and Calculus.(L2)
CO2	**Apply** the echelon form to obtain the solution of system of linear equations and eigen vectors of a matrix.(L3)
CO3	**Apply** the concepts of calculus to find the series expansion and extremum of a given function, area enclosed by plane curves and volume of the solids.(L3)
CO4	**Analyze** the solution set of linear system of equations and nature of the quadratic forms. (L4)
CO5	**Analyze** the behavior of functions using mean value theorems, extremum of the given function and limits of integration for functions of several variables.(L4)
CO6	**Submit a report** by solving the given problems using the concepts of Linear algebra and Calculus.

Contribution of Course Outcomes towards achievement of Program Outcomes &Strength of correlations (3:High, 2: Medium, 1:Low)

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	2												1	
CO2	3												1	
CO3	3												1	
CO4		3											1	
CO5		3											1	
CO6									3	3		3	1	

SYLLABUS		
Unit No.	**Contents**	**Mapped CO**
I	**Matrices** Rank of a matrix by echelon form, normal form. Cauchy–Binet formulae (without proof).Inverse of Non- singular matrices by Gauss-Jordan method, System of linear equations: Solving system of Homogeneous and Non-Homogeneous equations by Gauss elimination method, Jacobi and Gauss Seidel Iteration Methods.	**CO1, CO2, CO4, CO6**
II	**Eigen values, Eigen vectors and Orthogonal Transformation** Eigen values, Eigen vectors and their properties, Diagonalization of a matrix, Cayley-Hamilton Theorem(without proof), finding inverse and power of a matrix by Cayley-Hamilton Theorem, Quadratic forms and Nature of the Quadratic Forms, Reduction of Quadratic form to canonical forms by Orthogonal Transformation.	**CO1, CO2, CO4, CO6**
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 and applications on the above theorems.	**CO1, CO3, CO5, CO6**
IV	**Partial differentiation and Applications (Multivariable calculus)** Functions of several variables: Continuity and Differentiability, Partial derivatives, total derivatives, 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.	**CO1, CO3, CO5, CO6**
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).	**CO1, CO3, CO5, CO6**

Learning Resources
Text Books:
1. Higher Engineering Mathematics, B.S.Grewal, Khanna Publishers, 2017, 44th Edition 2. Advanced Engineering Mathematics, Erwin Kreyszig, John Wiley & Sons, 2018,10 th Edition.
Reference Books:
1. Thomas Calculus, George B. Thomas, Maurice D. Weir and Joel Hass, Pearson Publishers, 2018, 14th Edition. 2. Advanced Engineering Mathematics, R.K.Jain and S. R.K.Iyengar, Alpha Science International Ltd., 2021 5th Edition (9threprint). 3. Advanced Modern Engineering Mathematics, Glyn James, Pearson publishers, 2018, 5th Edition. 4. Advanced Engineering Mathematics, Micheael Greenberg, Pearson publishers, 9th edition 5. Higher Engineering Mathematics, H.K Das, Er.Rajnish Verma, S.Chand Publications, 2014, Third Edition (Reprint2021).
E-Resources: **1.** https://nptel.ac.in/courses/111/108/111108157/ 2. https://youtu.be/xDSejIvZmg4 **3. https://nptel.ac.in/courses/111104125**

CHEMISTRY

Course Code	23BS1102	Year	I	Semester	I
Course Category	Basic Sciences	Branch	EEE	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	Nil
Continuous Internal Evaluation:	30	Semester End Evaluation:	70	Total Marks:	100

Course Outcomes	
Upon successful completion of the course, the student will be able to	
CO1	Interpret fundamental concepts of chemistry. L2
CO 2	Apply knowledge of quantum mechanics, materials and energy sources to describe and solve problems. L3
CO3	Utilize knowledge of conducting polymers and instrumentation to design and develop new materials.L3
CO4	Analyze bonding models, Modern engineering materials, and electrochemical processes to make informed decisions L4
CO5	Assume the concept of polymers and instrumentation methods and their respective applications to design and develop new products. L4
CO6	Communicate concepts and technologies related to chemistry effectively in written reports.

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3: High,2: Medium, 1: Low)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2													
CO2	3													
CO3	3													
CO4		3												
CO5		3												
CO6									3	3		3		

SYLLABUS		
Unit No.	Contents	Mapped CO
I	**UNIT I Structure and Bonding Models:** Fundamentals of Quantum mechanics, Schrodinger Wave equation, significance of Ψ and Ψ2, particle in one dimensional box, molecular orbital theory – bonding in homo-and hetero nuclear diatomic molecules – energy level diagrams of O2 and CO etc. π-molecular orbitals of butadiene and benzene-calculation of bond order.	CO1,CO2 CO4. CO6
II	**UNIT II Modern Engineering materials** **Semiconductors**- Introduction, basic concept, applications.	CO1,CO2 CO4,CO6

	Super conductors-Introduction ,basic concept, applications. **Super capacitors-** Introduction, Basic Concept, Classification and Applications. **Nano materials**-Introduction, classification, properties and applications of Fullerenes, carbon Nano tubes , Graphines and nanoparticles.	
III	**UNIT III Electrochemistry and Applications** Electrochemical cell, Nernst equation, cell potential calculations and numerical problems. potentiometry- potentiometric titrations (redox titrations), concept of conductivity, conductivity cell, conduct metric titrations (acid-base titrations). Electrochemical sensors – potentiometric sensors with examples, amperometric sensors with examples. Primary cells – Zinc-air battery, Secondary cells – lithium- ion batteries- working of the batteries including cell reactions. Fuel cells- hydrogen-oxygen fuel cell– working of the cells. Polymer Electrolyte Membrane Fuel cells (PEMFC).	**CO1,CO2 CO4,CO6**
IV	**UNIT IV Polymer Chemistry** Introduction to polymers, functionality of monomers, chain growth and step growth polymerization, coordination polymerization with specific examples and mechanisms of polymer formation Plastics –Thermo and Thermosetting plastics, Preparation, properties and applications of – PVC, Teflon, Bakelite, Nylon-6,6, carbon fibres. Elastomers–Buna-S,Buna-N–preparation, properties and applications Conducting polymers – poly acetylene, poly aniline, – mechanism of conduction and applications. Bio-Degradable polymers - Poly Glycolic Acid (PGA), Polyl Lactic Acid (PLA).	**CO1,CO3 CO5,CO6**
V	**UNIT V Instrumental Methods and Applications** 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.	**CO1,CO3, CO5,CO6**

Learning Resources
Text Books:
1. Jain and Jain, Engineering Chemistry, 16/e, Dhanpat Rai, 2013. 2. Peter Atkins, Julio de Paula and James Keeler, Atkins' Physical Chemistry, 10/e, Oxford University Press, 2010.
Reference Books:
1. Skoog and West, Principles of Instrumental Analysis, 6/e, Thomson, 2007. 2. J.D. Lee, Concise Inorganic Chemistry, 5th Edition, Wiley Publications, Feb.2008 3. Textbook of Polymer Science, Fred W. Billmayer Jr, 3rd Edition
E-Resources: https://nptel.ac.in/courses/103108100 https://onlinecourses.nptel.ac.in/noc23_cy19/previe w https://nptel.ac.in/courses/118104008

23ES1101-BASIC CIVIL AND MECHANICAL ENGINEERING

Branch	EEE	**Year : I**	**Sem: I**
Course Category:	Engineering Sciences	Credits:	3
Course Type:	Theory	Lecture-Tutorial-Practical:	3-0-0
Prerequisites:	Nil	Continuous Evaluation:	30
		Semester End Evaluation:	70
		Total Marks:	100

PART A: BASIC CIVIL ENGINEERING

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	**K2**
CO2	Know the concepts of surveying and to understand the measurement of distances, angles and levels through surveying	**K2**
CO3	Realize the importance of Transportation in nation's economy and the engineering measures related to Transportation.	**K2**
CO4	Understand the importance of Water Storage and Conveyance Structures so that the social responsibilities of water conservation will be appreciated.	**K2**
CO5	Understand the basic characteristics of Civil Engineering Materials and attain knowledge on prefabricated technology.	**K2**

Contribution of course outcomes towards Achievement of Program Outcomes

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	3	1			1	2	2	2	2	2		2		
CO2	3	3			3	2	2	2	2	2		2		
CO3	3	2			3	2	2	2	2	2		2		
CO4	3	3			3	2	2	2	2	2		2		
CO5	3	2			3	2	2	2	2	2		2		
Avg.	3	2			2	2	2	2	2	2		2		

Course Content

UNIT-1	**Basics of Civil Engineering**: Role of Civil Engineers in Society- Various Disciplines of Civil Engineering- Structural Engineering- Geo-technical Engineering- Transportation Engineering - Hydraulics and Water Resources Engineering - Environmental Engineering-Scope of each discipline - Building Construction and Planning- Construction Materials-Cement - Aggregate - Bricks- Cement concrete- Steel. Introduction to Prefabricated construction Techniques	**CO1, CO5**
UNIT-2	**Surveying:** Objectives of Surveying- Horizontal Measurements- Angular Measurements Introduction to Bearings Levelling instruments used for levelling -Simple problems on levelling and bearings-Contour mapping.	**CO2**

UNIT-3	**Transportation Engineering** Importance of Transportation in Nation's economic development- Types of Highway Pavements- Flexible Pavements and Rigid Pavements - Simple Differences. Basics of Harbour, Tunnel, Airport, and Railway Engineering **Water Resources and Environmental Engineering**: Introduction, Sources of water- Quality of water- Specifications- Introduction to Hydrology– Rainwater Harvesting-Water Storage and Conveyance Structures (Simple introduction to Dams and Reservoirs).	**CO3, CO4**

LEARNING RESOURCES	
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. Fifth Edition. 2. Hydrology and Water Resources Engineering, Santosh Kumar Garg, Khanna Publishers, Delhi. 2016. 3. Irrigation Engineering and Hydraulic Structures - Santosh Kumar Garg, Khanna Publishers, Delhi 2023. 38th Edition. 4. Highway Engineering, S.K.Khanna, C.E.G. Justo and Veeraraghavan, Nemchand and Brothers Publications 2019. 10th Edition. 5. Indian Standard DRINKING WATER — SPECIFICATION IS 10500-2012.

PART B- Basic Mechanical Engineering

(For EEE, ECE and CSE branches)

Course Code	23ES1101	Year	I	Semester	I
Course Category	Engineering science	Branch	EEE	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	Nil
Continuous Internal Evaluation	30	Semester End Evaluation	70	Total Marks	100

Course Outcomes: Upon successful completion of the course, the student will be able to

	Statement	Skill	Level	UNIT
CO1	Understand regarding various engineering material, different modules of Mechanical engineering and importance of Mechanical Engineering in different sectors and industries	Understand	L2	1,2,3
CO2	Explain different manufacturing and thermal engineering processes.	Understand	L2	2
CO3	Describe the concepts of a power plant, mechanical power transmission elements and robotics.	Understand	L2	3

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (H: High (3), M: Medium (2), L:Low (1))

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2				3								
CO2	2	2				3								
CO3	2	2				3								

Syllabus

UNIT	Content	Mapped CO
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	CO1
II	**Manufacturing Processes:** Principles of Casting**,** Forming, joining processes, Machining, Introduction to CNC machines, 3D printing, and Smart manufacturing. **Thermal Engineering** – Working principle of Boilers, Otto cycle, Diesel cycle, Refrigeration and air-conditioning cycles, IC engines, 2- Stroke and 4-Stroke engines, SI/CI Engines, Components of Electric and Hybrid Vehicles.	CO1, CO2
III	**Power plants** – Working principle of Steam, Diesel, Hydro, Nuclear power plants. **Mechanical Power Transmission -** Belt Drives, Chain, Rope drives, Gear Drives and their applications. **Introduction to Robotics -** Joints & links, configurations, and applications of robotics.	CO1, CO3

Learning Recourse(s)
Text Book(s)
1. Internal Combustion Engines by V.Ganesan, By Tata McGraw Hill publications (India) Pvt. Ltd. 2. A text 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. G. Shanmugam and M.S.Palanisamy, Basic Civil and the Mechanical Engineering, Tata McGraw Hill publications (India) Pvt. Ltd. 2. Thermal Engineering by Mahesh M Rathore Tata McGraw Hill publications (India) Pvt.Ltd. 3. 3D printing & Additive Manufacturing Technology- L. Jyothish Kumar, Pulak M Pandey, Springer publications.

Introduction to Programming

(Common to all Branches)

Course Code	**23ES1102**	**Year**	I	**Semester**	I
Course Category	Engineering Science	**Branch**	EEE	**Course Type**	Theory
Credits	3	**L-T-P**	3-0-0	**Prerequisites**	Basic Mathematics
Continues Internal Evaluate:	30	**Semester End Exam:**	70	**Total Marks:**	100

Course Outcomes		
Upon successful completion of the course, the student will be able to		
CO1	Describe the basics of Computer Programming and Problem Solving	**L2**
CO2	Apply programming constructs of C language to solve the problems	**L3**
CO3	Apply different data types like arrays, structures, unions, and pointers in implementing solutions to various problems.	**L3**
CO4	Analyze the given problem and use a modular programming approach to develop solutions.	**L4**

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3:Substantial, 2: Moderate, 1:Slight)

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	1													
CO2	3													
CO3	3													
CO4		2										1		

Syllabus		Mapped CO
Unit No.	**Contents**	
I	**Introduction to Programming and Problem Solving:** History of Computers, Basic organization of a computer: ALU, input-output units, memory, program counter, Introduction to Programming Languages, Basics of a Computer Program- Algorithms, flowcharts, pseudo code. Introduction to Compilation and Execution, Primitive Data Types, Variables, and Constants, Basic Input and Output, Operations, Type Conversion, and Casting. Problem solving techniques: Algorithmic approach, characteristics of algorithm, Problem solving strategies: Top-down approach, Bottom-up approach, Time andspace complexities of algorithms.	**CO1**
II	**Control Structures:** Simple sequential programs Conditional Statements (if, if-else, switch), Loops (for, while do-while) Break and Continue.	**CO1, CO2**
III	**Arrays and Strings:** Arrays indexing, memory model, programs with array of integers, two dimensional arrays, Introduction to Strings.	**CO1, CO2, CO3**
IV	**Pointers & User Defined Data types:** Pointers, dereferencing and address operators, pointer and address arithmetic, array manipulation using pointers, dynamic memory allocation, User-defined data types- Structures, Unions.	**CO1, CO3, CO4**
V	**Functions & File Handling:** Introduction to Functions, Function Declaration and Definition, Function call Return Types and Arguments, modifying parameters inside functions using pointers, arrays as parameters, Recursion, Scope and Lifetime of Variables, Basics of File Handling.	**CO1, CO3, CO4**

Learning Resources

Textbooks

1. Programming in C, Reema Thareja, AICTE Edition, 2018, Oxford University Press
2. The C Programming Language, Brian W. Kernighan and Dennis M. Ritchie, Prentice-Hall, 1988

References

1. Schaum's Outline of Programming with C, Byron S Gottfried, McGraw-Hill Education, 1996
2. Computing fundamentals and C Programming, Bala Guruswamy, E., McGraw-Hill Education, 2008.
3. C Programming, A Problem-Solving Approach, Forouzan, Gilberg, Prasad, CENGAGE, 3rd edition

e- Resources and other Digital Material

1. https://www.geeksforgeeks.org/c-programming-language/
2. https://www.greatlearning.in/academy/learn-for-free/courses/c-programming
3. https://onlinecourses.nptel.ac.in/noc22_cs101/course

COMMUNICATIVE ENGLISH LAB

Course Code	23HS1151	Year	I	Semester	I
Course Category	Humanities	Branch	EEE	Course Type	Lab
Credits	1	L-T-P	0-0-2	Prerequisites	
Continuous Internal Evaluation:	30	Semester End Evaluation:	70	Total Marks:	100

Course Outcomes	
Upon successful completion of the course, the student will be able to	
CO1	Demonstrate the English language proficiency through Emphasis on LSRW Skills. (L3)
CO2	Apply communication skills through various language learning activities. (L3)
CO3	Develop an insight into the importance of phonetics for better pronunciation and accent. (L3)
CO4	Enhance professionalism through debates, group discussions and presentations. (L4)
CO5	Hone employability skills. (L4)

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3:Substantial,2:Moderate,1:Slight)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1									3	3		3		
CO2									3	3		3		
CO3									3	3		3		
CO4									3	3		3		
CO5									3	3		3		
AVG									3	3		3		

Syllabus		
Exp. No.	Contents	Mapped CO
Experiments		
1	Vowels & Consonants	CO1, CO3
2	Accent	

3	JAM	CO1, CO2
4	Role Play or Conversational Practice	
5	Listening-I (Global comprehension)	CO1, CO2
6	Listening-II (Identifying key terms, understanding concepts)	
7	Group Discussions	CO1, CO2 & CO4
8	Debates	
9	PPTs/Poster Presentation	
10	Interview Skills	CO1, CO5

Learning Resources
Suggested Software: ● Walden Info tech ● Young India Films
Reference Books: 1. Raman Meenakshi, Sangeeta-Sharma. *Technical Communication*. Oxford Press.2018. 2. Taylor Grant: *English Conversation Practice*, Tata McGraw-Hill Education India, 2016 3. Hewing's, Martin. Cambridge *Academic English* (B2). CUP, 2012. 4. J.Sethi&P.V.Dhamija. *A Course in Phonetics and Spoken English*, (2ndEd), Kindle, 2013.

CHEMISTRY LAB

Course Code	23BS1151	**Year**	I	**Semester**	I
Course Category	Basic Sciences	**Branch**	**EEE**	**Course Type**	Lab
Credits	1	**L-T-P**	0-0-2	**Prerequisites**	Nil
Continuous Internal Evaluation:	**30**	**Semester End Evaluation:**	**70**	**Total Marks:**	**100**

Course Outcomes	
Upon successful completion of the course, the student will be able to	
CO1	Demonstrate the working of potentiometer and conductometer instruments. (L3)
CO2	Prepare advanced materials like polymers and Nano materials (L3)
CO3	Calculate the strength of Pb-Acid battery(L4)
CO4	Examine the ferrous iron content in a sample using dichrometry (L4)
CO5	Calculate the wave length of a sample by using UV-Visible Spectroscopy and colorimetry (L4)
CO6	Make an effective report based on the experiments.

Contribution of Course Outcomes towards achievement of Program Outcomes &Strength of correlations(3:High,2: Medium, 1:Low)														
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO 1**	**PSO 2**
CO1	3			3								3		
CO2	3			3								3		
CO3	3			3								3		
CO4	3			3								3		
CO5	3			3								3		
CO6									3	3		3		

Syllabus		
Exp. No.	Contents	Mapped CO
Experiments		
1	Conductometric titration of strong acid vs strong base	CO1,CO6
2	Conductometric titration of weak acid vs. strong base	CO1,CO6
3	Determination of cell constant and conductance of solutions	CO1,CO6
4	Potentiometry - determination of redox potentials and emfs	CO1,CO6 CO1
5	Determination of Strength of an acid in Pb-Acid battery	CO3,CO6
6	Preparation of a Bakelite	CO2,CO6
7	Verify Lambert-Beer's law	CO5,CO6
8	Wavelength measurement of sample through UV-Visible Spectroscopy	CO5,CO6
9	Preparation of nanomaterials by precipitation method	CO2,CO6
10	Estimation of Ferrous Iron by Dichrometry	CO4,CO6

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

Engineering Workshop

(For EEE, ECE and CSE branches)

Course Code	23ES1151	Year	I	Semester	I
Course Category	Engineering Science	Branch	EEE	Course Type	Lab
Credits	1.5	L-T-P	0-0-3	Prerequisites	Nil
Continuous Internal Evaluation	30	Semester End Evaluation	70	Total Marks	100

Upon successful completion of the course, the student will be able to

	Course Outcomes	Skill	Level	Expt. No
CO1	Identify workshop tools and their operational capabilities.	Apply	L3	1-9
CO2	Practice on manufacturing of components using workshop trades including fitting, carpentry, foundry, and welding	Apply	L3	2,3,4,6,7, 8
CO3	Apply fitting operations in various applications	Apply	L3	4
CO4	Apply basic electrical engineering knowledge for House Wiring Practice	Apply	L3	5

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3: High, 2: Medium, 1: Low)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3					2			3	2		2		
CO2	3		2			2			3	2		2		
CO3	3		2			2			3	2		2		
CO4	3		2			2			3	2		2		

Syllabus

Expt. No.	Contents	Mapped CO's
1	Demonstration: Safety practices and precautions to be observed in workshop.	**CO1**
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 c) Corner Dovetail joint or Bridle joint	**CO1, CO2**
3	**Sheet Metal Working:** Familiarity with different types of tools used in sheet metal working, Developments of following sheet metal job from GI sheets. a) Tapered tray b) Conical funnel c) Elbow pipe d) Brazing	**CO1, CO2**

4	**Fitting:** Familiarity with different types of tools used in fitting and do the following fitting exercises a) V-fit b) Dovetail fit c) Semi-circular fit d) Bicycle tire puncture and change of two-wheeler tire	**CO1, CO2, CO3**
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) Three phase motor f) Soldering of wires	**CO1, CO4**
6	**Foundry Trade:** Demonstration and practice on Moulding tools and processes, Preparation of Green Sand Moulds for given Patterns..	**CO1, CO2**
7	**Welding Shop:** Demonstration and practice on Arc Welding and Gas welding. Preparation of Lap joint and Butt joint	**CO1, CO2**
8	**Plumbing:** Demonstration and practice of Plumbing tools, Preparation of Pipe joints with coupling for same diameter and with reducer for different diameters.	**CO1, CO2**
9	**Basic repairs of Two-wheeler vehicle** – Demonstration of working of two-wheeler vehicle and its repairs.	**CO1**

Learning Resources
Text Books
1. Basic Workshop Technology: Manufacturing Process, Felix W.; Independently Published,2019. Workshop Processes, Practices and Materials; Bruce J. Black, Routledge publishers, 5th Edn. 2015. 2. A Course in Workshop Technology Vol I. & II, B.S. Raghuwanshi, Dhanpath Rai & Co., 2015 & 2017.
Reference Books
1. Elements of Workshop Technology, Vol. I by S. K. Hajra Choudhury & Others, Media Promoters and Publishers, Mumbai. 2007, 14th edition 2. Workshop Practice by H. S. Bawa, Tata-McGraw Hill, 2004. 3. Wiring Estimating, Costing and Contracting; Soni P.M. & Upadhyay P.A.; Atul Prakashan, 2021-22.

Computer Programming Lab

(Common to all Branches)

Course Code	**23ES1152**	**Year**	I	**Semester**	I
Course Category	Engineering Sciences	**Branch**	EEE	**Course Type**	Lab
Credits	1.5	**L-T-P**	0-0-3	**Prerequisites**	Basic Mathematics
Continuous Internal Evaluation:	30	**Semester End Exam:**	70	**Total Marks:**	100

Course Outcomes		
Upon successful completion of the course, the student will be able to		
CO1	Apply C programming language constructs to solve the given problem	L2
CO2	Implement programs as an individual on different IDE's/ online platforms.	L3
CO3	Develop an effective report based on various programs implemented.	L3
CO4	Apply technical knowledge for a given problem and express it with effective oral communication.	L3
CO5	Analyze outputs using given constraints/test cases.	L4

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (H:High, M: Medium, L:Low)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3													
CO2	2				1									
CO3										3				
CO4										3				
CO5		3										1		

Syllabus		
Expt. No.	**Contents**	**Mapped COs**
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()	**CO1, CO2, CO3, CO4, CO5**
II	**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 1: Converting algorithms/flow charts into C Source code. Developing the algorithms/flowcharts for the following sample programs i) Sum and average of 3 numbers ii) Conversion of Fahrenheit to Celsius and vice versa iii) Simple interest calculation	**CO1, CO2, CO3, CO4, CO5**
III	**WEEK 3** **Objective: Learn how to define variables with the desired datatype, 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	**CO1, CO2, CO3, CO4, CO5**
IV	**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: Tutorial4: Operators and the precedence and as associativity: Lab4: Simple computational problems using the operator' precedence and associativity i) Evaluate the following expressions. a. A+B*C+(D*E) + F*G	**CO1, CO2, CO3, CO4, CO5**

	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	
V	**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.	**CO1, CO2, CO3, CO4, CO5**
VI	**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.	**CO1, CO2, CO3, CO4, CO5**
VII	**WEEK 7:** **Objective: Explore the full scope of Arrays construct namely defining and initializing 1-D and 2-D and more generically n-D arrays and referencing individual array elements from the defined array. Using integer 1-D arrays, explore search solution linear search.** Suggested Experiments/Activities: Tutorial 7: 1 D Arrays: searching. Lab 7:1D Array manipulation, linear search i) Find the min and max of a 1-D integer array. ii) Perform linear search on1D array. iii) The reverse of a 1D integer array iv) Find 2's complement of the given binary number. v) Eliminate duplicate elements in an array.	**CO1, CO2, CO3, CO4, CO5**

VIII	**WEEK 8 :** **Objective:** Explore the difference between other arrays and character arrays that can be used as Strings by using null character and get comfortable with string by doing experiments that will reverse a string and concatenate two strings. Explore sorting solution bubble sort using integer arrays. **Suggested Experiments/Activities:** **Tutorial 8:** 2 D arrays, sorting and Strings. **Lab 8:** Matrix problems, String operations, Bubble sort i) Addition of two matrices ii) Multiplication two matrices iii) Sort array elements using bubble sort iv) Concatenate two strings without built-in functions v) Reverse a string using built-in and without built-in string functions	**CO1, CO2, CO3, CO4, CO5**
IX	**WEEK 9:** **Objective:** Explore pointers to manage a dynamic array of integers, including memory allocation & value initialization, resizing changing and reordering the contents of an array and memory de-allocation using malloc (), calloc (), realloc () and free () functions. Gain experience processing command-line arguments received by C **Suggested Experiments/Activities:** **Tutorial 9:** Pointers, structures and dynamic memory allocation **Lab 9:** Pointers and structures, memory dereference. i) Write a C program to find the sum of a 1D array using malloc() ii) Write a C program to find the total, average of n students using structures iii) Enter n students data using calloc() and display failed students list iv) Read student name and marks from the command line and display the student details along with the total. v) Write a C program to implement realloc()	**CO1,CO2,CO3, CO4,CO5**
X	**WEEK 10:** **Objective:** Experiment with C Structures, Unions, bit fields and self-referential structures (Singly linked lists) and nested structures **Suggested Experiments/Activities:** **Tutorial 10:** Bitfields, Self-Referential Structures, Linked lists **Lab10 :** Bitfields, linked lists Read and print a date using dd/mm/yyyy format using bit-fields and differentiate the same without using bit- fields i) Create and display a singly linked list using self-referential structure. ii) Demonstrate the differences between structures and unions using a C program. iii) Write a C program to shift/rotate using bitfields. Write a C program to copy one structure variable to another structure of the same type	**CO1,CO2,CO3, CO4,CO5**
	WEEK 11: **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	**CO1, CO2, CO3, CO4, CO5**

XI	**Suggested Experiments/Activities:** **Tutorial 11:** Functions, call by value, scope and extent, **Lab 11:** Simple functions using call by value, solving differential equations using Eulers theorem. i) Write a C function to calculate NCR value. ii) Write a C function to find the length of a string. iii) Write a C function to transpose of a matrix. iv) Write a C function to demonstrate numerical integration of differential equations using Euler's method.	
XII	**WEEK 12:** **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 12: Recursion, the structure of recursive calls Lab 12: 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.	**CO1,CO2,CO3, CO4,CO5**
XIII	**WEEK 13:** **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 13: Call by reference, dangling pointers** **Lab 13: 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.	**CO1,CO2,CO3, CO4,CO5**
XIV	**WEEK14:** **Objective:** To understand data files and file handling with various file I/O functions. Explore the differences 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()	**CO1,CO2,CO3, CO4,CO5**
	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.	

Learning Resources
Text Books
1. Ajay Mittal, Programming in C: A practical approach, Pearson. 2. Byron Gottfried, Schaum's Outline of Programming with C, McGraw Hill
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
e- Resources & other digital material
1. https://www.geeksforgeeks.org/c-programming-language/ 2. https://www.greatlearning.in/academy/learn-for-free/courses/c-programming 3. https://onlinecourses.nptel.ac.in/noc22_cs101/course

HEALTH AND WELLNESS, YOGA AND SPORTS

Course Code	23MC1142	**Year**	I	**Semester**	I
Course Category	MC	**Branch**	EEE	**Course Type**	Theory
Credits	0.5	**L-T-P**	0-0-1	**Prerequisites**	Nil
Continuous Internal Evaluation:	100	**Semester End Evaluation:**	--	**Total Marks:**	100

Course Outcomes	
After successful completion of the course, the student will be able to	
CO1	Outline the importance of yoga and sports for Physical fitness and sound health.(L2)
CO2	Make use of various activities that help to enhance their health.(L3)
CO3	Develop Positive Personality for individual and group work.(L3)
CO4	Categorize the health-related fitness components.(L4)
CO5	Analyze the current personal fitness levels.(L4)

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3:High, 2: Medium, 1:Low)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1						3			3					
CO2						3								
CO3									3					
CO4									3					
CO5						3			3					

UNIT NO	Contents	Mapped COS
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	CO1 CO2 CO5
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	CO1 CO3 CO4 CO5

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.	CO1 CO4 CO5

Learning Recourses

Text 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

Reference Books

1. Wiseman, John Lofty, SAS Survival Handbook: The Ultimate Guide to SurvivingAnywhere Third Edition, William Morrow Paperbacks, 2014
2. The Sports Rules Book/ Human Kinetics with Thomas Hanlon. -- 3rd ed. HumanKinetics, Inc.2014

DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS

Course Code	23BS1201	**Year**	**I**	**Semester**	II
Course Category	Basic Science	**Branch**	EEE	**Course Type**	Theory
Credits	3	**L-T-P**	3-0-0	**Pre-requisites**	NIL
Continuous Internal Evaluation:	30	**Semester End Evaluation :**	70	**Total Marks:**	100

Course Outcomes	
Upon successful completion of the course, the student will be able to	
CO1	**Interpret** the basic concepts of differential equations and vector calculus (L2).
CO2	**Apply** different methods to solve ordinary differential equations and partial differential equations, L-C-R Circuit problems and simple harmonic motion problems (L3).
CO3	**Apply** the differential operator to calculate the divergence and flux of vector point functions (L3).
CO4	**Analyze** the given ordinary differential equation and partial differential equation to find the solution (L4).
CO5	**Evaluate** work done; flux using line and surface integrals, areas and volumes using vector integral theorems (L4).
CO6	**Submit a report** by solving the given problems using the concepts of Differential equations and Vector Calculus.

Contribution of Course Outcomes towards achievement of Program Outcomes & Strengthof correlations (3:High, 2: Medium, 1:Low)

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO 2**
CO1	2												1	
CO2	3												1	
CO3	3												1	
CO4		3											1	
CO5		3											1	
CO6									3	3		**3**	**1**	

SYLLABUS		
Unit No.	**Contents**	**Mapped CO**
I	**Differential equations of first order and first degree** Linear differential equations – Bernoulli's equations- Exact equations and equations reducible to exact form. Applications: Newton's Law of cooling – Law of natural growth and decay-Electrical circuits.	CO1,CO2, CO4,CO6
II	**Linear differential equations of higher order(Constant Coefficients)** Definitions, homogenous and non-homogenous, complimentary function, general solution, particular integral, Wronskian, Method of variation of parameters. Simultaneous linear equations, Applications to L-C-R Circuit problems and Simple Harmonic motion.	CO1,CO2, CO4,CO6
III	**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.	CO1,CO2, CO4,CO6
IV	**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, vector identities.	CO1,CO3, CO5,CO6
V	**Vector integration** Line integral-circulation-work done, surface integral-flux, Green's theorem in the plane (without proof), Stoke's theorem (without proof), volume integral, Divergence theorem (without proof) and related problems.	CO1,CO3, CO5,CO6

Learning Resources

Text Books:

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

Reference Books:

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

E-Resources:

1.https://nptel.ac.in/courses/111/105/111105121/
2.https://nptel.ac.in/courses/111/105/111105122/
3. https://nptel.ac.in/courses/111/107/111107108/

ENGINEERING PHYSICS

Course Code	23BS1203	Year	I	Semester	II
Course Category	Basic Science	Branch	EEE	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	----
Continuous Internal Evaluation:	30	Semester End Evaluation:	70	Total Marks:	100

Course Outcomes	
Upon successful completion of the course, the student will be able to	
CO1	Interpret the fundamental concepts of optical sources, structure and properties of various solid materials**.(L2)**
CO2	Apply the principles of lasers, optical fibers and semiconductors in technical aspects. **(L3)**
CO3	Illustrate the concepts of quantum mechanics, Dielectrics, Magnetic materials and crystal physics for engineering applications. **(L3)**
CO4	Examine the nature of communication system and semiconducting materials. **(L4)**
CO5	Analyze the theory of solids deduce various analytical parameters. **(L4)**
CO6	Submit a report on the concepts of optical fibers, theory of solids, Principles quantum mechanics and semiconductors.

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3:High, 2: Medium, 1:Low)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2												1	1
CO2	3												1	1
CO3	3												1	1
CO4		3											1	1
CO5		3											1	1
CO6									3	3		3	1	1

SYLLABUS		
Unit No.	**Contents**	**Mapped CO**
I	**LASERS**: Characteristics of lasers –Absorption, spontaneous and stimulated emission of radiation – population inversion – pumping mechanisms – Ruby, Helium-Neon & Semiconductor lasers -Applications	**CO1, CO2, CO4,**
	of lasers. **Fiber optics**: Principle of optical fiber –structure of optical fiber- Acceptance angle and numerical aperture – Types of optical fibers- Attenuation in optical fibers – optical fiber in communication system- applications of optical fiber.	**CO6**
II	**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 Diffract meter–crystal structure determination by Laue's and powder methods.	**CO1, CO3, CO5, CO6**
III	**Dielectric Materials:** Introduction - Dielectric polarization - Dielectric polarizability, Susceptibility, Dielectric constant and Displacement Vector – Relation between the electric vectors-Types of polarizations- Electronic(Quantitative), Ionic(Quantitative) and Orientation polarizations (Qualitative) - Lorentz internal field - Clausius- Mossotti equation - complex dielectric constant – Frequency dependence of polarization – dielectric loss **Magnetic Materials:** Introduction – Magnetic dipole moment - Magnetization-Magnetic susceptibility and permeability – Atomic origin of magnetism - Classification of magnetic materials: Dia, para, Ferro, anti- ferro & Ferri magnetic materials - Domain concept for Ferro magnetism & Domain walls (Qualitative)- Hysteresis-soft and hard magnetic materials.	**CO1, CO3, CO5, CO6**
IV	**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	**CO1, CO3, CO5, CO6**
V	**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.	**CO1, CO2, CO4, CO6**

Learning Resources
Text Books:
1. A Textbook of Engineering Physics, M. N. Avadhanulu, P. G. Kshirsagar & T V S Arun Murthy, S. Chand Publications, 11th Edition 2019. 2. Engineering Physics - D.K.Bhattacharya and PoonamTandon, Oxford press (2015)
Reference Books:
1. Engineering Physics- B.K.Pandey and S. Chaturvedi, Cengage Learning 2021. 2. Engineering Physics –Shatendra Sharma, Jyotsna Sharma, Pearson Education, 2018. 3. Engineering Physics" - Sanjay D. Jain, D. Sahasrabudhe and Girish, University Press. 2010 4. Engineering Physics-M.R.Srinivasan, New Age international publishers (2009).
E-Resources: https://www.loc.gov/rr/scitech/selected-internet/physics.html

Basic Electrical & Electronics Engineering

Course Code	23ES1202	Year	I	Semester	II
Course Category	Engineering Science	Branch	EEE	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	Nil
Continuous Internal Evaluation:	30	Semester End Evaluation:	70	Total Marks:	100

Course Outcomes	
Upon successful completion of the course, the student will be able to	
CO1	**Describe** the fundamentals of electrical circuits, machines, MC/MI instruments, semiconductor devices and its applications, principles of digital electronics **(L2)**
CO2	**Apply** the basic knowledge of mathematics, science and electrical engineering to obtain the desired parameters of electric circuits, machines, measuring instruments and power generation **(L3)**
CO3	**Analyze** the behaviour of Electric circuits, electrical load and electricity bill **(L4)**
CO4	**Apply** the basic principles of semiconductor devices and digital electronics to interpret analog and digital circuits respectively **(L3)**
CO5	**Analyze** the characteristics of analog circuits and performance of digital circuits **(L4)**
CO6	**Acquire** the capacity to do various activities on diverse topics within the field of electrical and electronics engineering

Contribution of Course Outcomes towards achievement of Program Outcomes & Strengthof correlations (3:High, 2: Medium, 1:Low)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1														
CO2	3					1	1						2	1
CO3		3				1							2	1
CO4	3												2	1
CO5		3											2	1
CO6						1	1		2			1	2	1

SYLLABUS		
Unit No.	**Contents**	**Mapped CO**
	PART A: BASIC ELECTRICAL ENGINEERING	
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, Voltage and current relationshipwith 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).	**CO1,CO2, CO3,CO6**

II	**Machines and Measuring Instruments** **Machines:** Construction, principle and operation of (i) DC Motor, (ii) DC Generator, (iii) Single Phase Transformer, (iv) Three Phase Induction Motor and (v) Alternator, Applications of electrical machines. **Measuring Instruments:** Construction and working principle of Permanent Magnet Moving Coil (PMMC), Moving Iron (MI) Instruments and Wheat Stone bridge.	**CO1,CO2, CO6**
III	**Energy Resources, Electricity Bill & Safety Measures** **Energy Resources:** Conventional and non-conventional energy resources; Layout and operation of various Power Generation systems: Hydel, Nuclear, Solar & Wind power generation. **Electricity bill:** Power rating of household appliances including air conditioners, PCs, Laptops, Printers, etc. Definition of ―unit‖ used for consumption of electrical energy, two-part electricity tariff, calculation of electricity bill for domestic consumers. **Equipment Safety Measures:** Working principle of Fuse and Miniature circuit breaker (MCB), merits and demerits. Personal safety measures: Electric Shock, Earthing and its types, Safety Precautions to avoid shock.	**CO1,CO2, CO3,CO6**
	PART B: BASIC ELECTRONICS ENGINEERING	
IV	**SEMICONDUCTOR DEVICES** Introduction - Evolution of electronics – Vacuum tubes to nano electronics - Characteristics of PN Junction Diode — Zener Effect — Zener Diode and its Characteristics. Bipolar Junction Transistor — CB, CE, CC Configurations and Characteristics — Elementary Treatment of Small Signal CE Amplifier.	**CO1,CO4, CO5, CO6**
V	**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), working of simple zener voltage regulator. Amplifiers: Block diagram of Public Address system, Circuit diagram and working of common emitter (RC coupled) amplifier with its frequency response. Electronic Instrumentation: Block diagram of an electronic instrumentation system.	**CO1,CO4, CO5, CO6**
VI	**DIGITAL ELECTRONICS** Overview of Number Systems, Logic gates including Universal Gates, BCD codes, Excess-3 code, Gray code, Hamming code. Boolean Algebra, Basic Theorems and properties of Boolean Algebra, Truth Tables and Functionality of Logic Gates – NOT, OR, AND, NOR, NAND, XOR and XNOR. Simple combinational circuits–Half and Full Adders. Introduction to sequential circuits, Flip flops, Registers and counters (Elementary Treatment only)	**CO1,CO4, CO5, CO6**

Learning Resources
PART A: BASIC ELECTRICAL ENGINEERING
Text Books:
1. Basic Electrical Engineering, D. C. Kulshreshtha, Tata McGraw Hill, 2019, First Edition 2. Power System Engineering, P.V. Gupta, M.L. Soni, U.S. Bhatnagar and A. Chakrabarti, Dhanpat Rai & Co, 2013 3. Fundamentals of Electrical Engineering, Rajendra Prasad, PHI publishers, 2014, Third Edition
Reference Books:
1. Basic Electrical Engineering, D. P. Kothari and I. J. Nagrath, Mc Graw Hill, 2019, Fourth Edition 2. Principles of Power Systems, V.K. Mehtha, S.Chand Technical Publishers, 2020 3. Basic Electrical Engineering, T. K. Nagsarkar and M. S. Sukhija, Oxford University Press, 2017 4. Basic Electrical and Electronics Engineering, S. K. Bhattacharya, Pearson Publications, 2018, Second Edition.
e- Resources & other digital material:
1. https://nptel.ac.in/courses/108105053 2. https://nptel.ac.in/courses/108108076
PART B: BASIC ELECTRONICS ENGINEERING
Textbooks: 1. R. L. Boylestad & Louis Nashlesky, Electronic Devices & Circuit Theory, Pearson Education, 2021. 2. R. P. Jain, Modern Digital Electronics, 4th Edition, Tata Mc Graw Hill, 2009
Reference Books:
1. R. S. Sedha, A Textbook of Electronic Devices and Circuits, S. Chand & Co, 2010. 2. Santiram Kal, Basic Electronics- Devices, Circuits and IT Fundamentals, Prentice Hall, India, 2002. 3. R. T. Paynter, Introductory Electronic Devices & Circuits – Conventional Flow Version, Pearson Education,2009.
e- Resources & other digital material:
1. https://nptel.ac.in/courses/108105132 2. https://nptel.ac.in/courses/108101091

Engineering Graphics

(For EEE, ECE and CSE branches)

Course Code	23ES1203	**Year**	I	**Semester**	II
Course Category	Engineering Science	**Branch**	EEE	**Course Type**	Theory
Credits	3	**L-T-P**	1-0-4	**Prerequisites**	Nil
Continuous Internal Evaluation	30	**Semester End Evaluation**	70	**Total Marks**	100

Course Outcomes	
Upon successful completion of the course, the student will be able to	
CO1	Construct regular polygons, conic sections, curves and scales used in Engineering practice.(L3)
CO2	Construct orthographic projections of an object when its position is defined with respect to the reference planes.(L3)
CO3	Develop the orthographic projections for the given isometric view.(L3)
CO4	Develop the lateral surfaces of solids.(L3)
CO5	Identify the appropriate commands that are used to prepare the given drawing in CAD environment.(L3)

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3:High, 2: Medium, 1:Low)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2							2	2	2			
CO2	3	3							3	3	3			
CO3	2	2							2	2	2			
CO4	2	2							2	2	2			
CO5	2				2				2	2	2			

Syllabus

Unit No.	Syllabus	Mapped CO's
1	**Introduction:** Lines, Lettering and Dimensioning, Geometrical Constructions And Constructing regular polygons by general method. **Curves:** construction of ellipse, parabola and hyperbola by general method Cycloids, Involutes, Normal and tangent to the Curves. **Scales:** Plain scales and diagonal scales.	CO1
2	**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.	CO2

3	**Projections of Planes:** Regular planes only, Plane perpendicular to both reference planes, Plane parallel to one reference plane and perpendicular to the other reference plane, Plane inclined to one reference plane and perpendicular to the other reference plane, plane inclined to both the reference planes. **Projections of Solids:** Types of solids: Polyhedra and Solids of revolution. Projections of solids 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 other plane	CO2
4	**Sections of Solids:** Perpendicular and inclined section planes, Sectional views and True shape of section, Sections of solids in simple position only. **Development of Surfaces**: Methods of Development: Parallel line development and radial line development. Development of a cube, prism, cylinder, pyramid and cone.	CO3
5	**Conversion of Views:** Conversion of isometric views to orthographic views.	CO4
	Computer graphics: Creating 2D&3Ddrawingsof objects including PCB and Transformations using Auto CAD (Not for end examination).	CO5

Learning Resources

Text Books

1. N.D. Bhatt, Engineering Drawing, 53/e, Charotar Publishers,2016.

Reference Books

1. Engineering Drawing, K.L.Narayanaand P.Kannaiah,TataMcGrawHill,2013.
2. Engineering Drawing, M.B.ShahandB.C.Rana,PearsonEducationInc,2009.
3. Engineering Drawing with an Introduction to Auto CAD, Dhananjay Jolhe, Tata Mc Graw Hill, 2017.
4. K. Venugopal, Engineering Drawing and Graphics,6/e, New Age Publishers,2011.

e- Resources & other digital material

1. http://www.youtube.com/watch?v=XCWJ XrkWco, Accessed on 01-06-2017.
2. http://www.me.umn.edu/courses/me2011/handouts/drawing/blanco - tutorial.html# isodrawing, Accessed on 01-06-2017.
3. http://www.slideshare.net, Accessed on 01-06-2017.
4. http://edpstuff.blogspot.in, Accessed on 01-06-2017.

ELECTRICAL CIRCUIT ANALYSIS -I

Course Code	23EE3201	Year	I	Semester	II
Course Category	Professional Core	Branch	EEE	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	NIL
Continuous Internal Evaluation:	30	Semester End Evaluation:	70	Total Marks:	100

Course Outcomes	
Upon successful completion of the course, the student will be able to	
CO1	**Understand** the basic electrical elements and different fundamental laws, transformations, concept of self-inductance and mutual inductance, phasor diagrams, resonance and network theorems.(L2)
CO2	**Apply** the basics of electrical engineering to solve various electrical and magnetic circuits.(L3)
CO3	**Apply** the concepts of electrical circuits to obtain various mathematical and graphical representations.(L3)
CO4	**Analyze** nodal and mesh networks, series and parallel magnetic circuits, resonance circuits, Network theorems, steady state response of different circuit topologies (with R, L and C components).(L4)
CO5	**Submit a report on** Electric Circuits, Magnetic circuits, Single phase circuits, Resonance, Locus diagrams, Network Theorems.

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3:High, 2: Medium, 1:Low)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1														
CO2	3												3	2
CO3	3												3	2
CO4		3											3	2
CO5				3					3	3			3	2

SYLLABUS		
Unit No.	**Contents**	**Mapped CO**
I	**INTRODUCTION TO ELECTRICAL CIRCUITS** Basic Concepts of passive elements of R, L, C and their V-I relations, Sources (dependent and independent), Kirchoff's laws, Network reduction techniques (series, parallel, series - parallel, star-to-delta and delta-to-star transformation), source transformation technique, nodal analysis and mesh analysis to DC networks with dependent and independent voltage and current sources.	**CO1, CO2, CO4, CO5**

II	**MAGNETIC CIRCUITS** Basic definition of MMF, flux and reluctance, analogy between electrical and magnetic circuits, Faraday's laws of electromagnetic induction – concept of self and mutual inductance, Dot convention – coefficient of coupling and composite magnetic circuit, analysis of series and parallel magnetic circuits.	**CO1, CO2, CO4, CO5**
III	**SINGLE PHASE CIRCUITS** Characteristics of periodic functions, Average value, R.M.S. value, form factor, representation of a sine function, concept of phasor, phasor diagrams, node and mesh analysis. Steady state analysis of R, L and C circuits to sinusoidal excitations-response of pure resistance, inductance, capacitance, series RL circuit, series RC circuit, series RLC circuit, parallel RL circuit, parallel RC circuit.	**CO1, CO3, CO4, CO5**
IV	**RESONANCE AND LOCUS DIAGRAMS** Series Resonance: Characteristics of a series resonant circuit, Q-factor, selectivity and bandwidth, expression for half power frequencies; Parallel resonance: Q-factor, selectivity and bandwidth; Locus diagram: RL, RC, RLC with R, L and C variables.	**CO1, CO3, CO4, CO5**
V	**NETWORK THEOREMS (DC & AC EXCITATIONS)** Superposition theorem, Thevenin's theorem, Norton's theorem, Maximum Power Transfer theorem, Reciprocity theorem, Millman's theorem and compensation theorem	**CO1, CO4, CO5**

Learning Resources

Text Books:

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

Reference Books:

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

E-Resources:

1. https://onlinecourses.nptel.ac.in/noc23_ee81/preview
2. https://nptel.ac.in/courses/108104139
3. https://nptel.ac.in/courses/108106172
4. https://nptel.ac.in/courses/117106108

ENGINEERING PHYSICS LAB

Course Code	23BS1252	Year	I	Semester	II
Course Category	Basic Science	Branch	EEE	Course Type	Lab
Credits	1	L-T-P	0-0-2	Prerequisites	Nil
Continuous Internal Evaluation:	30	Semester End Evaluation:	70	Total Marks:	100

Course Outcomes	
Upon successful completion of the course, the student will be able to	
CO1	Identify the type of semiconductor using Hall effect and measure the thermal resistivity, energy band gap **[L3].**
CO2	Apply resonance to estimate the frequency of a tuning fork and verify laws of a stretched string **[L3].**
CO3	Examine the optical, elastic, and dielectric properties of the given materials. **[L4].**
CO4	Assess s the intensity of the magnetic field of circular coil carrying current with distance and measure resistance using four probe method **[L4]**
CO5	Summarize and tabulate the experimental observations and output.

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3:High, 2: Medium, 1:Low)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3			3								3		
CO2	3			3								3		
CO3	3			3								3		
CO4	3			3								3		
CO5									3	3		3		

Exp.no	Contents	Mapped CO
1	Determination of dielectric constant of the various solid samples	**CO3,CO5**
2	Determination of wavelength of Laser light using diffraction grating.	**CO3,CO5**
3	Determination of the resistivity of semiconductors by four probe methods	**CO4,CO5**
4	Determination of energy gap of a semiconductor using p-n junction diode	**CO1,CO5**
5	Magnetic field along the axis of a current carrying circular coil by StewartGee's Method	**CO4,CO5**
7	Determination of temperature coefficients of a thermistor.	**CO1,CO5**
8	Determination of rigidity modulus of the material of the given wire using Torsional pendulum	**CO3,CO5**
9	To verify the laws of transverse vibrations of a string using Sonometer.	**CO2,CO5**
10	Determination of Frequency of electrically maintained tuning fork by Melde's experiment	**CO2,CO5**

Learning Resources

References:

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

Web Resources

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

IT WORKSHOP

(Common to CSE, ECE, EEE)

Course Code	23ES1252	**Year**	I	**Semester**	II
Course Category	Engineering Sciences	**Branch**	EEE	**Course Type**	Lab
Credits	1	**L-T-P**	0-0-2	**Prerequisites**	-Nil -
Continuous Internal Evaluation:	30	**Semester End Exam:**	70	**Total Marks:**	100

Course Outcomes		
Upon successful completion of the course, the student will be able to		
CO1	Describe various Hardware components, operating systems, and World wide web functionalities and dependencies	L2
CO2	Apply various tools for Document/ Presentation preparation.	L3
CO3	Develop an effective report based on various experiments completed	L3
CO4	Apply technical knowledge for a given problem and express it with effective oral Communication	L3

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations(3:High, 2:Medium, 1:Low)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1													
CO2	2				1									
CO3										3				
CO4										3				

Syllabus		
Expt. No.	**Contents**	**Mapped**
I	**PC Hardware & Software Installation (WEEK-1)** 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.	**CO1 CO3 CO4**
II	**PC Hardware & Software Installation (WEEK-2)** 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.	**CO1 CO3 CO4**
III	**PC Hardware & Software Installation (WEEK-3)** 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.	**CO1 CO3 CO4**

IV	**PC Hardware & Software Installation (WEEK-4)**	
	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	**CO1** **CO3** **CO4**
V	**PC Hardware & Software Installation (WEEK-4)** 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	**CO1** **CO3** **CO4**
VI	**Internet & World Wide Web (WEEK-5)** 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.	**CO1** **CO3** **CO4**
VII	**Internet & World Wide Web (WEEK-5)** 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.	**CO1** **CO3** **CO4**
VIII	**Internet & World Wide Web (WEEK-6)** 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.	**CO1** **CO3** **CO4**
IX	**Internet & World Wide Web (WEEK-6)** 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.	**CO1** **CO3** **CO4**
X	**LaTeX and WORD (WEEK-7)** Task 1 – Word Orientation: The mentor needs to give an overview of LaTeX and Microsoft (MS) office or equivalent (FOSS) tool word: Importance of LaTeX 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.	**CO2** **CO3** **CO4**
XI	**LaTeX and WORD (WEEK-7)** 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 LaTeX and Word.	**CO2** **CO3** **CO4**
XII	**LaTeX and WORD (WEEK-8)** 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.	**CO2** **CO3** **CO4**
XIII	**LaTeX and WORD (WEEK-8)** 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.	**CO2** **CO3** **CO4**

XIV	**EXCEL (WEEK-9)** 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	**CO2** **CO3** **CO4**
XV	**EXCEL (WEEK-10)** 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.	**CO2** **CO3** **CO4**
XVI	**EXCEL (WEEK-10) LOOKUP/VLOOKUP** Task 3: Split cells, freeze panes, group and outline, Sorting, Boolean and logical operators, Conditional formatting	**CO2** **CO3** **CO4**
XVII	**POWER POINT (WEEK-11)** 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.	**CO2** **CO3** **CO4**
XVIII	**POWER POINT (WEEK-11)** Task 2: Interactive presentations - Hyperlinks, Inserting –Images, Clip Art, Audio, Video, Objects, Tables and Charts.	**CO2** **CO3** **CO4**
XIX	**POWER POINT (WEEK-12)** 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.	**CO2** **CO3** **CO4**
XX	**AI TOOLS – ChatGPT (WEEK-13)** 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?"	**CO2** **CO3** **CO4**
XXI	**AI TOOLS – ChatGPT (WEEK-14)** 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."	**CO2** **CO3** **CO4**
XXII	**AI TOOLS – ChatGPT (WEEK-15)** 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?'"	**CO2** **CO3** **CO4**

Learning Resources
Text 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
Reference Books
1. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education, 2012, 2nd edition 2. PC Hardware - A Handbook, Kate J. Chase, PHI (Microsoft) 3. LaTeX Companion, Leslie Lamport, PHI/Pearson. 4. IT Essentials PC Hardware and Software Companion Guide, David Anfins on and Ken Quamme. – CISCO Press, Pearson Education, 3 rd edition 5. IT Essentials PC Hardware and Software Labs and Study Guide, Patrick Regan– CISCO Press, Pearson Education, 3rd edition

Electrical & Electronics Engineering Workshop

Course Code	23ES1253	**Year**	I	**Semester**	II
Course Category	Engineering Science	**Branch**	EEE	**Course Type**	Lab
Credits	1.5	**L-T-P**	0-0-3	**Prerequisites**	Nil
Continuous Internal Evaluation	30	**Semester End Evaluation**	70	**Total Marks**	100

Course Outcomes

Upon successful completion of the course, the student will be able to

CO1	Solve for various electrical parameters in an Electrical Circuit (L3)
CO2	**Analyze** Wheatstone bridge and Open Circuit Characteristics of DC Shunt Generator (L4)
CO3	**Analyze** the Characteristics of Different Electronic Circuits (L4)
CO4	**Examine** the Truth Tables of Logic Gates and Flip-flops Using Respective IC's (L4)
CO5	Conduct experiments as a **team / individual** by using equipment available in the laboratory
CO6	Make an effective **report** based on experiments

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3:High, 2: Medium, 1:Low)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3			3										
CO2				3									1	1
CO3		3			3								1	1
CO4		3		3	3								1	1
CO5									3				1	1
CO6										3			1	1

Syllabus

Expt. No.		Mapped CO's
	PART A: ELECTRICAL ENGINEERING LAB	
	Conduct any six experiments	
1	Verification of KCL and KVL.	CO1,CO5, CO6
2	Verification of Superposition theorem.	CO1,CO5, CO6
3	Measurement of Resistance using Wheat stone bridge.	CO2,CO5, CO6
4	Magnetization Characteristics of DC shunt Generator.	CO2,CO5, CO6
5	Measurement of Power and Power factor using Single-phase wattmeter.	CO1,CO5, CO6
6	Measurement of Earth Resistance.	CO1, CO5, CO6
7	Calculation of Electrical Energy for Domestic Premises.	CO1,CO5, CO6

	PART B: ELECTRONICS ENGINEERING LAB	
	Conduct any six experiments (Both Software and Hardware)	
8	Plot V-I characteristics of PN Junction diode A) Forward bias B) Reverse bias.	CO3,CO5, CO6
9	Plot V – I characteristics of Zener Diode and its application as voltage Regulator.	CO3,CO5, CO6
10	Implementation of half wave and full wave rectifiers.	CO3,CO5, CO6
11	Plot Input & Output characteristics of BJT in CE and CB configurations.	CO3,CO5, CO6
12	Frequency response of CE amplifier.	CO3,CO5, CO6
13	Simulation of RC coupled amplifier with the design supplied.	CO3,CO5, CO6
14	Verification of Truth Table of AND, OR, NOT, NAND, NOR, Ex-OR, Ex-NOR gates using ICs.	CO4,CO5, CO6
15	Verification of Truth Tables of S-R, J-K& D flip flops using respective ICs.	CO4,CO5, CO6

Learning Resources

Reference Books (PART-A)

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

Reference Books (PART-B)

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

ELECTRICAL CIRCUITS LAB

Course Code	23EE3251	**Year**	I	**Semester(s)**	II
Course Category	Professional Core	**Branch**	EEE	**Course Type**	Lab
Credits	1.5	**L-T-P**	0-0-3	**Prerequisites**	NIL
Continuous Internal Evaluation:	**30**	**Semester End Evaluation:**	**70**	**Total Marks:**	**100**

Course Outcomes	
Upon successful completion of the course, the student will be able to	
CO1	**Apply** fundamental laws of electrical circuits to verify Kirchhoff's circuit laws, network reduction techniques, node and mesh analysis.
CO2	**Apply** various theorems to compare practical results obtained with theoretical calculations.
CO3	**Determine** resistance, self, mutual inductances and coefficient of coupling values, parameters of choke coil.
CO4	**Plot** locus diagrams of RL, RC series circuits and examine series and parallel resonance.
CO5	Conduct experiments as a **team / individual** by using equipment available in the laboratory
CO6	Make an effective **report** based on experiments

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3:High, 2: Medium, 1:Low)

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	3			3									3	1
CO2		3		3									3	1
CO3	3			3									3	1
CO4		3		3									3	1
CO5									3				3	1
CO6										3			3	1

Syllabus		
Exp. No.	Contents	Mapped CO
Any Ten Experiments		
1	Verification of Kirchhoff's circuit laws.	CO1 CO5 CO6
2	Verification of node and mesh analysis.	
3	Verification of network reduction techniques.	
4	Determination of cold and hot resistance of an electric lamp	CO3 CO5 CO6
5	Determination of Parameters of a choke coil.	
6	Determination of self, mutual inductances, and coefficient of coupling	
7	Series and parallel resonance	CO4 CO5 CO6
8	Locus diagrams of R-L (L Variable) and R-C (C Variable) series circuits	
9	Verification of Superposition theorem	CO2 CO5 CO6
10	Verification of Thevenin's and Norton's Theorems	
11	Verification of Maximum power transfer theorem	
12	Verification of Compensation theorem	
13	Verification of Reciprocity and Millman's Theorems	

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

NSS/NCC/SCOUTS & GUIDES/ COMMUNITY SERVICE

Course Code	23MC1241	Year	I	Semester	II
Course Category	MC	Branch	EEE	Course Type	MC
Credits	0.5	L-T-P	0-0-1	Prerequisites	-
Continuous Internal Evaluation:	100	Semester End Evaluation:	-	Total Marks:	100

Course Outcomes	
Upon successful completion of the course, the student will be able to	
CO1	Outline the importance of discipline, character and service motto. (L2)
CO2	Solve some societal issues by applying acquired knowledge, facts, and techniques. (L3)
CO3	Explore human relationships by analyzing social problems. (L3)
CO4	Determine to extend their help for the fellow beings and downtrodden people. (L4)
CO5	Develop leadership skills and civic responsibilities. (L4)

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3:High, 2: Medium, 1:Low)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1						2	3		2			1		
CO2						2	3		2			1		
CO3						2	3		2			1		
CO4						2	3		2			1		
CO5						2	3		2			1		

Syllabus		
Exp. No.	Contents	Mapped CO
Experiments		
1	**UNIT- I: Orientation** General Orientation on NSS activities, career guidance. **Activities:** i) Conducting –ice breaking sessions-expectations from the course-knowing personal talents and skills ii) Conducting orientations programs for the students – future plans-activities-releasing road map etc. iii) Displaying success stories-motivational biopics- award winning movies on societal issues etc. iv) Conducting talent show in singing patriotic songs- paintings- any other contribution.	CO1
2	**UNIT- II: Nature & Care Activities:** 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) Organizing 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.	CO2 CO5
3	**UNIT- III: Community Service Activities:** i) Conducting One Day Special Camp in a village contacting village-area leaders- Surveyin the village, identification of problems- helping them to solve via media- authorities-experts-etc. ii) Conducting awareness programs on Health-related issues such as General Health,Mental health, Spiritual Health, HIV/AIDS, iii) Conducting consumer Awareness. Explaining various legal provisions etc. iv) Women Empowerment Programmes- Sexual Abuse, Adolescent Health and Population Education. v) Any other programmes in collaboration with local charities, NGOs etc.	CO3 CO4 CO5

Learning Resources
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. National Service Scheme Manual (Revised), 2006, Government of India.
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 Environmental Engineering and Science*, Pearson Education, New Delhi. 2/e 2007
5. Ram Ahuja. *Social Problems in India*, Rawat Publications, New Delhi.