ACADEMIC REGULATIONS, PROGRAM STRUCTURE AND SYLLABUS (DR24)

CIVIL ENGINEERING

For
(Applicable to the batches admitted from (2024-25)
(I To IV Semesters)

D N R COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous)

Approved by AICTE, New Delhi & Permanently Affiliated to JNTUK, Kakinada
Accredited by NBA (B. Tech – CSE, ECE & EEE) & NAAC with A++ Grade
Balusumudi, Bhimavaram-2, West Godavari District, Andhra Pradesh
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ABOUT D N R COLLEGE OF ENGINEERING & TECHNOLOGY

Dantuluri Narayana Raju College (D.N.R) was established in 1945, before India got Independence, and was an offshoot of the National movement and renaissance thinking. Being agrarian, the Godavari region had been kept out of the higher education in the Pre-Independence period. Sri Dantuluri Narayana Raju, a freedom fighter, an activist and a visionary wanted to provide the uneducated rural masses with the hither to unthinkable and unreachable source for their overall development and welfare i.e. higher education. That visionary, with the help of a limited number of committed lieutenants and Philanthropists, strived hard with a missionary zeal and realised the establishment of a college at Bhimavaram, Known as West Godavari Bhimavaram (W.G.B) College in **1945.**

In 1964 it was renamed as Dantuluri Narayana Raju (D.N.R) College in memory of its founder. Under this premier association DNR College of Engineering & Technology was established in the year 2010. DNRCET offers B.Tech programmes in Civil Engineering, Electrical and Electronics Engineering, Mechanical Engineering, Electronics and Communication Engineering and Computer Science Engineering and allied branches, Four M Tech Programmes in the Civil Engineering, Mechanical engineering, Electronics and Communication Engineering and Computer Science Engineering.

The institute has been running successfully with the support of well qualified and committed faculty for the last nine years serving the needs of the people in and around this area besides extending the hands to other districts also. The college has a motto of providing quality engineering education through well-defined teaching learning methodologies following by the curriculum of JNTUK, Kakinada in a highly disciplinal environment.

The DNR College of Engineering & Technology is also conducting several training programs, workshops, expert lectures, awareness programs etc, in different disciplines for facilitating the students to face the interviews by the time they complete their graduation.

Apart from the technical programs mentioned above, the institution is also serving the society by different means through its NSS unit. It is a great privilege that many students have membership in technical bodies like ISTE & CSI. The dedicated placement cell regularly conducts grooming sessions making students industry-fit.

VISION & MISSION OF THE INSTITUTE

VISION

To evolve as a Centre of Excellence in Teaching, Innovative Research, Entrepreneurship and consultation in engineering and technology and empower the rural youth as globally competitive and self-disciplined technocrats.

MISSION

IM1: Inculcate technical knowledge, and soft skills through student centric teaching-learning process.

IM2: Strengthen industry institute interaction to provide solutions to the ever-changing   requirements.

IM3: Create a work culture that encourage learning, Research & development.

IM4: Develop a unique practice that instills responsibility and accountability in association with stakeholders.

VISION & MISSION OF THE DEPARTMENT

VISION

To be recognized Centre of Excellence for providing high-quality Civil Engineering education.

MISSION

DM1: To provide time-trusted technical education to serve industry needs.

DM2: To provide state-of-the-art infrastructure and encourage logical thinking to face challenges.

DM3: To organize trainings and development workshops with emphasis on structural engineering.

DM4: To Involve in activities for the overall development of stakeholders with collaborations

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

Graduates of the Program will

PEO 1	Apply fundamentals for successful profession and/or for higher education in civil engineering
PEO 2	Use modern engineering tools for planning, design, execution and maintenance of works with sustainable development in the chosen profession.
PEO 3	Display communication skills and leadership quality needed to deal with industry and society.

PROGRAM OUTCOMES (POs)

After successful completion of the program, the graduates will be able to

PO1	Apply knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.
PO2	Identify, formulate, research literature and analyze complex engineering problems, reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.
PO3	Design solutions for complex engineering problems and design systems, components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.
PO4	Conduct investigations of complex problems using research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions.
PO5	Create, select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling, to complex engineering activities, with an understanding of the limitations.
PO6	Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice.
PO7	Understand the impact of professional engineering solutions in societal and environmental contexts and demonstrate knowledge of, and need for sustainable development.
PO8	Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice.
PO9	Function effectively as an individual, and as a member or leader in diverse teams and in multidisciplinary settings.
PO10	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.
PO11	Demonstrate knowledge and understanding of engineering management principles and apply these to one's own work, as a member and leader in a team and to manage projects in multidisciplinary environments.
PO12	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)

After successful completion of the program, the graduates will be able to

PSO 1	Design and execute of quality construction works
PSO 2	Use STAAD.Pro and ETABS for analyzing structures

Mission of the department – PEOs mapping

PEOs Statements		M1	M2	M3	M4
PEO1	Apply fundamentals for successful profession and/or for higher education in civil engineering.	3	3	2	2
PEO2	Use modern engineering tools for planning, design, execution and maintenance of works with sustainable development in the chosen profession..	2	3	3	2
PEO3	Exhibit professionalism, ethical attitude, communication and managerial skills, team work, social responsibility and adapt to current trends.	2	3	2	3

Note:.

Bloom's Taxonomy Knowledge Level	Knowledge Level Representation
Remember	K1
Understand	K2
Apply	K3
Analyse	K4
Evaluate	K5

Mapping / Correlation levels
1: Slight (Low)
2: Moderate (Medium)
3: Substantial (High)

(Effective for the students admitted into I year from the Academic Year **2024-25** onwards)

DNR College of Engineering & Technology 2024 Regulations (DR24 Regulations) applicable to all programmes given hereunder. These regulations govern the B. Tech. programmes offered by all the Departments with effect from the students admitted into the programmes from academic year 2024-25.

1. **Courses of Study**

The following programmes of study are offered at present as specializations for the B. Tech. programmes in DNR College of Engineering & Technology, Bhimavaram.

S.No.	Programme	Code	Short Name
1	Civil Engineering	01	CE
2	Electrical & Electronics Engineering	02	EEE
3	Mechanical Engineering	03	ME
4	Electronics & Communication Engineering	04	ECE
5	Computer Science & Engineering	05	CSE
6	Information Technology	12	IT
7	Artificial Intelligence and Data Science	54	AI & DS
8	Artificial Intelligence and Machine Learning	42	CSE(AIML)

2. **Award of the Degree**

   a. **Award of the B.Tech. Degree / B.Tech. Degree** with a Minor if he/she fulfills the following:
      i. Pursues a Programme 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:** A student will be declared eligible for the award of the B.Tech with Honors if he/she fulfills 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.

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

4. **Admissions**

   Admission to the B. Tech Program shall be made subject to the eligibility, qualifications and specialization prescribed by the A.P. State Government/JNTUK 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.

5. **Program related terms**

   Credit: A unit by which the course work is measured. It determines the number of hours of instruction required per week. One credit is equivalent to one hour of teaching

(Lecture/Tutorial) or two hours of practical work/field work per week.

Credit Definition:

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

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

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

6. Semester/Credits:

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

b. 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.

c. Regular courses may also be offered during the summer on a fast-track mode to enable students to do additional courses or complete backlogs in a course work.

d. The college can decide on the courses to be offered in the summer term depending on the availability of the faculty and the number of students.

7. Structure of the Undergraduate Programme

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

S.No.	Category	Breakup of Credits (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	-

8. Course Classification:

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

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

9. Programme Pattern

i. Total duration of the of B. Tech (Regular) Programme is four academic years.
ii. Each academic year of study is divided into two semesters.
iii. Minimum number of instruction days in each semester is 90 days.

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

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

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

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

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

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

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

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

xii. A pool of interdisciplinary/job-oriented/domain skill courses which are relevant to the industry are integrated into the curriculum of all disciplines. There shall be 05 skill-oriented courses offered during III to VII semesters. Among the five skill courses, four courses shall focus on the basic and advanced 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 College for the students having good academic record.

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

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

10. Evaluation Process

The performance of a student in each semester shall be evaluated course 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 internally for 30 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 internal evaluation and semester 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 and practical courses, the distribution shall be 30 marks for continuous Internal Evaluation and 70 marks for the Semester End-Examination.

II. 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 semester end examination question paper shall be set with two parts each for 35 marks.

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

a) Continuous Internal Evaluation

I. For theory courses, during the semester, there shall be two internal examinations. Each internal 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 5 marks.

i. 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 5 marks. Any fraction shall be rounded off to the next higher mark.

● The objective paper shall be conducted 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.

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

ii. The first internal examination shall be conducted for I, II and half of the III unit syllabus with one either or type question from each unit. The second internal examination shall be conducted for remaining half of the syllabus from III unit, IV and V units with one either or type question from each unit

i. Final internal marks shall be arrived at by considering the marks secured by the student in both the internal examinations with 80% weightage given to the better mid exam and 20% to the other.
   For Example:
   Marks obtained in first internal   : 25
   Marks obtained in second internal : 20
   Final internal Marks: (25x0.8) + (20x0.2) = 24

If the student is absent for any one internal examination, the final internal 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 internal   : Absent
   Marks obtained in second internal : 25
   Final internal Marks: (25x0.8) + (0x0.2) =20

a) End Examination Evaluation:
End examination of theory courses shall have the following pattern:
i. Part-A shall contain 10 compulsory short answer questions for a total of 20marks such that each question carries 2 marks.

ii. There shall be 2 short answer questions from each unit.

iii. In each of the questions in Part-B, there shall be either/or type questions of 10 marks each. Student shall answer any one of them.

iv. The questions from 2 to 11 in part-B shall be set by covering one unit of the syllabus for each question either/or type.

End examination of theory courses consisting of two parts of different courses, *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. Part-A shall contain 10 compulsory short answer questions for a total of 10 marks such that each question carries 1mark.

iii. Part-B contains Six either/or type questions of 10 marks each. Students shall answer any one of them.

iv. All the questions in Part-B 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 course 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. Internal examination shall be evaluated for 30 marks in each part and final internal marks shall be arrived by considering the average of marks obtained in two parts.

d) For the course having design and/or drawing, such as Engineering Drawing/Graphics, the distribution of marks shall be 30 for continuous evaluation and 70 for semester 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 internal examinations in a semester for duration of 2 hours each for 15 marks with weightage of 80% to better internal exam 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 internal examination. The sum of day-to-day evaluation and the internal exam marks will be the final internal marks for the course.

The end examination pattern for Engineering Drawing/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 courses 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 internal exam test papers shall be preserved for a minimum of 3 years in the respective Departments as per the College/University norms and shall be produced to the Committees of the College/University as and when the same are asked for.

11. Skill oriented Courses

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

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

iii) The course shall carry 100 marks and shall be evaluated through continuous assessments during the semester for 30 internal 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 Controller of Examinations/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 Department/ 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 College at the beginning of the semester.

vii) If a student prefers to take a certificate course offered by external agency, the concerned 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 College.

12. Massive Open Online Courses (MOOCs):

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

A student shall register for the course (Minimum of either 8 weeks or 12 weeks) offered through MOOCs with the approval of Head of the Department. The Head of the Department shall

appoint one mentor to monitor the student's progression. The student needs to earn a certificate by passing the exam. The student shall be awarded the credits assigned in the curriculum only by submission of the certificate. Examination fee, if any, will be borne by the student.

Students who have qualified in the proctored examinations conducted through MOOCs platform can apply for credit transfer as specified and are exempted from appearing internal as well as external examination (for the specified equivalent credit course only) conducted by the university. Necessary amendments in rules and regulations regarding adoption of MOOC courses would be proposed from time to time.

13. Credit Transfer Policy

Adoption of MOOCs is mandatory, to enable Blended model of teaching-learning as also envisaged in the NEP 2020. As per University Grants Commission (Credit Framework for Online Learning Courses through SWAYAM) Regulation, 2016, the Institution 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 College 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 Institution/Department shall notify at the beginning of semester the list of the online learning courses eligible for credit transfer.
vi) The institution/Department 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 Institution shall ensure no overlap of MOOC exams with that of the semester end examinations. 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 concerned Departments shall submit the following to the examination section of the Institution:

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.

c) The Institution 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 Department/Institution from time to time.

14. Academic Bank of Credits (ABC)

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

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

15. Mandatory Internships

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

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 Institution and is evaluated for 140 marks.

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

16. Guidelines for offering a Minor

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

i)   The Minor program requires the completion of 12 credits in Minor stream chosen.

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

iii) Electives (minimum of 2 courses) to complete a total of 12 credits.

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

17. Guidelines for offering Honors

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

i)   Honors is introduced in the curriculum of all B. Tech. programs offering a major degree and is applicable to all B. Tech (Regular and Lateral Entry) students admitted in Engineering & Technology.

ii) A student shall earn additional 15 credits for award of B.Tech.(Honors) degree from same branch/department/discipline registered for major degree. This is in addition to the credits essential for obtaining the Undergraduate degree in Major Discipline (i.e., 160 credits).

iii) A student is permitted to register for Honors in IV semester after the results of III Semester are declared and students may be allowed to take maximum two subjects per semester pertaining to the Honors from V Semester onwards.

iv) The concerned HOD shall arrange separate class work and timetable of the courses offered under Honors program.

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

vi) Students can complete the courses offered under Honors either in the college or in online platforms like SWAYAM with a minimum duration of 12 weeks for a 3-credit course and

vii) 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.

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

ix) A student shall maintain an attendance of 75% in all registered courses under Honors to be eligible for attending semester end examinations.

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

xi) If a student drops or is terminated from the Honors program, the additional credits so far

earned cannot be converted into open or core electives; they will remain extra. However, such students will receive a separate grade sheet mentioning the additional courses completed by them.

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

Enrolment into Honors:

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

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

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

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

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

Registration for Honors:

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

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

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

18. Attendance Requirements

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

ii) subjects. Condonation of shortage of attendance in aggregate up to 10% (65% and above and below 75%) in each semester may be granted by the College Academic Committee.

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

iv) A stipulated fee shall be payable towards condonation of shortage of attendance to the College.

v) 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.

vi) 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.

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

viii) 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.

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

19. Promotion Rules

The following academic requirements must be satisfied in addition to the attendance requirements mentioned in section 16.

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

20. Grading

As a measure of the student's performance, a 10-point Absolute Grading System using the following Letter Grades and corresponding percentage of marks shall be followed:
After each course is evaluated for 100 marks, the marks obtained in each course will be converted to a corresponding letter grade as given below, depending on the range in which the marks obtained by the student fall.

Structure of Grading of Academic Performance

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

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

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

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

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

where, C_i is the number of credits of the ith subject and G_i 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.,

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

where "S_i" is the SGPA of the ith semester and C_i 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	$\geq 6.5 < 7.5$
Second Class	$\geq 5.5 < 6.5$
Pass Class	$\geq 5.0 < 5.5$

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

21. Withholding of Results

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

22. Multiple Entry / Exit Option

a. Exit Policy:

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

i) **UG Certificate in (Field of study/discipline)** - Programme duration: First year (first two semesters) of the undergraduate programme, 40 credits followed by an additional exit 10-credit bridge course(s) lasting two months, including at least 6- credit job-specific internship/ apprenticeship that would help the candidates acquire job-ready competencies required to enter the workforce.

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

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

b. Entry Policy:

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

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

23. Gap Year Concept

Gap year concept for Student Entrepreneur in Residence is introduced and outstanding students who wish to pursue entrepreneurship / become entrepreneur are allowed to take a break of one year at any time after II year to pursue full-time entrepreneurship programme/to establish 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 Institution . 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

24. Transitory Regulations

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

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

25. Minimum Instruction Days for a Semester:

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

26. Medium of Instruction:

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

27. Student Transfers:

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

28. General Instructions:

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

II. Malpractices rules-nature and punishments are appended.

III. Where the words "he", "him", "his", occur in the regulations, they also include "she", "her", "hers", respectively.

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

V. The Institute 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 institute.

VI. In the case of any doubt or ambiguity in the interpretation of the guidelines given, the decision of the Head of the institution is final.

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XX

ACADEMIC REGULATIONS (DR24) FOR B.TECH.

(LATERAL ENTRY SCHEME)

*(Effective for the students admitted into II year through Lateral Entry Scheme from the Academic Year **2025-26** 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 programme 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 fulfil the requirement for the award of the degree within <u>six</u> 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 internal 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.
      iii. And in case if student is already detained for want of credits for particular academic year, the student may make up the credits through supplementary exams of the above exams before the commencement of IV year I semester class work of next year.

4. **Course Pattern**

      i. The entire course of study is three academic years on semester pattern.
      ii. A student eligible to appear for the end examination in a subject but absent at it or has failed in the end examination may appear for that subject at the next supplementary examination offered.
      iii. When a student is detained due to lack of credits/shortage of attendance the student may be re-admitted when the semester is offered after fulfilment of academic regulations, the student shall be in the academic regulations into which he/she is readmitted.

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

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B.Tech. - COURSE STRUCTURE – DR24
(Applicable from the academic year 2024-25 onwards)
INDUCTION PROGRAMME

S.No.	Course Name	Category	L-T-P-C
1	Physical Activities -- Sports, Yoga and Meditation, Plantation	MC	0-0-6-0
2	Career Counselling	MC	2-0-2-0
3	Orientation to all branches -- career options, tools, etc.	MC	3-0-0-0
4	Orientation on admitted Branch -- corresponding labs, tools and platforms	EC	2-0-3-0
5	Proficiency Modules & Productivity Tools	ES	2-1-2-0
6	Assessment on basic aptitude and mathematical skills	MC	2-0-3-0
7	Remedial Training in Foundation Courses	MC	2-1-2-0
8	Human Values & Professional Ethics	MC	3-0-0-0
9	Communication Skills -- focus on Listening, Speaking, Reading, Writing skills	BS	2-1-2-0
10	Concepts of Programming	ES	2-0-2-0

Group-A Branches:

CSE (05), B. Tech-AIDS (54) & CSE- AIML(42)

Group-B Branches:

CE(01), EEE (02), ME (03), ECE (04), & IT(12)

DR24

ENGINEERING CURRICULUM

W.e.f. 2024-25

I YEAR – I SEMESTER

B.Tech. (Regular-Full time)

(Effective for the students admitted into I year from
The Academic Year **2024-25** onwards)

EPARTMENT OF BASIC SCIENCE AND HUMANITIES

B.Tech. I Year I Semester (for Group –A Branches - CSE, AID, CSM)

S.No.	Category	Subject Code	Title	L/D	T	P	Credits
1	BS&H	BT24BS1101	Communicative English	2	0	0	2
2	BS&H	BT24BS1102	Chemistry	3	0	0	3
3	BS&H	BT24BS1103	Linear Algebra & Calculus	3	0	0	3
4	Engineering Science	BT24CE1101	Basic Civil & Mechanical Engineering	3	0	0	3
5	Engineering Science	BT24CS1101	Introduction to Programming	3	0	0	3
6	BS&H	BT24BS1105	Communicative English Lab	0	0	2	1
7	BS&H	BT24BS1106	Chemistry Lab	0	0	2	1
8	Engineering Science	BT24ME1103	Engineering Workshop	0	0	3	1.5
9	Engineering Science	BT24CS1103	Computer Programming Lab	0	0	3	1.5
10	BS&H	BT24BS1108	Health and wellness, Yoga and Sports	-	-	1	0.5
Total				**14**	**0**	**11**	**19.5**

B.Tech. I Year I Semester (for Group – B Branches – (CE, EEE, ME, ECE & IT)

S.No	Category	Subject code	Title	L/D	T	P	Credits
1	BS&H	BT24BS1104	Engineering Physics	3	0	0	3
2	BS&H	BT24BS1103	Linear Algebra & Calculus	3	0	0	3
3	Engineering Science	BT24EE1101	Basic Electrical & Electronics Engineering	3	0	0	3
4	Engineering Science	BT24ME1101/ BT24ME1102	Engineering graphics/ Engineering drawing	1	0	4	3
5	Engineering Science	BT24CS1101	Introduction to Programming	3	0	0	3
6	Engineering Science	BT24CS1102	IT Workshop	0	0	2	1
7	BS& H	BT24BS1107	Engineering Physics Lab	0	0	2	1
8	Engineering Science	BT24EE1102	Electrical & Electronics Engineering Workshop	0	0	3	1.5
9	Engineering Science	BT24CS1103	Computer Programming Lab	0	0	3	1.5
10	BS&H	BT24BS1109	NSS/NCC/Scouts & Guides/ Community Service	-	-	1	0.5
Total				**13**	**0**	**15**	**20.5**

DEPARTMENT OF BASIC SCIENCE AND HUMANITIES

I Year- I Semester	Course Code: BT24BS1101	L	T	P	C
		2	0	0	2
	COMMUNICATIVE ENGLISH *(Common to All Branches of Engineering)*				

Course Objectives:

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

Course Outcomes:

CO1: Understand the context, theme, and pieces of specific information from social or Transactional dialogues.

CO2: Apply the principles of writing skills and cohesive devices in paragraphs and formal/informal communication.

CO3: Build confidence and creative thinking by challenging the hardships in life.

CO4: Discover the peace and amicable relations in human development.

CO5: Perceive the personal traits and communicative competence in the form of interpersonal communication.

CO6: Form error free sentences in communication by using proper grammatical structures and correct word forms.

CO/PO/PSO Mapping:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS O1	PS O2
CO1	-	-	-	-	-	-	-	-	-	3	-	-	-	-
CO2	-	-	-	-	-	-	-	-	-	3	-	2	-	-
CO3	-	-	-	-	-	-	-	-	-	3	-	-	-	-
CO4	-	-	-	-	-	-	-	-	-	3	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	3	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	3	-	3	-	-

UNIT I   Lesson: HUMAN VALUES: Gift of Magi (Short Story)

Listening: Identifying the topic, the context and specific pieces of information by listening to short audio texts and answering a series of questions.

Speaking: Asking and answering general questions on familiar topics such as home, family, work, studies and interests; introducing oneself and others.

Reading: Skimming to get the main idea of a text; scanning to look for specific pieces of information.

Writing: Mechanics of Writing-Capitalization, Spellings, Punctuation-Parts of Sentences.

Grammar: Parts of Speech, Basic Sentence Structures-forming questions

Vocabulary: Synonyms, Antonyms, Affixes (Prefixes/Suffixes), Root words.

UNIT II   Lesson: NATURE: The Brook by Alfred Tennyson (Poem)

Listening: Answering a series of questions about main ideas and supporting ideas after listening to audio texts.

Speaking: Discussion in pairs / small groups on specific topics followed by short structure talks

Reading: Identifying sequence of ideas; recognizing verbal techniques that help to link the ideas in a paragraph together.

Writing: Structure of a paragraph - Paragraph writing (specific topics)

Grammar: Cohesive devices - linkers, use of articles and zero article; prepositions.

Vocabulary: Homonyms, Homophones, Homographs.

UNIT III   Lesson: BIOGRAPHY: Elon Musk

Listening: Listening for global comprehension and summarizing what is listened to.

Speaking: Discussing specific topics in pairs or small groups and reporting what is discussed

Reading : Reading a text in detail by making basic inferences -recognizing and interpreting specific context clues; strategies to use text clues for comprehension.

Writing   : Summarizing, Note-making, paraphrasing

Grammar: Verbs - tenses; subject-verb agreement; Compound words, Collocations

Vocabulary: Compound words, Collocations

UNIT IV   Lesson: INSPIRATION: The Toys of Peace by Saki

Listening: Making predictions while listening to conversations/ transactional dialogues without video; listening with video.

Speaking: Role plays for practice of conversational English in academic contexts (formal and informal) - asking for and giving information/directions.

Reading: Studying the use of graphic elements in texts to convey information, reveal trends/patterns/relationships, communicate processes or display complicated data.

Writing: Letter Writing: Official Letters, Resumes

Grammar: Reporting verbs, Direct & Indirect speech, Active & Passive Voice

Vocabulary: Words often confused, Jargons

UNIT V   Lesson: MOTIVATION: The Power of Intrapersonal Communication (An Essay)

Listening: Identifying key terms understanding concepts and answering a series of relevant questions that test comprehension.

Speaking: Formal oral presentations on topics from academic contexts

Reading: Reading comprehension.

Writing: Writing structured essays on specific topics.

Grammar: Editing short texts –identifying and correcting common errors in grammar and usage (articles, prepositions, tenses, subject verb agreement)

Vocabulary: Technical Jargons

Textbooks:

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

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

Reference Books:

3. Dubey, Sham Ji & Co. English for Engineers, Vikas Publishers, 2020

4. Bailey, Stephen. Academic writing: A Handbook for International Students, Routledge,2014.

5. Murphy, Raymond. English Grammar in Use, Fourth Edition, Cambridge University Press, 2019.

DEPARTMENT OF BASIC SCIENCE AND HUMANITIES

I Year- I Semester	Course Code: BT24BS1102	L	T	P	C
		3	0	0	3
	CHEMISTRY *(Common to CSE, AIML, AIDS)*				

Course Objectives:
- To familiarize engineering chemistry and its applications
- To train the students on the principles and applications of electrochemistry and polymers

Course Outcomes:
At the end of the course, the students will be able to:
CO1: Understand the fundamentals of Quantum mechanics and Molecular Orbital Theory)
CO2: Apply the basic principles of semiconductors, super conductors, and nanomaterials in real world applications. .
CO3: Compare the materials for construction of batteries and electrochemical sensors.
CO4: Explain the preparation, properties, and applications of thermoplastics, thermosetting, elastomers and conducting polymers
CO5: Summarize the concepts of Instrumental methods.
CO6: Define the principles of spectrometry, slc in separation of solid and liquid mixtures.

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO 12	PS O1	PS O2
CO1	3	2	2	-	-	-	-	-	-	-	-	1	-	-
CO2	3	2	2	-	-	-	-	-	-	-	-	2	-	-
CO3	2	2	2	-	-	-	-	-	-	-	-	2	-	-
CO4	3	2	2	-	-	-	-	-	-	-	-	2	-	-
CO5	3	2	2	-	-	-	-	-	-	-	-	2	-	-
CO6	3	2	2	-	-	-	-	-	-	-	-	1	-	-

UNIT -I: Structure and Bonding Models   **(10Hours)**
Fundamentals of Quantum mechanics, Schrodinger Wave equation, significance of Ψ and $\Psi2$, particle in one dimensional box, molecular orbital theory – bonding in homo- and heteronuclear diatomic molecules– energy level diagrams of O_2 and CO, etc. π-molecular orbitals of butadiene and benzene, calculation of   bond order.

UNIT -II: Modern Engineering materials   **(10Hours)**
Semiconductors – Introduction, basic concept, application
Super conductors-Introduction basic concept, applications.
Super capacitors: Introduction, Basic Concept-Classification – Applications.
Nano materials: Introduction, classification, properties and applications of Fullerenes, carbon nano tubes and Graphene nanoparticles.

UNIT -III: Electrochemistry and Applications   (10Hours)

Electrochemical cell, Nernst equation, cell potential calculations and numerical problems, potentiometer- potentiometric titrations (redox titrations), concept of conductivity, conductivity cell, conductometric titrations (acid-base titrations).

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). Electrochemical sensors – potentiometric sensors with examples, amperometric sensors with examples

Electrochemical sensors – potentiometric sensors with examples, amperometric sensors with examples.

UNIT -IV: Polymer Chemistry   (10Hours)

Introduction to polymers, functionality of monomers, chain growth and step growth polymerization, coordination polymerization, with specific examples and mechanisms of polymer formation.

Plastics –Thermo and Thermosetting plastics, Preparation, properties and applications of – PVC, Teflon, Bakelite, Nylon-6,6, carbon fibres.

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

UNIT -V: Instrumental Methods and Applications   (10Hours)

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

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

Reference Books:
1. 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. Text book of Polymer Science, Fred W. Billmayer Jr., 3rd Edition
4. A text book of Engineering Chemistry by Sashi Chawala, Dhanpat Rai & Co. 2017

DEPARTMENT OF BASIC SCIENCE AND HUMANITIES

I Year- I Semester	Course Code: BT24BS1103	L	T	P	C
		3	0	0	3
	LINEAR ALGEBRA&CALCULUS *(Common to All Branches of Engineering)*				

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

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

CO1: Describe the basic properties on elementary row and column operations

CO2: Solve a given system of linear algebraic equations.

CO3: Find the Characteristic equation, Eigen values & Eigen vectors.

CO4: Utilize mean value theorems to real life problems.

CO5: Apply the concept of the partial differentiation in various engineering fields.

CO6: Evaluate double, triple integrals and their applications.

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

UNIT-I   Matrices   10 hr
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, Gauss elimination method, Jacobi and Gauss Seidel Iteration Methods.

UNIT-II   Eigen values, Eigen vectors and Orthogonal Transformation   10 hr
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.

UNIT-III   Calculus   8 hr
Mean Value Theorems: Rolle's Theorem, Lagrange's mean value theorem with their geometrical interpretation, Cauchy's mean value theorem, Taylor's and Maclaurin theorems with remainders (without proof), Problems and applications on the above theorems.

UNIT-IV   Partial differentiation and Applications (Multivariable calculus)   10 hr
Functions of several variables: Continuity and Differentiability, Partial derivatives, total derivatives, chain rule, Directional derivative, 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.

UNIT-V   Multiple Integrals (Multi variable Calculus)   10 hr

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

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

Reference Books:
1. Thomas Calculus, George B.Thomas, Maurice D.Weirand Joel Hass, Pearson Publishers, 2018, 14th Edition.
2. Advanced Engineering Mathematics, R.K.Jain and S.R.K.Iyengar, Alpha Science International Ltd., 20215th Edition(9th reprint).
3. Advanced Modern Engineering Mathematics, Glyn James, Pearson publishers, 2018, 5thEdition.
4. Advanced Engineering Mathematics, Micheael Greenberg,Pearson publishers, 9thedition
5. Higher Engineering Mathematics, H.KDas, Er.RajnishVerma, S.Chand Publications,2014, Third Edition (Reprint 2021)

DEPARTMENT OF CIVIL ENGINEERING & DEAPRTMENT OF MECHANICAL ENGINEERING

I Year- I Semester	Course Code: BT24CE1101	L	T	P	C
		3	0	0	3
	BASIC CIVIL AND MECHANICAL ENGINEERING *(Common to All branches of Engineering)*				

Course Objectives:

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

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

CO1: Understand the various sub divisions of Civil Engineering and their role in ensuring better society.

CO2: Know the objectives of surveying and understand the measurement of distances, angles and levels through surveying

CO3: Understand the role of Transportation Engineering in Nation's economy and importance of Water Resource Engineering and Environmental Engineering.

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

Part A: BASIC CIVIL ENGINEERING

UNIT I

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.

UNIT II

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

UNIT III

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).

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.

Online learning resources :

1. https://archive.nptel.ac.in/courses/105/102/105102012/

2.https://archive.nptel.ac.in/content/storage2/courses/105104098/TransportationII/lecture6/2slide.htm

PART B: BASIC MECHANICAL ENGINEERING

Course Objectives: The students after completing the course are expected to
• Get familiarized with the scope and importance of Mechanical Engineering in different sectors and industries.
• Explain different engineering materials and different manufacturing processes.
• Provide an overview of different thermal and mechanical transmission systems and introduce basics of robotics and its applications.

Course Outcomes: On completion of the course, the student should be able to:
   CO4: **Understand** the different manufacturing processes.
   CO5: **Explain** the basics of thermal engineering and its applications and the working of different mechanical power transmission systems and power plants.
   CO6: **Describe** the basics of robotics and its applications

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO4	2	-	-	-	-	2	2	-	-	-	-	-	1	-
CO5	2	1	-	-	1	1	-	-	-	-	-	-	-	-
CO6	1	-	-	-	-	1	1	-	-	-	-	-	-	-

UNIT I
Introduction to Mechanical Engineering: Role of Mechanical Engineering in Industries and Society-Technologies in different sectors such as Energy, Manufacturing, Automotive, Aerospace, and Marine sectors.
Engineering Materials - Metals-Ferrous and Non-ferrous, Ceramics, Composites, Smart materials.

UNIT II
Manufacturing Processes: Principles of Casting, Forming, joining processes, Machining, Introduction to CNC machines, 3D printing, and Smart manufacturing.
Thermal Engineering – Working principle of Boilers, Otto cycle, Diesel cycle, Refrigeration and air-conditioning cycles, IC engines, 2-Stroke and 4-Stroke engines, SI/CI Engines, Components of Electric and Hybrid Vehicles.

UNIT 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.

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

Textbooks:

1. Internal Combustion Engines by V.Ganesan, By Tata McGraw Hill publications (India) Pvt. Ltd.
2. A 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
4. Appuu Kuttan KK, Robotics, I.K. International Publishing House Pvt. Ltd. Volume-I

DEPARTMENT OF COMPUTER SCIENCE ENGINEERING

I Year- I Semester	Course Code: BT24CS1101	L	T	P	C
		3	0	0	3
	INTRODUCTION TO PROGRAMMING *(Common to All branches of Engineering)*				

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

Course Outcomes: A student after completion of the course will be able to
CO1: Understand basics of computers, the concept of algorithm and algorithmic thinking (L2)
CO2: Analyse a problem and develop an algorithm to solve it (L4).
CO3: Implement various algorithms using the C programming language (L4).
CO4: Understand more advanced features of C language (L2).
CO5: Develop problem-solving skills and the ability to debug and optimize the code (L6).
CO6: Apply file input–output operations (L3)

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

UNIT 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 (Using Dia Tool), 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 and space complexities of algorithms.

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

UNIT III Arrays and Strings
Arrays indexing, memory model, programs with array of integers, two dimensional arrays, Introduction to Strings.

UNIT IV Pointers & User Defined Data types

Pointers, dereferencing and address operators, pointer and address arithmetic, array manipulation using pointers, User-defined data types-Structures and Unions.

UNIT 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. Scope and Lifetime of Variables, Basics of File Handling

Note: The syllabus is designed with C Language as the fundamental language of implementation.

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

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

DEPARTMENT OF BASIC SCIENCE AND HUMANITIES

I Year- I Semester	Course Code: BT24BS1105	L	T	P	C
		0	0	2	1
	COMMUNICATIVE ENGLISH LAB *(Common to All Branches of Engineering)*				

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

Course Outcomes:

CO1: Distinguish the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension in day to day conversations.
CO2: Demonstrate communication skills through various language learning activities
CO3: Apply the writing skills in e-mail Writing and Resume Writing.
CO4: Appraise and manifest professionalism in participating group discussions and debates.
CO5: Exhibit the effective interpersonal skills in presentations and interviews
CO6: Understand the different aspects of the English language proficiency with emphasis on LSRW skills.

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PO 12	PS O1	PS O2
CO1	-	-	-	-	3	-	-	-	1	1	-	-	-	-
CO2	-	-	-	-	-	-	-	-	3	3	-	1	-	-
CO3	-	-	-	-	1	-	-	-	1	2	-	2	-	-
CO4	-	-	-	-	-	-	-	-	3	3	-	2	-	-
CO5	-	-	-	-	-	-	-	-	3	3	-	2	-	-
CO6	-	-	-	-	2	-	-	-	-	2	-	2	-	-

List of Topics:

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

Suggested Software:

- Walden Infotech
- 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, (2nd Ed),Kindle, 2013

Online learning resources :

Spoken English:

www.esl-lab.com

www.englishmedialab.com

www.englishinteractive.net

https://www.britishcouncil.in/english/online

http://www.letstalkpodcast.com/

https://www.youtube.com/c/mmmEnglish_Emma/featured

https://www.youtube.com/c/ArnelsEverydayEnglish/featured

https://www.youtube.com/c/engvidAdam/featured

https://www.youtube.com/c/EnglishClass101/featured

https://www.youtube.com/c/SpeakEnglishWithTiffani/playlists

https://www.youtube.com/channel/UCV1h_cBE0Drdx19qkTM0WNw

Voice & Accent:

https://www.youtube.com/user/letstalkaccent/videos

https://www.youtube.com/c/EngLanguageClub/featured

https://www.youtube.com/channel/UC_OskgZBoS4dAnVUgJVexc

https://www.youtube.com/channel/UCNfm92h83W2i2ijc5Xwp_IA

DEPARTMENT OF BASIC SCIENCE AND HUMANITIES

I Year- I Semester	Course Code: BT24BS1106	L	T	P	C
		0	0	2	1
	CHEMISTRY LAB *(Common to CSE, AIML, AIDS)*				

Course Objectives:

- Verify the fundamental concepts with experiments.

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

CO1: Determine the cell constant and conductance of solutions

CO2: Prepare advanced polymer materials.

CO3: Measure the strength of an acid present in secondary batteries

CO4: Analyze the IR spectra of some organic compounds.

CO5: Calculate strength of acid in Pb-Acid battery.

CO6: Understand the synthesis of Bakelite

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO 12	PS O1	PS O2
CO1	3	2	2	-	-	-	-	-	-	-	-	2	-	-
CO2	3	3	2	-	-	-	-	-	-	-	-	2	-	-
CO3	3	2	2	-	-	-	-	-	-	-	-	2	-	-
CO4	3	3	2	-	-	-	-	-	-	-	-	2	-	-
CO5	3	2	2	-	-	-	-	-	-	-	-	2	-	-
CO6	3	2	2	-	-	-	-	-	-	-	-	2	-	-

List of Experiments:

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

Reference:

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

DEPARTMENT OF MECHANICAL ENGINEERING

I Year- I Semester	Course Code: BT24ME1103	L	T	P	C
		0	0	3	1.5
	ENGINEERING WORKSHOP *(Common to All branches of Engineering)*				

Course Objectives:
To familiarize students with wood working, sheet metal operations, fitting, electrical house wiring skills, and basic repairs of two-wheeler vehicle.

Course Outcomes:
CO1: Build carpentry fitting and forging operations in various applications.
CO2: Executing operations of foundry and sheet metal works using varies tools.
CO3: Inspect basic electrical engineering knowledge for house wiring practice
CO4: Develop a lap and butt joint using arc welding.
CO5: Develop pipe joint for different diameter of pipes
CO6: Inspect basic repair of two-wheeler vehicle **.**

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO 12	PS O1	PS O2
CO1	3	-	3	-	2	-	-	3	-	-	-	1	-	-
CO2	3	-	3	-	2	-	-	3	-	-	-	1	-	-
CO3	3	-	3	-	2	-	-	3	-	-	-	1	-	-
CO4	3	-	3	-	2	-	-	3	-	-	-	1	-	-
CO5	3	-	3	-	2	-	-	3	-	-	-	1	-	-
CO6	3	-	3	-	2	-	-	3	-	-	-	1	-	-

SYLLABUS
1. Demonstration: Safety practices and precautions to be observed in workshop.
2. Wood Working: Familiarity with different types of woods and tools used in wood working and make following joints.
   a) Half – Lap joint b) Mortise and Tenon joint c) Corner Dovetail joint or Bridle joint
3. Sheet Metal Working: Familiarity with different types of tools used in sheet metal working, Developments of following sheet metal job from GI sheets.
   a) Tapered tray b) Conical funnel c) Elbow pipe d) Brazing
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 tyre
5. Electrical Wiring: Familiarity with different types of basic electrical circuits and make the following connections.
   a) Parallel and series b) Two-way switch c) Godown lighting d) Tube light e) Three phase motor f) Soldering of wires
6. Foundry Trade: Demonstration and practice on Moulding tools and processes, Preparation of Green Sand Moulds for given Patterns.

7. Welding Shop: Demonstration and practice on Arc Welding and Gas welding. Preparation of Lap joint and Butt joint.
8. Plumbing: Demonstration and practice of Plumbing tools, Preparation of Pipe joints with coupling for same diameter and with reducer for different diameters.
9. Basic repairs of Two-wheeler vehicle – Demonstration of working of two-wheeler vehicle and its repairs.

Textbooks:

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.

DEPARTMENT OF COMPUTER SCIENCE ENGINEERING

I Year- I Semester	Course Code: BT24CS1103	L	T	P	C
		0	0	3	1.5
	COMPUTER PROGRAMMING LAB *(Common to All branches of Engineering)*				

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

Course Outcomes:
CO1: Read understand and trace they execution of programs written in C language
CO2: Select the right control structure for solving the problem.
CO3: Develop C programs which utilize memory efficiently using programming constructs like pointers.
CO4: Develop, D-Bug and execute programs to demonstrate applications of arrays, functions, basic concepts of pointers in C.
CO5: Develop a programs to demonstrate the applications of string operations in C.
CO6: Develop a programs to demonstrate the applications of file operations in C.

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2
CO1	2	3	-	2	-	-	-	-	-	-	-	-	-	2
CO2	2	3	3	3	-	-	-	-	-	-	-	-	-	-
CO3	2	3	3	2	3	-	-	-	-	-	-	-	-	-
CO4	2	3	3	3	2	-	-	-	-	-	-	-	2	-
CO5	2	3	3	2	2	-	-	-	-	-	-	-	2	-
CO6	-	2	3	2	2	-	-	-	-	-	-	-	-	-

UNIT I
WEEK 1
Objective: Getting familiar with the programming environment on the computer and writing the first program.

Suggested Experiments/Activities:
Tutorial 1: Problem-solving using Computers.
 Lab1: Familiarization with programming environment
   i. Basic Linux environment and its editors like Vi, Vim & Emacs etc.
  ii. Exposure to Turbo C, gcc
 iii. Writing simple programs using printf(), scanf()

WEEK 2
Objective: Getting familiar with how to formally describe a solution to a problem in a series of finite steps both using textual notation and graphic notation.

Suggested Experiments /Activities:
Tutorial 2: Problem-solving using Algorithms and Flow charts.
 Lab 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

WEEK 3
Objective: Learn how to define variables with the desired data-type, initialize them with appropriate values and how arithmetic operators can be used with variables and constants.

Suggested Experiments/Activities:
Tutorial 3: Variable types and type conversions:
  Lab 3: Simple computational problems using arithmetic expressions.
   i. Finding the square root of a given number
  ii.   Finding compound interest
 iii.   Area of a triangle using heron's formulae
 iv.   Distance travelled by an object

UNIT II
WEEK 4
Objective: Explore the full scope of expressions, type-compatibility of variables & constants and operators used in the expression and how operator precedence works.

Suggested Experiments/Activities:
Tutorial4: Operators and the precedence and as associativity:
  Lab4: Simple computational problems using the operator' precedence and associativity
Evaluate the following expressions.
   i. A+B*C+(D*E) + F*G
  ii. A/B*C-B+A*D/3
 iii. A+++B---A
 iv. J= (i++) + (++i)

Find the maximum of three numbers using conditional operator
Take marks of 5 subjects in integers, and find the total, average in float

WEEK 5
Objective: Explore the full scope of different variants of "if construct" namely if-else, null-else, if-else if*-else, switch and nested-if including in what scenario each one of them can be used and how to use them. Explore all relational and logical operators while writing conditionals for "if construct".

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

WEEK 6
Objective: Explore the full scope of iterative constructs namely while loop, do-while loop and or 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.

UNIT III
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.

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

UNIT IV
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()

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.
   iv.   Write a C program to copy one structure variable to another structure of the same type.

UNIT V
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

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

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.

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.

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()
- 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.

Textbooks:
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.

DEPARTMENT OF BASIC SCIENCE AND HUMANITIES

I Year- I Semester	Course Code: BT24BS1108	L	T	P	C
		0	0	1	0.5
HEALTH AND WELLNESS, YOGA AND SPORTS *(Common to All branches of Engineering)*					

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

Course Outcomes: After completion of the course the student will be able to
CO1: Understand the importance of yoga and sports for Physical fitness and sound health.
CO2: Demonstrate an understanding of health-related fitness components.
CO3: Compare and contrast various activities that help enhance their health.
CO4: Assess current personal fitness levels.
CO5: Develop Positive Personality.
CO6: Describe the history of sports, Ancient and Modern Olympics

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	-	-	-	-	-	-	-	-	-	-	2	-	-
CO2	-	-	-	-	-	-	-	-	-	-	-	2	-	-
CO3	-	-	-	-	-	-	-	-	-	-	-	2	-	-
CO4	-	-	-	-	-	-	-	-	-	-	-	2	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	2	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	2	-	-

UNIT I Concept of health and fitness, Nutrition and Balanced diet, basic concept of immunity Relationship between diet and fitness, Globalization and its impact on health, Body Mass Index (BMI) of all age groups.
Activities:
i) Organizing health awareness programmes in community
ii) Preparation of health profile
iii) Preparation of chart for balance diet for all age groups

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

UNIT III Concept of Sports and fitness, importance, fitness components, history of sports, Ancient and Modern Olympics, Asian games and Commonwealth games.
Activities:
i) Participation in one major game and one individual sport viz., Athletics, Volleyball, Basketball,   Handball, Football, Badminton, Kabaddi, Kho-kho, Table tennis, Cricket etc. Practicing general   and specific warm up, aerobics
ii) Practicing cardiorespiratory fitness, treadmill, run test, 9 min walk, skipping and running.

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

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

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

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D.N.R. COLLEGE OF ENGINEERING & TECHNOLOGY
AUTONOMOUS
Approved by AICTE, New Delhi & Permanently Affiliated to JNTUK, Kakinada
Accredited with A⁺⁺ Grade by NAAC & Accredited by NBA (B. TECH – CSE, ECE & EEE)
Ph: 08816-221238 Email: dnrcet@gmail.com   website: https://dnrcet.org

DEPARTMENT OF BASIC SCIENCE AND HUMANITIES

I Year- I Semester	Course Code: BT24BS1104	L	T	P	C
		3	0	0	3
	ENGINEERING PHYSICS *(Common for all branches of Engineering)*				

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

Course Outcomes:
CO1: Analyze the intensity variation of light due to polarization, interference and diffraction.
CO2: Examine the crystal structures with the basics of crystals..
CO3: Summarize various types of polarization of dielectrics and classify the magnetic materials.
CO4: Using fundamentals of quantum mechanics solve the one dimensional motion of particles.
CO5: Apply the basic concepts of quantum free electron theory to Fermi energy and classification of crystalline solids.
CO6: Identify the type of semiconductor using Hall effect.

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PS O1	PS O2
CO1	3	2	2	1	-	-	-	-	-	-	-	1	-	-
CO2	3	2	2	1	-	-	-	-	-	-	-	1	-	-
CO3	3	2	2	-	-	-	-	-	-	-	-	1	-	-
CO4	3	2	2	-	-	-	-	-	-	-	-	1	-	-
CO5	3	2	2	-	-	-	-	-	-	-	-	1	-	-
CO6	3	2	2	-	-	-	-	-	-	-	-	1	-	-

UNIT I   Wave Optics   12hr
Interference: Introduction - Principle of superposition –Interference of light - Interference in thin films (Reflection Geometry) & applications - Colours in thin films- Newton's Rings, Determination of wavelength and refractive index.
Diffraction: Introduction - Fresnel and Fraunhofer diffractions - Fraunhofer diffraction due to single slit, double slit & N-slits (Qualitative) – Diffraction Grating - Dispersive power and resolving power of Grating (Qualitative).
Polarization: Introduction -Types of polarization - Polarization by reflection, refraction and Double refraction - Nicol's Prism -Half wave and Quarter wave plates.

UNIT II   Crystallography and X-ray diffraction   10hr
Crystallography: Space lattice, Basis, Unit Cell and lattice parameters – Bravais Lattices – crystal systems (3D) – coordination number - packing fraction of SC, BCC & FCC - Miller indices – separation between successive (hkl) planes.
X-ray diffraction: Bragg's law - X-ray Diffractometer – crystal structure determination by Laue's and powder methods

UNIT III   **Dielectric and Magnetic Materials**   **8hr**

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.

Magnetic Materials: Introduction - Magnetic dipole moment - Magnetization-Magnetic susceptibility and permeability – Atomic origin of magnetism - Classification of magnetic materials: Dia, para, Ferro, anti-ferro & Ferri magnetic materials - Domain concept for Ferromagnetism & Domain walls (Qualitative) - Hysteresis - soft and hard magnetic materials.

UNIT IV   **Quantum Mechanics and Free electron Theory**   **10hr**

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

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

UNIT V   **Semiconductors**   **8hr**

Semiconductors: Formation of energy bands – classification of crystalline solids - Intrinsic semiconductors: Density of charge carriers – Electrical conductivity – Fermi level – Extrinsic semiconductors: density of charge carriers – dependence of Fermi energy on carrier concentration and temperature - Drift and diffusion currents – Einstein's equation – Hall effect and its applications.

Textbooks:
1. Engineering Physics, Dr.D. Tirupathi Naidu and M. Veeranjaneyulu, VGS Publications, 2023.
2. A Text book of Engineering Physics, M. N. Avadhanulu, P.G.Kshirsagar & TVS Arun Murthy, S.Chand Publications, 11th Edition 2019.
3. Engineering Physics - D.K.Bhattacharya and Poonam Tandon, Oxford press (2015)

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

Online learning resources:
https://dnrcet.org/web/departments/hs/courses/b-tech/syllabus/

DEPARTMENT OF ELECTRICAL ELECTRONICS ENGINEERING

I Year- I Semester	Course Code: BT24EE1101	L	T	P	C
		3	0	0	3
	BASIC ELECTRICAL & ELECTRONICS ENGINEERING *(Common to All branches of Engineering)*				

Course Objectives: Students will learn
- About the basic principles of Direct Current (DC) & Alternating Current (AC) Circuit analysis
- About the fundamentals of magnetic circuits analysis.
- About Electrical Wiring and Electrical Safety.

Course Outcomes: At the end of the course, the student will be able to
CO1: Apply the circuit laws for the analysis of simple DC and AC circuits.
CO2: Apply the basic principles for solving fundamental magnetic circuits.
CO3: Apply the basic principles of electrical wiring and electric safety measures.

CO/ PO	PO1	PO2	PO3	PO4	PO 5	PO6	PO7	PO8	PO9	PO10	PO11	PO 12	PS O1	PS O2
CO1	3	3	3	2	-	1	-	-	3	3	3	1	1	2
CO2	3	3	2	2	-	2	-	-	2	3	3	1	1	1
CO3	3	2	2	1	-	3	-	-	2	3	3	1	1	2

PART A: BASIC ELECTRICAL ENGINEERING

UNIT I   INTRODUCTION TO ELECTRICAL CIRCUITS
Basic Concepts of passive elements of R, L, C and their V-I relations, Sources (dependent and independent), Kirchhoff'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.

UNIT 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.

UNIT III   ELECTRICAL WIRING, ELECTRICITY BILL & SAFETY MEASURES
Electrical Wiring: SimpleLamp circuits, stair case wiring scheme, godown wiring scheme, types of service mains, types of electrical wiring, cost estimation of indoor wiring, wiring layout of workshop/ electrical laboratory.
Electricity bill: Power rating of household appliances including air conditioners, PCs, Laptops, Printers,etc., Types of 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

PART B: BASIC ELECTRONICS ENGINEERING

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

CO4: Analyze various characteristics of semiconductor devices.

CO5: Apply the basic principles for understanding and working of rectifiers and power Supplies.

CO6: Explain the working of various logic gates**.**

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

UNIT I   SEMI CONDUCTOR 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

UNIT II   BASIC ELECTRONIC CIRCUITS AND INSTRUMENTTAION

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

UNIT III   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)

Textbooks:

1.Principles of Electrical and Electronics Engineering, V.K. Mehtha, S. Chand Technical Publishers

2.Basic Electrical Engineering, Ritu SahDev, Khanna Publishers, 2018, First Edition.

3.FundamentalsofElectricalCircuits,CharlesK.AlexanderandMathewN.O.Sadiku,McGrawHill Education (India),2013,Fifth Edition

4.Electrical Wiring Estimating and Costing –Dr. S. L. Uppal-Khanna Publishers-198

5.Fundamentals of Electrical Engineering, Rajendra Prasad, PHI publishers, 2014, Third Edition

6.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.Circuit Theory, Abhijit Chakrabarti, Dhanpat Rai & Co. Publications, 8th edition, 2023.

4.BasicElectricalEngineering,D.C.Kulshreshtha,TataMcGrawHill, First Edition, 2019

5.Basic Electrical and Electronics Engineering, S. K. Bhatacharya, Person Publications, 2018, Second Edition.

E-Resources:

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

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

DEPARTMENT OF MECHANICAL ENGINEERING

I Year- I Semester	Course Code: BT24ME1101	L	T	P	C
		1	0	4	3

ENGINEERING GRAPHICS
(Common to CE and Mechanical Engineering Branches)

Course Objectives:

- To enable the students with various concepts like dimensioning, conventions and standards related to Engineering Drawing

- To impart knowledge on the projection of points, lines and plane surfaces

- To improve the visualization skills for better understanding of projection of solids

- To develop the imaginative skills of the students required to understand Section of solids and Developments of surfaces.

- To make the students understand the viewing perception of a solid object in Isometric and Perspective projections.

Course Outcomes:
CO1: Construct polygons, curves and scales.
CO2: Identify the position of points and lines.
CO3: Analyze the location and position of plane figures
CO4: Analyze the location and position of solids
CO5: Explain principles behind development of surfaces
CO6: Develop an Isometric view and orthographic views.

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PO 12	PS O1	PS O2
CO1	3	2	1	1	-	-	-	-	-	1	-	2	-	-
CO2	3	2	2	1	-	-	-	-	-	1	-	2	-	-
CO3	3	2	3	1	-	-	-	-	-	1	-	2	-	-
CO4	3	2	3	1	-	-	-	-	1	1	-	2	-	-
CO5	3	2	3	1	-	-	-	-	1	1	-	2	-	-
CO6	3	2	3	2	1	-	-	-	3	1	-	2	-	-

UNIT I
Introduction: Lines, Lettering and Dimensioning, Geometrical Constructions and Constructing regular polygons by general methods.
Curves: construction of ellipse, parabola and hyperbola by general, Cycloids, Involutes, Normal and tangent to Curves.
Scales: Plain scales, diagonal scales and Vernier scales.

UNIT II
Orthographic Projections: Reference plane, importance of reference lines or Plane, Projections of a point situated in any one of the four quadrants.
Projections of Straight Lines: Projections of straight lines parallel to both reference planes, perpendicular to one reference plane and parallel to other reference plane, inclined to one reference plane and parallel to the other reference plane. Projections of Straight Line Inclined to both the reference planes

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

UNIT III
Projections of Solids: Types of solids: Polyhedra and Solids of revolution.

Projections of solids in simple positions: Axis perpendicular to horizontal plane, Axis perpendicular to vertical plane and Axis parallel to both the reference planes, Projection of Solids with axis inclined to one reference plane and parallel to another plane.

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

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

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

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

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

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

DEPARTMENT OF MECHANICAL ENGINEERING

I Year- I Semester	Course Code: BT24ME1102	L	T	P	C
		1	0	4	3
	ENGINEERING DRAWING *(Common to EEE, ECE, CSE, CSE aligned branches and IT)*				

Course Objectives:

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

Course Outcomes:

CO1: Construct polygons, curves and scales.
CO2: Identify the position of points and lines.
CO3: Identify the position of lines when inclined to both the planes.
CO4: Analyze the location and position of plane figures.
CO5: Analyze the location and position of solid bodies.
CO6: Develop an Isometric view and orthographic views.

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

UNIT I
Introduction: Lines, Lettering and Dimensioning, Geometrical Constructions and Constructing regular polygons by general methods.
Curves: construction of ellipse, parabola and hyperbola by general, Cycloids, Involutes, Normal and tangent to Curves.
Scales: Plain scales, diagonal scales and Vernier scales.

UNIT II
Orthographic Projections: Reference plane, importance of reference lines or Plane, Projections of a point situated in any one of the four quadrants.
Projections of Straight Lines: Projections of straight lines parallel to both reference planes, perpendicular to one reference plane and parallel to other reference plane, inclined to one reference plane and parallel to the other reference plane. Projections of Straight Line Inclined to both the reference planes

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

UNIT IV
Projections of Solids: Types of solids: Polyhedra and Solids of revolution.
Projections of solids in simple positions: Axis perpendicular to horizontal plane, Axis perpendicular to vertical plane and Axis parallel to both the reference planes, Projection of Solids with axis inclined to one reference plane and parallel to another plane.

UNIT V
Conversion of Views: Conversion of isometric views to orthographic views; Conversion of orthographic views to isometric views.
Computer graphics: Creating 2D&3D drawings of objects including PCB and Transformations using Auto CAD (Not for end examination).

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

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

DEPARTMENT OF COMPUTER SCIENCE ENGINEERING

I Year- I Semester	Course Code: BT24CS1102	L	T	P	C
		0	0	2	1
	IT WORKSHOP *(Common to all branches of Engineering)*				

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

Course Outcomes:
CO1: Apply knowledge for computer assembling and software installation and solve trouble shooting problems
CO2: Understand hardware components and inter dependencies
CO3: Evaluate the cyber hygiene that is protecting the personal computer from getting infected with the viruses, worms and other cyber-attacks
CO4: Use various Microsoft tools like professional word documents and presentations
CO5: Calculate various excel spreadsheets
CO6: Build various AI Tools – Chartgpt

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO 12	PS O1	PS O2
CO1	2	3	2	2	2	-	-	-	-	-	-	-	-	2
CO2	2	3	3	3	-	-	-	-	-	-	-	-	-	-
CO3	2	3	3	2	3	-	-	-	-	-	-	-	-	-
CO4	2	3	3	3	2	-	-	-	-	-	-	-	2	-
CO5	2	3	3	2	2	-	-	-	-	-	-	-	2	-
CO6	3	2	3	2	2	-	-	-	-	-	-	-	-	-

PC Hardware & Software Installation

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

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

Task 3: Every student should individually install MS windows on the personal computer. Lab instructor should verify the installation and follow it up with a Viva.
Task 4: Every student should install Linux on the computer. This computer should have windows installed. The system should be configured as dual boot (VMWare) with both Windows and Linux. Lab instructors should verify the installation and follow it up with a Viva

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

Internet & World Wide Web

Task1: Orientation & Connectivity Boot Camp: Students should get connected to their Local Area Network and access the Internet. In the process they configure the TCP/IP setting. Finally students should demonstrate, to the instructor, how to access the websites and email. If there is no internet connectivity preparations need to be made by the instructors to simulate the WWW on the LAN.

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

Task 3: Search Engines & Netiquette: Students should know what search engines are and how to use the search engines. A few topics would be given to the students for which they need to search on Google. This should be demonstrated to the instructors by the student.

Task 4: Cyber Hygiene: Students would be exposed to the various threats on the internet and would be asked to configure their computer to be safe on the internet. They need to customize their browsers to block pop ups, block active x downloads to avoid viruses and/or worms.

LaTeX and WORD

Task 1 – Word Orientation: The mentor needs to give an overview of La TeX and Microsoft (MS) office or equivalent (FOSS) tool word: Importance of La TeX and MS office or equivalent (FOSS) tool Word as word Processors, Details of the four tasks and features that would be covered in each, Using La TeXand word – Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter in word.

Task 2: Using La TeX and Word to create a project certificate. Features to be covered:- Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time option in both La TeX and Word.

Task 3: Creating project abstract Features to be covered:-Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.

Task 4: Creating a Newsletter: Features to be covered:- Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphs and Mail Merge in word.

EXCEL

Excel Orientation: The mentor needs to tell the importance of MS office or equivalent (FOSS) tool Excel as a Spreadsheet tool, give the details of the four tasks and features that would be covered in each. Using Excel – Accessing, overview of toolbars, saving excel files, Using help and resources.

Task 1: Creating a Scheduler - Features to be covered: Gridlines, Format Cells, Summation, auto fill, Formatting Text

Task 2: Calculating GPA -. Features to be covered:- Cell Referencing, Formulae in excel – average, std. deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function,

LOOKUP/VLOOKUP

Task 3: Split cells, freeze panes, group and outline, Sorting, Boolean and logical operators, Conditional formatting

POWER POINT

Task 1: Students will be working on basic power point utilities and tools which help them create basic power point presentations. PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows in PowerPoint.

Task 2: Interactive presentations - Hyperlinks, Inserting –Images, Clip Art, Audio, Video, Objects, Tables and Charts.

Task 3: Master Layouts (slide, template, and notes), Types of views (basic, presentation, slide slotter, notes etc), and Inserting – Background, textures, Design Templates, Hidden slides.

AI TOOLS – ChatGPT

Task 1: Prompt Engineering: Experiment with different types of prompts to see how the model responds. Try asking questions, starting conversations, or even providing incomplete sentences to see how the model completes them.

• Ex: Prompt: "You are a knowledgeable AI. Please answer the following question: What is the capital of France?"

Task 2: Creative Writing: Use the model as a writing assistant. Provide the beginning of a story or a description of a scene, and let the model generate the rest of the content. This can be a fun way to brainstorm creative ideas

• Ex: Prompt: "In a world where gravity suddenly stopped working, people started floating upwards. Write a story about how society adapted to this new reality."

Task 3: Language Translation: Experiment with translation tasks by providing a sentence in one language and asking the model to translate it into another language. Compare the output to see how accurate and fluent the translations are.

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

Reference Books:

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

DEPARTMENT OF BASIC SCIENCE AND HUMANITIES

I Year- I Semester	Course Code: BT24BS1107	L	T	P	C
		0	0	2	1
	ENGINEERING PHYSICS LAB *(Common to All Branches of Engineering)*				

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

Course Outcomes: The students will be able to
CO1: Operate optical instruments like travelling microscope and spectrometer.
CO2: Estimate the wavelengths of different colours using diffraction grating.
CO3: Plot the intensity of the magnetic field of circular coil carrying current with distance.
CO4: Evaluate dielectric constant and magnetic susceptibility for dielectric and magnetic materials respectively.
CO5: Calculate the band gap of a given semiconductor.
CO6: Identify the type of semiconductor using Hall effect.

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO 12	PS O1	PS O2
CO 1	3	2	-	-	-	-	-	-	1	-	-	1	-	-
CO 2	3	2	-	-	-	-	-	-	1	-	-	1	-	-
CO 3	3	2	-	-	-	-	-	-	1	-	-	1	-	-
CO 4	3	2	-	-	-	-	-	-	1	-	-	1	-	-
CO 5	3	2	-	-	-	-	-	-	1	-	-	1	-	-
CO 6	3	2	-	-	-	-	-	-	1	-	-	1	-	-

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

16. Sonometer: Verification of laws of stretched string.
17. Determination of young's modulus for the given material of wooden scale by
     Non uniform bending (or double cantilever) method.
18. Determination of Frequency of electrically maintained tuning fork by Melde's experiment.

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

References:

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

Online learning resources :

1. www.vlab.co.in

DEPARTMENT OF ELECTRICAL ELECTRONICS ENGINEERING

I Year- I Semester	Course Code: BT24EE1102	L	T	P	C
		0	0	3	1.5
ELECTRICAL & ELECTRONICS ENGINEERING WORKSHOP *(Common to All branches of Engineering)*					

Course Objectives: Students will learn
- To verify Kirchhoff's laws.
- To measure various electrical quantities using different types of meters.
- About safety measures used in electrical systems.

Course Outcomes: At the end of the course, the student will be able to
CO1: Study and identification of various electrical circuit components and also measure voltage, current and power electrical circuits.
CO2: Choose and assemble various wiring schemes.
CO3: Solve electrical energy and measure earth resistance for domestic premises.

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:

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

Part-A BASIC ELECTRICAL ENGINEERING LAB

List of Experiments:
1. Identification of various types of resistors and capacitors and understand the usage of digital multi-meter
2. Study various types of electrical cables/wires, switches, fuses, fuse carriers, MCB, ELCB, RCCB, and MCCB with their specifications and usage.
3. Measurement of Voltage, Current and Power in a DC Circuit
4. Verification of KCL and KVL
5. Measurement of Earth Resistance using Megger
6. Calculation of Electrical Energy for Domestic Premises
7. Staircase wiring scheme
8. Godown wiring scheme

Note: A minimum of six experiments are to be performed.

Reference Books:
1. Engineering Circuits Analysis, Jack Kemmerly,WilliamHayt and Steven Durbin, Tata McGraw Hill Education,2020, 9thedition.
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
4. Basic Electrical Engineering, D. C. Kulshreshtha, Tata McGraw Hill, 2019, First Edition.

PART B: ELECTRONICS ENGINEERING LAB

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

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

CO4: Identify the various electronic components andunderstand the working of components.
CO5: Plot and discuss the characteristics of various electron devices.
CO6: Explain the operation of a digital circuit.

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2
CO4	3	2	2	-	-	-	-	-	-	1	-	3	2	-
CO5	3	2	2	-	-	-	-	-	-	1	-	3	2	-
CO6	3	2	2	-	-	-	-	-	-	1	-	3	2	-

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

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

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

DEPARTMENT OF BASIC SCIENCE AND HUMANITIES

I Year- I Semester	Course Code: BT24BS1109	L	T	P	C
		0	0	1	0.5
	NSS and COMMUNITY SERVICE *(Common to All branches of Engineering)*				

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

Course Outcomes: After completion of the course the students will be able to
CO1: Understand the importance of discipline, character and service motto
CO2: Solve some societal issues by applying acquired knowledge, facts, and techniques.
CO3: Explore human relationships by analyzing social problems
CO4: Determine to extend their help for the fellow beings and downtrodden people.
CO5: Develop leadership skills and civic responsibilities.
CO6: Participate in activities related to health, hygiene, environment, literacy, disaster management, and gender equity with empathy and commitment.

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

UNIT I
Orientation
General Orientation on NSS/NCC/ Scouts & Guides/Community Service activities, career guidance.
Activities:
  i.   Conducting –ice breaking sessions-expectations from the course-knowing personal talents and skills
 ii.   Conducting orientations programs for the students –future plans-activities-releasing road map etc.
 iii.   Displaying success stories-motivational biopics- award winning movies on societal issues etc.
 iv.   Conducting talent show in singing patriotic songs-paintings- any other contribution.

UNIT 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.

UNIT III
Community Service
Activities:

i.   Conducting One Day Special Camp in a village contacting village-area leaders- Survey in the village, identification of problems- helping them to solve via media- authoritiesexperts-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.

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

General Guidelines:
1. Institutes must assign slots in the Timetable for the activities.
2. Institutes are required to provide instructor to mentor the students.

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

DR24

ENGINEERING CURRICULUM

W.e.f. 2024-25

I YEAR - II SEMESTER

B.Tech. (Regular-Full time)

(Effective for the students admitted into I year from
The Academic Year **2024-25** onwards)

DEPARTMENT OF BASIC SCIENCE AND HUMANITIES

B.Tech. I Year II Semester (for Group –A Branches - CSE, AID, CSM)

S.No.	Category	Subject Code	Title	L/D	T	P	Credits
1	BS&H	BT24BS1205	Engineering Physics	3	0	0	3
2	BS&H	BT24BS1204	Differential Equations & Vector Calculus	3	0	0	3
3	BS&H	BT24EE1201	Basic Electrical and Electronics Engineering	3	0	0	3
4	Engineering Science	BT24ME1201	Engineering Drawing	1	0	4	3
5	Engineering Science	BT24CS1202	IT Workshop	0	0	2	1
6	BS&H	BT24CS1201	Data Structures (Branch specific)	3	0	0	3
7	BS&H	BT24BS1209	Engineering Physics Lab	0	0	2	1
8	Engineering Science	BT24EE1204	Electrical and Electronics Engineering Workshop	0	0	3	1.5
9	Engineering Science	BT24CS1203	Data Structures Lab	0	0	3	1.5
10	BS&H	BT24BS1211	NSS & Community Service	-	-	1	0.5
Total				**13**	**00**	**15**	**20.5**

B.Tech. I Year II Semester (for Group -B Branches - CE, EEE, ME, ECE & IT)

S.No.	Category	Subject Code	Title	L/D	T	P	Credits
1	BS&H	BT24BS1201	Communicative English	2	0	0	2
2	BS& H	BT24BS1203/ BT24BS1202	Engineering Chemistry / Chemistry	3	0	0	3
3	BS& H	BT24BS1204	Differential Equations & Vector Calculus	3	0	0	3
4	Engineering Science	BT24CE1201	Basic Civil & Mechanical Engineering	3	0	0	3
5	Professional Core	BT24ME1202/ BT24EE1203/ BT24CS1201/ BT24EE1202	Engineering Mechanics / Network Analysis / Data structures / Electrical Circuit Analysis – I (Branch specific)	3	0	0	3
6	BS&H	BT24BS1206	Communicative English Lab	0	0	2	1
7	BS&H	BT24BS1208/ BT24BS1207	Engineering Chemistry Lab/ Chemistry Lab	0	0	2	1
8	Engineering Science	BT24ME1203	Engineering Workshop	0	0	3	1.5
9	Professional Core	BT24CE1202/ BT24ME1204/ BT24EE1206/ BT24CS1202/ BT24EE1205	Engineering Mechanics & Building Practices Lab/ Engineering Mechanics Lab / Network Analysis and Simulation Lab / Data structures Lab/ Electrical Circuits Lab	0	0	3	1.5
10	BS& H	BT24BS1210	Health and wellness, Yoga and Sports	-	-	1	0.5
Total				**14**	**00**	**11**	**19.5**

I Year- II Semester	Course Code: BT24BS1205	L	T	P	C
		3	0	0	3
	ENGINEERING PHYSICS *(Common for all branches of Engineering)*				

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

Course Outcomes:
CO1: Analyze the intensity variation of light due to polarization, interference and diffraction.
CO2: Examine the crystal structures with the basics of crystals.
CO3: Summarize various types of polarization of dielectrics and classify the magnetic materials.
CO4: Using fundamentals of quantum mechanics solve the one dimensional motion of particles.
CO5: Apply the basic concepts of quantum free electron theory to Fermi energy and classification of crystalline solids.
CO6: Identify the type of semiconductor using Hall effect.

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PS O1	PS O2
CO1	3	2	2	1	-	-	-	-	-	-	-	1	-	-
CO2	3	2	2	1	-	-	-	-	-	-	-	1	-	-
CO3	3	2	2	-	-	-	-	-	-	-	-	1	-	-
CO4	3	2	2	-	-	-	-	-	-	-	-	1	-	-
CO5	3	2	2	-	-	-	-	-	-	-	-	1	-	-
CO6	3	2	2	-	-	-	-	-	-	-	-	1	-	-

UNIT I   Wave Optics   12hr
Interference: Introduction - Principle of superposition –Interference of light - Interference in thin films (Reflection Geometry) & applications - Colours in thin films- Newton's Rings, Determination of wavelength and refractive index.
Diffraction: Introduction - Fresnel and Fraunhofer diffractions - Fraunhofer diffraction due to single slit, double slit & N-slits (Qualitative) – Diffraction Grating - Dispersive power and resolving power of Grating (Qualitative).
Polarization: Introduction -Types of polarization - Polarization by reflection, refraction and Double refraction - Nicol's Prism -Half wave and Quarter wave plates.

UNIT II   Crystallography and X-ray diffraction   10hr
Crystallography: Space lattice, Basis, Unit Cell and lattice parameters – Bravais Lattices – crystal systems (3D) – coordination number - packing fraction of SC, BCC & FCC - Miller indices – separation between successive (hkl) planes.
X-ray diffraction: Bragg's law - X-ray Diffractometer – crystal structure determination by Laue's and powder methods

UNIT III   Dielectric and Magnetic Materials   8hr

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.

Magnetic Materials: Introduction - Magnetic dipole moment - Magnetization-Magnetic susceptibility and permeability – Atomic origin of magnetism - Classification of magnetic materials: Dia, para, Ferro, anti-ferro & Ferri magnetic materials - Domain concept for Ferromagnetism & Domain walls (Qualitative) - Hysteresis - soft and hard magnetic materials.

UNIT IV   Quantum Mechanics and Free electron Theory   10hr

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

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

UNIT V   Semiconductors   8hr

Semiconductors: Formation of energy bands – classification of crystalline solids - Intrinsic semiconductors: Density of charge carriers – Electrical conductivity – Fermi level – Extrinsic semiconductors: density of charge carriers – dependence of Fermi energy on carrier concentration and temperature - Drift and diffusion currents – Einstein's equation – Hall effect and its applications.

Textbooks:
1. Engineering Physics, Dr.D. Tirupathi Naidu and M. Veeranjaneyulu, VGS Publications, 2023.
2. A Text book of Engineering Physics, M. N. Avadhanulu, P.G.Kshirsagar & TVS Arun Murthy, S.Chand Publications, 11th Edition 2019.
3. Engineering Physics - D.K.Bhattacharya and Poonam Tandon, Oxford press (2015)

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

Online learning resources :
https://dnrcet.org/web/departments/hs/courses/b-tech/syllabus/

DEPARTMENT OF BASIC SCIENCE AND HUMANITIES

I Year- II Semester	Course Code: BT24BS1204	L	T	P	C
		3	0	0	3
	DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS *(Common to All Branches of Engineering)*				

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

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

CO1: Solve first-order linear differential equations
CO2: Understand homogeneous and non-homogeneous linear differential equations
CO3: Understand the basic concepts of partial differential equations (PDEs)
CO4: Solve first-order linear partial differential equations using **Lagrange's method.**
CO5: Apply the **Del operator** to scalar point functions to compute **gradients** and **directional derivatives**
CO6: Evaluate **volume integrals** and apply the **Divergence Theorem** (with proof) to relate surface and volume integrals in vector fields

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PS O1	PS O2
CO1	3	3	-	-	-	-	-	-	-	-	-	-	-	-
CO2	3	3	-	-	-	-	-	-	-	-	-	-	-	-
CO3	3	3	-	-	-	-	-	-	-	-	-	-	-	-
CO4	3	3	-	-	-	-	-	-	-	-	-	-	-	-
CO5	3	2	-	-	-	-	-	-	-	-	-	-	-	-
CO6	3	3	-	-	-	-	-	-	-	-	-	-	-	-

UNIT-I   Differential equations of first order and first degree   10 hr
Linear differential equations –Bernoulli's equations-Exact equations and equations reducible to exact form. Applications: Newton's Law of cooling – Law of natural growth and decay- Electrical circuits.

UNIT-II   Linear differential equations of higher order(Constant Coefficients)   10 hr
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.

UNIT-III   Partial Differential Equations   10 hr
Introduction and formation of Partial Differential Equations by elimination of arbitrary constants and arbitrary functions, solutions of first order linear equations using Lagrange's method. Homogeneous Linear Partial differential equations with constant coefficients.

UNIT-IV   Vector differentiation   8 hr

Scalar and vector point functions, vector operator Del, Del applies to scalar point functions-Gradient, Directional derivative, del applied to vector point functions-Divergence and Curl, vector identities.

UNIT-V   Vector integration   10 hr

LWithoutegral-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.

Textbooks:

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

Reference Books:

1.Thomas Calculus, George B.Thomas, MauriceD.Weir and JoelHass, 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

DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

I Year- II Semester	Course Code: BT24EE1201	L	T	P	C
		3	0	0	3
	BASIC ELECTRICAL & ELECTRONICS ENGINEERING *(Common to All branches of Engineering)*				

Course Objectives: Students will learn

- About the basic principles of Direct Current (DC) & Alternating Current (AC) Circuit analysis
- About the fundamentals of magnetic circuits analysis.
- About Electrical Wiring and Electrical Safety.

Course Outcomes: At the end of the course, the student will be able to
CO1: Apply the circuit laws for the analysis of simple DC and AC circuits.
CO2: Apply the basic principles for solving fundamental magnetic circuits.
CO3: Apply the basic principles of electrical wiring and electric safety measures.

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:

CO/ PO	PO1	PO2	PO3	PO4	PO 5	PO6	PO7	PO8	PO9	PO10	PO11	PO 12	PS O1	PS O2
CO1	3	3	3	2	-	1	-	-	3	3	3	1	1	2
CO2	3	3	2	2	-	2	-	-	2	3	3	1	1	1
CO3	3	2	2	1	-	3	-	-	2	3	3	1	1	2

PART A: BASIC ELECTRICAL ENGINEERING

UNIT I INTRODUCTION TO ELECTRICAL CIRCUITS

Basic Concepts of passive elements of R, L, C and their V-I relations, Sources (dependent and independent), Kirchhoff'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.

UNIT 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.

UNIT III   ELECTRICAL WIRING, ELECTRICITY BILL & SAFETY MEASURES

Electrical Wiring: SimpleLamp circuits, stair case wiring scheme, godown wiring scheme, types of service mains, types of electrical wiring, cost estimation of indoor wiring, wiring layout of workshop/ electrical laboratory.

Electricity bill: Power rating of household appliances including air conditioners, PCs, Laptops, Printersetc., Types of 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, SafetyPrecautions to avoid shock

PART B: BASIC ELECTRONICS ENGINEERING

Course Objectives: Students will learn
- To teach the fundamentals of semiconductor devices and its applications, principles of digital electronics.

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

CO4: Analyze various characteristics of semiconductor devices.

CO5: Apply the basic principles for understanding and working of rectifiers and power Supplies.

CO6: Explain the working of various logic gates**.**

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO4	2	1	2	1	-	1	-	-	-	-	1	3	2	-
CO5	3	1	2	1	-	1	-	-	-	-	1	3	2	-
CO6	2	2	2	1	-	1	-	-	-	-	1	3	2	-

UNIT I: **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

UNIT II: **BASIC ELECTRONIC CIRCUITS AND INSTRUMENTTAION**

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

UNIT III : 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)

Textbooks:
1. Principles of Electrical and Electronics Engineering, V.K. Mehtha, S. Chand Technical Publishers
2. Basic Electrical Engineering, Ritu SahDev, Khanna Publishers, 2018, First Edition.
3. FundamentalsofElectricalCircuits,CharlesK.AlexanderandMathewN.O.Sadiku,McGrawHill Education (India),2013,Fifth Edition
4. Electrical Wiring Estimating and Costing –Dr. S. L. Uppal-Khanna Publishers-198
5. Fundamentals of Electrical Engineering, Rajendra Prasad, PHI publishers, 2014, Third Edition
6. 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. Circuit Theory, Abhijit Chakrabarti, Dhanpat Rai & Co. Publications, 8th edition, 2023.
4. BasicElectricalEngineering,D.C.Kulshreshtha,TataMcGrawHill, First Edition, 2019
5. Basic Electrical and Electronics Engineering, S. K. Bhatacharya, Person Publications, 2018, Second Edition.

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

DEPARTMENT OF MECHANICAL ENEGINEERING

I Year- II Semester	Course Code: BT24ME1201	L	T	P	C
		1	0	4	3
	ENGINEERING DRAWING *(Common to EEE, ECE, CSE, CSE aligned branches and IT)*				

Course Objectives:
* To enable the students with various concepts like dimensioning, conventions and standards related to Engineering Drawing
* To impart knowledge on the projection of points, lines and
* To improve the visualization skills for better understanding of projection of plane surfaces
* To improve the visualization skills for better understanding of projection of solids
* To make the students understand the viewing perception of a solid object in Isometric and Perspective projections.

Course Outcomes:
CO1: Construct polygons, curves and scales.
CO2: Identify the position of points and lines.
CO3: Identify the position of lines when inclined to both the planes.
CO4: Analyze the location and position of plane figures**.**
CO5: Analyze the location and position of solid bodies.
CO6 : Develop an Isometric view and orthographic views

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

UNIT I

Introduction: Lines, Lettering and Dimensioning, Geometrical Constructions and Constructing regular polygons by general methods.
Curves: construction of ellipse, parabola and hyperbola by general, Cycloids, Involutes, Normal and tangent to Curves.
Scales: Plain scales, diagonal scales and Vernier scales.

UNIT II
Orthographic Projections: Reference plane, importance of reference lines or Plane, Projections of a point situated in any one of the four quadrants.
Projections of Straight Lines: Projections of straight lines parallel to both reference planes, perpendicular to one reference plane and parallel to other reference plane, inclined to one reference plane and parallel to the other reference plane. Projections of Straight Line Inclined to both the reference planes

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

UNIT IV
Projections of Solids: Types of solids: Polyhedra and Solids of revolution.
Projections of solids in simple positions: Axis perpendicular to horizontal plane, Axis perpendicular to vertical plane and Axis parallel to both the reference planes, Projection of Solids with axis inclined to one reference plane and parallel to another plane.

UNIT V
Conversion of Views: Conversion of isometric views to orthographic views; Conversion of orthographic views to isometric views.
Computer graphics: Creating 2D&3D drawings of objects including PCB and Transformations using Auto CAD (Not for end examination).

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

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

DEPARTMENT OF COMPUTER SCIENCE ENGINEERING

I Year- II Semester	Course Code: BT24CS1202	L	T	P	C
		0	0	2	1
	IT WORKSHOP *(Common to all branches of Engineering)*				

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

Course Outcomes:
CO1: Apply knowledge for computer assembling and software installation and solve trouble shooting problems (L3)
CO2: Understand hardware components and inter dependencies (L2).
CO3: Evaluate the cyber hygiene that is protecting the personal computer from getting infected with the viruses, worms and other cyber-attacks (L5).
CO4: Use various Microsoft tools like professional word documents and presentations (L2).
CO5: Calculate various excel spreadsheets (L4).
CO6: Build various AI Tools – Chartgpt (L6).

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

PC Hardware & Software Installation

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

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

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

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

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

Internet & World Wide Web

Task1: Orientation & Connectivity Boot Camp: Students should get connected to their Local Area Network and access the Internet. In the process they configure the TCP/IP setting. Finally students should demonstrate, to the instructor, how to access the websites and email. If there is no internet connectivity preparations need to be made by the instructors to simulate the WWW on the LAN.

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

Task 3: Search Engines & Netiquette: Students should know what search engines are and how to use the search engines. A few topics would be given to the students for which they need to search on Google. This should be demonstrated to the instructors by the student.

Task 4: Cyber Hygiene: Students would be exposed to the various threats on the internet and would be asked to configure their computer to be safe on the internet. They need to customize their browsers to block pop ups, block active x downloads to avoid viruses and/or worms.

LaTeX and WORD

Task 1 – Word Orientation: The mentor needs to give an overview of La TeX and Microsoft (MS) office or equivalent (FOSS) tool word: Importance of La TeX and MS office or equivalent (FOSS) tool Word as word Processors, Details of the four tasks and features that would be covered in each, Using La TeXand word – Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter in word.

Task 2: Using La TeX and Word to create a project certificate. Features to be covered:- Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time option in both La TeX and Word.

Task 3: Creating project abstract Features to be covered:-Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.

Task 4: Creating a Newsletter: Features to be covered:- Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphs and Mail Merge in word.

EXCEL

Excel Orientation: The mentor needs to tell the importance of MS office or equivalent (FOSS) tool Excel as a Spreadsheet tool, give the details of the four tasks and features that would be covered in each. Using Excel – Accessing, overview of toolbars, saving excel files, Using help and resources.

Task 1: Creating a Scheduler - Features to be covered: Gridlines, Format Cells, Summation, auto fill, Formatting Text

Task 2: Calculating GPA -. Features to be covered:- Cell Referencing, Formulae in excel – average, std. deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function,

LOOKUP/VLOOKUP

Task 3: Split cells, freeze panes, group and outline, Sorting, Boolean and logical operators, Conditional formatting

POWER POINT

Task 1: Students will be working on basic power point utilities and tools which help them create basic power point presentations. PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows in PowerPoint.

Task 2: Interactive presentations - Hyperlinks, Inserting –Images, Clip Art, Audio, Video, Objects, Tables and Charts.

Task 3: Master Layouts (slide, template, and notes), Types of views (basic, presentation, slide slotter, notes etc), and Inserting – Background, textures, Design Templates, Hidden slides.

AI TOOLS – ChatGPT

Task 1: Prompt Engineering: Experiment with different types of prompts to see how the model responds. Try asking questions, starting conversations, or even providing incomplete sentences to see how the model completes them.

• Ex: Prompt: "You are a knowledgeable AI. Please answer the following question: What is the capital of France?"

Task 2: Creative Writing: Use the model as a writing assistant. Provide the beginning of a story or a description of a scene, and let the model generate the rest of the content. This can be a fun way to brainstorm creative ideas

• Ex: Prompt: "In a world where gravity suddenly stopped working, people started floating upwards. Write a story about how society adapted to this new reality."

Task 3: Language Translation: Experiment with translation tasks by providing a sentence in one language and asking the model to translate it into another language. Compare the output to see how accurate and fluent the translations are.

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

Reference Books:

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

DEPARTMENT OF COMPUTER SCIENCE ENGINEERING

I Year- II Semester	Course Code: BT24CS1201	L	T	P	C
		3	0	0	3
	DATA STRUCTURES *(Common to CSE and IT)*				

Course Objectives:

- To provide the knowledge of basic data structures and their implementations.
- To understand importance of data structures in context of writing efficient programs.
- To develop skills to apply appropriate data structures in problem solving.

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

CO1: Explain the role of linear data structures in organizing and accessing data efficiently in algorithms.

CO2: Design, implement, and apply linked lists for dynamic data storage, demonstrating understanding of memory allocation.

CO3: Develop programs using stacks to handle recursive algorithms, manage program states, and solve related problems.

CO4: Apply queue-based algorithms for efficient task scheduling and breadth-first traversal in graphs and distinguish between deques and priority queues, and apply them appropriately to solve data management challenges.

CO5: Devise novel solutions to small scale programming challenges involving data structures such as stacks, queues, Trees.

CO6: Recognize scenarios where hashing is advantageous, and design hash-based solutions for specific problems.

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO 12	PS O1	PS O2
CO1	2	2	2	2	-	-	-	-	-	-	-	2	2	2
CO2	2	2	3	2	-	-	-	-	-	-	-	2	2	2
CO3	2	3	3	2	-	-	-	-	-	-	-	3	2	3
CO4	2	3	3	2	-	-	-	-	-	-	-	2	3	2
CO5	2	3	3	3	-	-	-	-	-	-	-	2	2	2
CO6	2	2	3	3	-	-	-	-	-	-	-	2	2	2

UNIT I

Introduction to Linear Data Structures: Definition and importance of linear data structures, Abstract data types (ADTs) and their implementation, Overview of time and space complexity analysis for linear data structures. Searching Techniques: Linear & Binary Search, Sorting Techniques: Bubble sort, Selection sort, Insertion Sort

UNIT II

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

UNIT III

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

UNIT IV

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

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

UNIT V
Trees: Introduction to Trees, Binary Search Tree – Insertion, Deletion & Traversal
Hashing: Brief introduction to hashing and hash functions, Collision resolution techniques: chaining and open addressing, Hash tables: basic implementation and operations, Applications of hashing in unique identifier generation, caching, etc.

Textbooks:
1. Data Structures and algorithm analysis in C, Mark Allen Weiss, Pearson, 2nd Edition.
2. Fundamentals of data structures in C, Ellis Horowitz, Sartaj Sahni, Susan Anderson-Freed, Silicon Press, 2008

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

DEPARTMENT OF BASIC SCIENCE AND HUMANITIES

I Year- II Semester	Course Code: BT24BS1209	L	T	P	C
		0	0	2	1
	ENGINEERING PHYSICS LAB *(Common to All Branches of Engineering)*				

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

Course Outcomes: The students will be able to
CO1: Operate optical instruments like travelling microscope and spectrometer.
CO2: Estimate the wavelengths of different colours using diffraction grating.
CO3: Plot the intensity of the magnetic field of circular coil carrying current with distance.
CO4: Evaluate dielectric constant and magnetic susceptibility for dielectric and magnetic materials respectively.
CO5: Calculate the band gap of a given semiconductor.
CO6: Identify the type of semiconductor using Hall effect.

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO 1	3	2	-	-	-	-	-	-	1	-	-	1	-	-
CO 2	3	2	-	-	-	-	-	-	1	-	-	1	-	-
CO 3	3	2	-	-	-	-	-	-	1	-	-	1	-	-
CO 4	3	2	-	-	-	-	-	-	1	-	-	1	-	-
CO 5	3	2	-	-	-	-	-	-	1	-	-	1	-	-
CO 6	3	2	-	-	-	-	-	-	1	-	-	1	-	-

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

16. Sonometer: Verification of laws of stretched string.
17. Determination of young's modulus for the given material of wooden scale by nonuniformbending (or double cantilever) method.
18. Determination of Frequency of electrically maintained tuning fork by Melde's experiment.

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

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

Online learning resources :
1. www.vlab.co.in

DEPARTMENT OF ELECTRICAL & ELCTRONICS ENGINEERING

I Year- II Semester	Course Code: BT24EE1204	L	T	P	C
		0	0	3	1.5
ELECTRICAL & ELECTRONICS ENGINEERING WORKSHOP *(Common to All branches of Engineering)*					

Course Objectives: Students will learn
- To verify Kirchhoff's laws.
- To measure various electrical quantities using different types of meters.
- About safety measures used in electrical systems.

Course Outcomes: At the end of the course, the student will be able to
CO1: Study and identification of various electrical circuit components and also measure voltage, current and power electrical circuits.
CO2: Choose and assemble various wiring schemes.
CO3: Solve electrical energy and measure earth resistance for domestic premises.

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:

CO /PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PO 12	PS O1	PS O2
CO1	3	2	2	-	-	2	2	-	2	1	-	1	2	-
CO2	3	1	-	1	-	-	-	-	2	2	-	1	2	-
CO3	3	2	2	2	2	1	-	-	2	1	-	2	2	2

Part-A BASIC ELECTRICAL ENGINEERING LAB
List of Experiments:

1. Identification of various types of resistors and capacitors and understand the usage of digital multi-meter
2. Study various types of electrical cables/wires, switches, fuses, fuse carriers, MCB, ELCB, RCCB, and MCCB with their specifications and usage.
3. Measurement of Voltage, Current and Power in a DC Circuit
4. Verification of KCL and KVL
5. Measurement of Earth Resistance using Megger
6. Calculation of Electrical Energy for Domestic Premises
7. Staircase wiring scheme
8. Godown wiring scheme

Note: A minimum of six experiments are to be performed.

Reference Books:

1. Engineering Circuits Analysis, Jack Kemmerly, WilliamHayt and Steven Durbin, Tata McGraw Hill Education,2020, 9thedition.
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
4. Basic Electrical Engineering, D. C. Kulshreshtha, Tata McGraw Hill, 2019, First Edition.

PART B: ELECTRONICS ENGINEERING LAB

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

Course Outcomes: At the end of the course, the student will be able to
CO4: Identify the various electronic components andunderstand the working of components.
CO5: Plot and discuss the characteristics of various electron devices.
CO6: Explain the operation of a digital circuit.

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO4	3	2	2	-	-	-	-	-	-	1	-	3	2	-
CO5	3	2	2	-	-	-	-	-	-	1	-	3	2	-
CO6	3	2	2	-	-	-	-	-	-	1	-	3	2	-

List of Experiments

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

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

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

Note: A minimum of six experiments are to be performed. All the experiments shall be implemented using both Hardware and Software.

DEPARTMENT OF COMPUTER SCIENCE ENGINEERING

I Year- II Semester	Course Code: BT24CS1203	L	T	P	C
		0	0	3	1.5
	DATA STRUCTURES LAB *(Common to CSE and IT)*				

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

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

CO1: Explain the role of linear data structures in organizing and accessing data efficiently in algorithms

CO2: Design, implement, and apply linked lists for dynamic data storage, demonstrating understanding of memory allocation

CO3: Develop programs using stacks to handle recursive algorithms, manage program states, and solve related problems

CO4: Apply queue-based algorithms for efficient task scheduling and breadth-first traversal in graphs and distinguish between deques and priority queues

CO5: Apply the map propriately to solve data management challenges

CO6: Recognize scenarios where hashing is advantageous, and design hash-based solutions for specific problems

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

List of Experiments:

Exercise 1: Array Manipulation
    i.   Write a program to reverse an array.
    ii. C Programs to implement the Searching Techniques – Linear & Binary Search
    iii. C Programs to implement Sorting Techniques – Bubble, Selection and Insertion Sort

Exercise 2: Linked List Implementation
    i.   Implement a singly linked list and perform insertion and deletion operations.
    ii. Develop a program to reverse a linked list iteratively and recursively.
    iii. Solve problems involving linked list traversal and manipulation.

Exercise 3: Linked List Applications
    i.   Create a program to detect and remove duplicates from a linked list.
    ii. Implement a linked list to represent polynomials and perform addition.
    iii. Implement a double-ended queue (deque) with essential operations.

Exercise 4: Double Linked List Implementation
    i.   Implement a doubly linked list and perform various operations to understand its properties and applications.
   ii. Implement a circular linked list and perform insertion, deletion, and traversal.

Exercise 5: Stack Operations
    i. Implement a stack using arrays and linked lists.
   ii. Write a program to evaluate a postfix expression using a stack.
  iii. Implement a program to check for balanced parentheses using a stack.

Exercise 6: Queue Operations
    i. Implement a queue using arrays and linked lists.
   ii. Develop a program to simulate a simple printer queue system.
  iii. Solve problems involving circular queues.

Exercise 7: Stack and Queue Applications
    i. Use a stack to evaluate an infix expression and convert it to postfix.
   ii. Create a program to determine whether a given string is a palindrome or not.
  iii. Implement a stack or queue to perform comparison and check for symmetry.

Exercise 8: Binary Search Tree
    i. Implementing a BST using Linked List.
   ii. Traversing of BST.

Exercise 9: Hashing
    i. Implement a hash table with collision resolution techniques.
   ii. Write a program to implement a simple cache using hashing.

Textbooks:
1. Data Structures and algorithm analysis in C, Mark Allen Weiss, Pearson, 2nd Edition.
2. Fundamentals of data structures in C, Ellis Horowitz, Sartaj Sahni, Susan Anderson-Freed, Silicon Press, 2008

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

DEPARTMENT OF BASIC SCIENCE AND HUMANITIES

I Year- II Semester	Course Code: BT24BS1211	L	T	P	C
		0	0	1	0.5
	NSS and COMMUNITY SERVICE *(Common to All branches of Engineering)*				

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

Course Outcomes: After completion of the course the students will be able to
CO1: Understand the importance of discipline, character and service motto
CO2: Solve some societal issues by applying acquired knowledge, facts, and techniques.
CO3: Explore human relationships by analyzing social problems
CO4: Determine to extend their help for the fellow beings and downtrodden people.
CO5: Develop leadership skills and civic responsibilities.
CO6: Participate in activities related to health, hygiene, environment, literacy, disaster management, and gender equity with empathy and commitment.

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

UNIT I
Orientation
General Orientation on NSS/NCC/ Scouts & Guides/Community Service activities, career guidance.
Activities:
  i.   Conducting –ice breaking sessions-expectations from the course-knowing personal talents and skills
  ii. Conducting orientations programs for the students –future plans-activities-releasing road map etc.
  iii. Displaying success stories-motivational biopics- award winning movies on societal issues etc.
  iv. Conducting talent show in singing patriotic songs-paintings- any other contribution.

UNIT 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.

UNIT III
Community Service
Activities:

i. Conducting One Day Special Camp in a village contacting village-area leaders- Survey in the village, identification of problems- helping them to solve via media- authoritiesexperts-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.

Reference Books:

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

General Guidelines:
1. Institutes must assign slots in the Timetable for the activities.
2. Institutes are required to provide instructor to mentor the students.

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

DEPARTMENT OF BASIC SCIENCE AND HUMANITIES

I Year- II Semester	Course Code: BT24BS1201	L	T	P	C
		2	0	0	2
	COMMUNICATIVE ENGLISH **(Common to All Branches of Engineering)**				

Course Objectives:

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

Course Outcomes:

CO1: Understand the context, theme, and pieces of specific information from social or Transactional dialogues.

CO2: Apply the principles of writing skills and cohesive devices in paragraphs and formal/informal communication.

CO3: Build confidence and creative thinking by challenging the hardships in life.

CO4: Discover the peace and amicable relations in human development.

CO5: Perceive the personal traits and communicative competence in the form of interpersonal communication.

CO6: Form error free sentences in communication by using proper grammatical structures and correct word forms.

CP/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PO 12	PS O1	PS O2
CO1	-	-	-	-	-	-	-	-	-	3	-	-	-	-
CO2	-	-	-	-	-	-	-	-	-	3	-	2	-	-
CO3	-	-	-	-	-	-	-	-	-	3	-	-	-	-
CO4	-	-	-	-	-	-	-	-	-	3	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	3	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	3	-	3	-	-

UNIT I   Lesson: HUMAN VALUES: Gift of Magi (Short Story)
Listening: Identifying the topic, the context and specific pieces of information by listening to short audio texts and answering a series of questions.

Speaking: Asking and answering general questions on familiar topics such as home, family, work, studies and interests; introducing oneself and others.

Reading: Skimming to get the main idea of a text; scanning to look for specific pieces of information.

Writing: Mechanics of Writing-Capitalization, Spellings, Punctuation-Parts of Sentences.

Grammar: Parts of Speech, Basic Sentence Structures-forming questions

Vocabulary: Synonyms, Antonyms, Affixes (Prefixes/Suffixes), Root words.

UNIT II   Lesson: NATURE: The Brook by Alfred Tennyson (Poem)

Listening: Answering a series of questions about main ideas and supporting ideas after listening to audio texts.

Speaking: Discussion in pairs / small groups on specific topics followed by short structure talks

Reading: Identifying sequence of ideas; recognizing verbal techniques that help to link the ideas in a paragraph together.

Writing: Structure of a paragraph - Paragraph writing (specific topics)

Grammar: Cohesive devices - linkers, use of articles and zero article; prepositions.

Vocabulary: Homonyms, Homophones, Homographs.

UNIT III   Lesson: BIOGRAPHY: Elon Musk

Listening: Listening for global comprehension and summarizing what is listened to.

Speaking: Discussing specific topics in pairs or small groups and reporting what is discussed

Reading : Reading a text in detail by making basic inferences -recognizing and interpreting
                specific context clues; strategies to use text clues for comprehension.

Writing   : Summarizing, Note-making, paraphrasing

Grammar: Verbs - tenses; subject-verb agreement; Compound words, Collocations

Vocabulary: Compound words, Collocations

UNIT IV   Lesson: INSPIRATION: The Toys of Peace by Saki

Listening: Making predictions while listening to conversations/ transactional dialogues without video; listening with video.

Speaking: Role plays for practice of conversational English in academic contexts (formal and informal) - asking for and giving information/directions.

Reading: Studying the use of graphic elements in texts to convey information, reveal trends/patterns/relationships, communicate processes or display complicated data.

Writing: Letter Writing: Official Letters, Resumes

Grammar: Reporting verbs, Direct & Indirect speech, Active & Passive Voice

Vocabulary: Words often confused, Jargons

UNIT V   Lesson: MOTIVATION: The Power of Intrapersonal Communication (An Essay)

Listening: Identifying key terms understanding concepts and answering a series of relevant questions that test comprehension.

Speaking: Formal oral presentations on topics from academic contexts

Reading: Reading comprehension.

Writing: Writing structured essays on specific topics.

Grammar: Editing short texts –identifying and correcting common errors in grammar and usage (articles, prepositions, tenses, subject verb agreement)

Vocabulary: Technical Jargons

Textbooks:

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

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

Reference Books:

1. Dubey, Sham Ji & Co. English for Engineers, Vikas Publishers, 2020

2. Bailey, Stephen. Academic writing: A Handbook for International Students, Routledge,2014.

3. Murphy, Raymond. English Grammar in Use, Fourth Edition, Cambridge University Press, 2019.

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DEPARTMENT OF BASIC SCIENCE AND HUMANITIES

I Year- II Semester	Course Code: BT24BS1203	L	T	P	C
		3	0	0	3
	ENGINEERING CHEMISTRY *(Common to Civil and Mechanical Engineering)*				

Course Objectives:
- To familiarize engineering chemistry and its applications
- To train the students on the principles and applications of electrochemistry and polymers

Course Outcomes:

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

CO1: Understand the boiler troubles and different water treatment methods

CO2: Distinguish between batteries ,and fuel cells

CO3: Explain the properties and applications of plastics, elastomers and fuels.

CO4: Apply Composites, refractories, lubricants and cement materials in the field of engineering

CO5: Summarize the concepts of colloids ,micelle ,and Nano-materials

CO6: Describe the corrosion revention methods

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PS O1	PS O2
CO1	3	2	2	-	-	-	-	-	-	1	-	1	-	-
CO2	3	2	2	-	-	-	-	-	-	1	-	2	-	-
CO3	2	2	2	-	-	-	-	-	-	1	-	2	-	-
CO4	3	2	2	-	-	-	-	-	-	1	-	2	-	-
CO5	3	2	2	-	-	-	-	-	-	1	-	2	-	-
CO6	3	2	2	-	-	-	-	-	-	1	-	2	-	-

UNIT – I   Water Technology

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

UNIT-II   Electrochemistry and Applications

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

UNIT- III   Polymers and Fuel Chemistry

Introduction to polymers, functionality of monomers, Mechanism of chain growth, step growth polymerization. Thermoplastics and Thermo-setting plastics-: Preparation, properties and applications of poly styrene. PVC Nylon 6,6 and Bakelite. Elastomers – Preparation, properties and applications of Buna S, Buna N, Thiokol rubbers. Fuels – Types of fuels, calorific value of fuels, numerical problems based on calorific value; Analysis of coal (Proximate and Ultimate analysis), Liquid Fuels, refining of petroleum, Octane and Cetane number- alternative fuels- propane, methanol, ethanol and bio fuel-bio diesel.

UNIT –IV Modern Engineering Materials

Composites- Definition, Constituents, Classification- Particle, Fibre and Structural reinforced composites, properties and Engineering applications Refractories- Classification, Properties, Factors affecting the refractory materials and Applications. Lubricants- Classification, Functions of lubricants, Mechanism, Properties of lubricating oils – Viscosity, Viscosity Index, Flash point, Fire point, Cloud point, saponification and Applications. Building materials- Portland Cement, constituents, Setting and Hardening of cement.

UNIT- V   Surface Chemistry and Nanomaterials

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

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

Reference Books:
1. H.F.W. Taylor, Cement Chemistry, 2/e, Thomas Telford Publications, 1997.
2. Textbook of Polymer Science, Fred W. Billmayer Jr, 3rd Edition
3. J. Shaw, Introduction to Colloids and Surface Chemistry, Butterworth-Heineman, 1992
4. A text book of Engineering Chemistry by Sashi Chawala, Dhanpat Rai & Co. 2017.

DEPARTMENT OF BASIC SCIENCE AND HUMANITIES

I Year- II Semester	Course Code: BT24BS1202	L	T	P	C
		3	0	0	3

CHEMISTRY
(Common to ECE, EEE and IT)

Course Objectives:
- To familiarize engineering chemistry and its applications
- To train the students on the principles and applications of electrochemistry and polymers

Course Outcomes:
At the end of the course, the students will be able to:
CO1: Understand the fundamentals of Quantum mechanics and Molecular Orbital Theory.
CO2: Apply the basic principles of semiconductors, super conductors, and nanomaterials in real world applications.
CO3: Compare the materials for construction of batteries and electrochemical sensors.
CO4: Explain the preparation, properties, and applications of thermoplastics thermosetting, elastomers and conducting polymers.
CO5: Summarize the concepts of Instrumental methods.
CO6: Define the principles of spectrometry, slc in separation of solid and liquid mixtures.

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

UNIT I Structure and Bonding Models:
Fundamentals of Quantum mechanics, Schrodinger Wave equation, significance of Ψ and $\Psi2$, particle in one dimensional box, molecular orbital theory – bonding in homo- and heteronuclear diatomic molecules– energy level diagrams of O2 and CO, etc. π-molecular orbitals of butadiene and benzene, calculation of   bond order.

UNIT II   Modern Engineering materials
Semiconductors – Introduction, basic concept, application
Super conductors-Introduction basic concept, applications.
Super capacitors: Introduction, Basic Concept-Classification – Applications.
Nano materials: Introduction, classification, properties and applications of Fullerenes, carbon nano tubes and Graphene nanoparticles.

UNIT III   Electrochemistry and Applications
Electrochemical cell, Nernst equation, cell potential calculations and numerical problems, potentiometer- potentiometric titrations (redox titrations), concept of conductivity, conductivity cell, conductometric titrations (acid-base titrations).
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). Electrochemical sensors – potentiometric sensors with examples, amperometric sensors with examples.

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 – polyacetylene, polyaniline, – mechanism of conduction and applications. Bio- Degradable polymers - Poly Glycolic Acid (PGA), Poly Lactic Acid (PLA).

UNIT V   Instrumental Methods and Applications

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

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

Reference Books:
1. 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. Text book of Polymer Science, Fred W. Billmayer Jr., 3rd Edition
4. A text book of Engineering Chemistry by Sashi Chawala, Dhanpat Rai & Co. 201

DEPARTMENT OF CIVIL ENGINEERING

I Year- II Semester	Course Code: BT24CE1201	L	T	P	C
		3	0	0	3
	BASIC CIVIL AND MECHANICAL ENGINEERING (Common to All branches of Engineering)				

Course Objectives:

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

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

CO1: Understand the various sub divisions of Civil Engineering and their role in ensuring better society.

CO2: Know the objectives of surveying and understand the measurement of distances, angles and levels through surveying

CO3: Understand the role of Transportation Engineering in Nation's economy and importance of Water Resource Engineering and Environmental Engineering.

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO 12	PS O1	PS O2
CO1	3	1	-	-	-	2	1	1	1	1	2	2	2	2
CO2	3	2	-	-	1	2	-	1	2	1	2	1	2	2
CO3	3	1	-	-	1	2	2	1	1	1	2	2	2	1

Part A: BASIC CIVIL ENGINEERING

UNIT I

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.

UNIT II

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

UNIT III

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).

Textbooks:

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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:

6. Surveying, Vol- I and Vol-II, S.K. Duggal, Tata McGraw Hill Publishers 2019. Fifth Edition.
7. Hydrology and Water Resources Engineering, Santosh Kumar Garg, Khanna Publishers, Delhi. 2016
8. Irrigation Engineering and Hydraulic Structures - Santosh Kumar Garg, Khanna Publishers, Delhi 2023. 38th Edition.
9. Highway Engineering, S.K.Khanna, C.E.G. Justo and Veeraraghavan, Nemchand and Brothers Publications 2019. 10th Edition.
10. Indian Standard DRINKING WATER — SPECIFICATION IS 10500-2012.

PART B: BASIC MECHANICAL ENGINEERING

Course Objectives: The students after completing the course are expected to
- Get familiarized with the scope and importance of Mechanical Engineering in different sectors and industries.
- Explain different engineering materials and different manufacturing processes.
- Provide an overview of different thermal and mechanical transmission systems and introduce basics of robotics and its applications.

Course Outcomes: On completion of the course, the student should be able to:
CO4: Understand the different manufacturing processes.
CO5:Explain the basics of thermal engineering and its applications and the working of different mechanical power transmission systems and power plants.
CO6:Describe the basics of robotics and its applications

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO4	2	-	-	-	-	2	2	-	-	-	-	-	1	-
CO5	2	1	-	-	1	1	-	-	-	-	-	-	-	-
CO6	1	-	-	-	-	1	1	-	-	-	-	-	-	-

UNIT I
Introduction to Mechanical Engineering: Role of Mechanical Engineering in Industries and Society-Technologies in different sectors such as Energy, Manufacturing, Automotive, Aerospace, and Marine sectors.
Engineering Materials - Metals-Ferrous and Non-ferrous, Ceramics, Composites, Smart materials.
UNIT II
Manufacturing Processes: Principles of Casting, Forming, joining processes, Machining, Introduction to CNC machines, 3D printing, and Smart manufacturing.
Thermal Engineering – Working principle of Boilers, Otto cycle, Diesel cycle, Refrigeration and air-conditioning cycles, IC engines, 2-Stroke and 4-Stroke engines, SI/CI Engines, Components of Electric and Hybrid Vehicles.

UNIT 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.

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

Textbooks:

1. Internal Combustion Engines by V.Ganesan, By Tata McGraw Hill publications (India) Pvt. Ltd.
2. A 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
4. Appuu Kuttan KK, Robotics, I.K. International Publishing House Pvt. Ltd. Volume-I

DEPARTMENT OF MECHANICAL ENGINEERING

I Year- II Semester	Course Code: BT24ME1202	L	T	P	C
		3	0	0	3
	ENGINEERING MECHANICS (Common to CE and ME)				

Course Objectives:
- To get familiarized with different types of force systems.
- To draw accurate free body diagrams representing forces and moments acting on a body to analyze the equilibrium of system of forces.
- To teach the basic principles of center of gravity, centroid and moment of inertia and determine them for different simple and composite bodies.
- To apply the Work-Energy method to particle motion.
- To understand the kinematics and kinetics of translational and rotational motion of rigid bodies.

Course Outcomes: On Completion of the course, the student should be able to
CO1: Understand the fundamental concepts in mechanics and determine thefrictional forces for bodies in contact.
CO2: Analyze different force systems such as concurrent, coplanar and spatial systemsand calculate their resultant forces and moments.
CO3: Calculate the centroids, center of gravity and moment of inertia of differentgeometrical shapes.
CO4: Apply the principles of work-energy and impulse-momentum to solve the problems of rectilinear and curvilinear motion of a particle.
CO5: Solve the problems involving the translational and rotational motion of rigid bodies.
CO6: Calculate the equilibrium of systems using work-Energy method

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PO 12	PS O1	PS O2
CO1	3	2	-	-	-	-	-	-	-	1	-	2	-	-
CO2	3	2	1	-	-	1	-	-	-	1	-	2	-	-
CO3	3	3	2	1	-	-	-	-	-	1	-	2	-	-
CO4	3	3	2	1	-	-	-	-	-	1	-	2	-	-
CO5	3	1	1	1	-	-	-	-	-	1	-	2	-	-
CO6	2	3	2	1	-	-	-	-	-	1	-	2	-	-

UNIT I
Introduction to Engineering Mechanics – Basic Concepts. Scope and Applications
Systems of Forces: Coplanar Concurrent Forces– Components in Space–Resultant–Moment of Force and its Application –Couples and Resultant of Force Systems.
Friction: Introduction, limiting friction and impending motion, Coulomb'slaws of dryfriction, coefficient of friction, Cone of Static friction.

UNIT II
Equilibrium of Systems of Forces: Free Body Diagrams, Lami's Theorm, Equations of Equilibrium of Coplanar Systems, Graphical method for the equilibrium, Triangle law of forces, converse of the law of polygon of forces condition of equilibrium, Equations of Equilibrium for Spatial System of forces, Numerical examples on spatial system of forces using vector approach, Analysis of plane trusses, Principle of virtual work with simple examples.

UNIT III
Centroid: Centroids of simple figures (from basic principles)–Centroids of Composite Figures.
Centre of Gravity: Centre of gravity of simple body (from basic principles), Centre of gravity of composite bodies, Pappus theorems.

Area Moments of Inertia: Definition– Polar Moment of Inertia, Transfer Theorem, Moments of Inertia of Composite Figures, Products of Inertia, Transfer Formula for Product of Inertia.
Mass Moment of Inertia: Moment of Inertia of Masses, Transfer Formula for Mass Moments of Inertia, Mass Moment of Inertia of composite bodies.

UNIT IV
Rectilinear and Curvilinear motion of a particle: Kinematics and Kinetics –D'Alembert's Principle - Work Energy method and applications to particle motion-Impulse Momentum method.

UNIT V
Rigid body Motion: Kinematics and Kinetics of translation, Rotation about fixed axis and plane motion, Work Energy method and Impulse Momentum method.

Textbooks:
1. Engineering Mechanics, S. Timoshenko, D. H. Young, J.V. Rao, S. Pati., , McGraw Hill Education 2017. 5th Edition.
2. Engineering Mechanics, P.C.Dumir- S.Sengupta and Srinivas V veeravalli , University press. 2020. First Edition.
3. A Textbook of Engineering Mechanics, S.S Bhavikatti. New age international publications 2018. 4th Edition.

Reference Books:
1. Engineering Mechanics, Statics and Dynamics, Rogers and M A. Nelson., McGraw Hill Education. 2017. First Edition.
2. Engineering Mechanics, Statics and Dynamics, I.H. Shames., PHI, 2002. 4th Edition.
3. Engineering Mechanics, Volume-I: Statics, Volume-II: Dynamics, J. L. Meriam and L. G. Kraige., John Wiley, 2008. 6th Edition.
4. Introduction to Statics and Dynamics, Basudev Battachatia, Oxford University Press, 2014. Second Edition
5. Engineering Mechanics: Statics and Dynamics, Hibbeler R.C., Pearson Education, Inc., New Delhi, 2022, 14th Edition

DEPARTMENT OF ELECTRICAL ELECTRONICS ENGINEERING

I Year- II Semester	Course Code: BT24EE1203	L	T	P	C
		3	0	0	3
	NETWORK ANALYSIS (ECE & allied branches)				

Course Objectives: Students will learn

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

Course Outcomes: At the end of the course, the student will be able to
CO1: Identify basic electrical circuits with nodal and mesh analysis and Apply network theorems for the analysis of AC and DC networks
CO2: Analyze transient response and Steady state response of network.
CO3: Apply nodal and mesh networks, series and parallel circuits, steady state response, different circuit topologies (with R, L and C components).
CO4: Apply steady state response, different circuit topologies (with R, L and C components).
CO5: Analyze the resonant circuits and draw the locus diagrams.
CO6: Develop the parameters of a two-port network.

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PS O1	PS O2
CO1	3	3	2	2	1	-	-	-	-	-	-	2	-	2
CO2	3	3	2	2	1	-	-	-	-	-	-	2	-	2
CO3	3	3	2	2	1	-	-	-	-	-	-	2	-	2
CO4	3	2	2	1	1	-	-	-	-	-	-	2	-	2
CO5	3	2	2	2	1	-	-	-	-	-	-	2	-	2
CO6	3	3	2	2	2	-	-	-	-	-	-	2	-	2

UNIT I   ELECTRICAL CIRCUITS & NETWORK THEOREMS
Types of circuit components, Types of Sources and Source Transformations, Mesh analysis and Nodal analysis, problem solving with resistances only including dependent sources also. Principal of Duality with examples. Network Theorems: Thevenin's, Norton's, Millman's, Reciprocity, Compensation, Substitution, Superposition, Max Power Transfer, and Tellegens-problem solving using dependent sources also

UNIT II   TRANSIENTS & LAPLACE TRANSFORM APPLICATIONS
Transients: First order differential equations, Definition of time constants, R-L circuit, R-C circuit with DC excitation, evaluating initial conditions procedure, second order differential equations, homogeneous, non-homogenous, problem-solving using R-L-C elements with DC excitation and AC excitation, Response as related to s-plane rotation of roots. Laplace transform: introduction, Laplace transformation, basic theorems, problem solving using Laplace transform, partial fraction expansion, Heaviside's expansions, problem solving using Laplace transform.

UNIT III   SINGLE PHASE AC SYSTEMS

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

UNIT IV   MAGNETIC CIRCUITS & RESONANCE

Resonance: Introduction, Definition of Q, Series resonance, Bandwidth of series resonance, Parallel resonance, general case-resistance present in both branches, anti-resonance at all frequencies. Coupled Circuits: Coupled Circuits: Self-inductance, Mutual inductance, Coefficient of coupling, analysis of coupled circuits, Natural current, Dot rule of coupled circuits, conductively coupled equivalent circuits- problem solving.

UNIT V   TWO PORT NETWORKS

Two-port Networks: Relationship of two port networks, Z-parameters, Y-parameters, Transmission line parameters, h- parameters, Relationships Between parameter Sets, Parallel & series connection of two port networks, cascading of two port networks, problem solving using dependent sources also. Image and iterative impedances. Image and iterative transfer constants. Insertion loss. Attenuators and pads. Lattice network and its parameters. Impedance matching networks.

Textbooks:
1. Engineering Circuit Analysis by William H. Hayt, Jack Kemmerly, Jamie Phillips, Steven M. Durbin, and 9th Edition 2020.
2. Network lines and Fields by John. D. Ryder 2nd Edition, PHI
3. Network Analysis – ME Van Valkenberg, Prentice Hall of India, revised 3rd Edition, 2019.
4. Circuit Theory, Abhijit Chakrabarti, Dhanpat Rai & Co. Publications, 8th edition, 2023

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

E-Resources:
1. https://nptel.ac.in/courses/108105159
2. https://nptel.ac.in/courses/117106108

DEPARTMENT OF ELECTRICAL ELECTRONICS ENGINEERING

I Year- II Semester	Course Code: BT24EE1202	L	T	P	C
		3	0	0	3
	ELECTRICAL CIRCUIT ANALYSIS-I (EEE & allied branches)				

Course Objectives: Students will learn
- About various techniques of circuit analysis using resistive circuits and the fundamentals of AC
  circuit analysis
- About magnetically coupled and 3 – phase circuits and the resonance phenomenon in Electrical
  circuits.
- About various theorems in Electrical Circuits.

Course Outcomes: At the end of the course, the student will be able to
CO1: Apply nodal and mesh networks, series and parallel circuits, steady-state response,
     and different circuit topologies (with R, L and C components)
CO2: Analyze the resonant circuits and draw the locus diagrams.
CO3: Apply network theorems for the analysis of DC networks.
CO4: Apply network theorems for the analysis of AC networks.
CO5: Analyze three-phase balanced circuits
CO6: Analyze three-phase unbalanced circuits

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PS O1	PS O2
CO1	3	3	2	2	-	1	-	-	-	-	-	1	1	1
CO2	3	3	2	2	-	2	-	-	-	-	-	1	1	1
CO3	3	2	2	1	-	2	-	-	-	-	-	1	1	1
CO4	2	2	2	2	-	2	-	-	-	-	-	1	1	1
CO5	3	2	2	1	-	1	-	-	-	-	-	1	1	1
CO6	2	2	2	2	-	1	-	-	-	-	-	1	1	1

UNIT I   SINGLE PHASE A.C SYSTEMS
Periodic waveforms - average value, rms value, peak factor and form factor, concept of phasor, phase
angle and phase difference, phasor diagrams for lagging, leading networks, complex and polar forms
of representations. node and mesh analysis.-Steady state analysis of R, L and C circuits, power factor
and its significance, real, reactive and apparent power, waveform of instantaneous power and complex
power **.**

UNIT II   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.

UNIT III   NETWORK THEOREMS (DC & AC EXCITATION)
Superposition theorem, Thevenin's theorem, Norton's theorem, Maximum Power Transfer theorem,
Reciprocity theorem, Millman's theorem and compensation theorem

UNIT IV   BALANCED THREE-PHASE CIRCUITS

Phase sequence, star and delta connection of sources and loads, relation between line and phase voltages and currents, analysis of balanced three phase circuits, measurement of active and reactive power.

UNIT V   UNBALANCED THREE-PHASE CIRCUITS

Loop method, Star-Delta transformation technique, two wattmeter method for measurement of three phase power.

Textbooks:
1. Network Analysis, M.E.Van Valkenberg, Pearson Education, 2019, Revised Third Edition.
2. Engineering Circuits Analysis, Jack Kemmerly,William Hayt and Steven Durbin

Reference Books:
1. Fundamentals of Electrical Circuits, Charles K Alexander and Mathew N.O Sadiku,Mc Graw Hill Education (India), 2022, 7th Edition.
2. Electric Circuits, David A. Bell, Oxford University Press, 2009, Seventh Edition.
3. Introductory Circuit Analysis, Robert L Boylestad, Pearson Publications, 2023, Fourteenth Edition.
4. Circuit Theory, Abhijit Chakrabarti, Dhanpat Rai & Co. Publications, 8th edition, 2023
5. Schaum's Outline of Electric Circuits, by Mahmood Nahvi, Joseph Edminister, McGraw Hill; 7th edition (31 December 2017).

E-Resources:
1. https://nptel.ac.in/courses/108105159
2. https://nptel.ac.in/courses/117106108

DEPARTMENT OF BASIC SCIENCE AND HUMANITIES

I Year- II Semester	Course Code: BT24BS1206	L	T	P	C
		0	0	2	1
	COMMUNICATIVE ENGLISH LAB (Common to All Branches of Engineering)				

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

Course Outcomes:

CO1: Distinguish the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension in day to day conversations.

CO2: Demonstrate communication skills through various language learning activities

CO3: Apply the writing skills in e-mail Writing and Resume Writing.

CO4: Appraise and manifest professionalism in participating group discussions and debates.

CO5: Exhibit the effective interpersonal skills in presentations and interviews

CO6: Understand the different aspects of the English language proficiency with emphasis on LSRW skills.

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

List of Topics:

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

Suggested Software:
- Walden Infotech
- 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, (2nd Ed),Kindle, 2013

Online learning resources :

Spoken English:

www.esl-lab.com

www.englishmedialab.com

www.englishinteractive.net

https://www.britishcouncil.in/english/online

http://www.letstalkpodcast.com/

https://www.youtube.com/c/mmmEnglish_Emma/featured

https://www.youtube.com/c/ArnelsEverydayEnglish/featured

https://www.youtube.com/c/engvidAdam/featured

https://www.youtube.com/c/EnglishClass101/featured

https://www.youtube.com/c/SpeakEnglishWithTiffani/playlists

https://www.youtube.com/channel/UCV1h_cBE0Drdx19qkTM0WNw

Voice & Accent:

https://www.youtube.com/user/letstalkaccent/videos

https://www.youtube.com/c/EngLanguageClub/featured

https://www.youtube.com/channel/UC_OskgZBoS4dAnVUgJVexc

https://www.youtube.com/channel/UCNfm92h83W2i2ijc5Xwp_IA

DEPARTMENT OF BASIC SCIENCE AND HUMANITIES

I Year- II Semester	Course Code: BT24BS1208	L	T	P	C
		0	0	2	1
	ENGINEERING CHEMISTRY LAB *(Common to Civil and Mechanical Engineering)*				

Course Objectives:

- To verify the fundamental concepts with experiments

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

CO1: Determine the cell constant and conductance of solutions.

CO2: Prepare advanced polymer materials.

CO3: Determine the physical properties like surface tension, adsorption and viscosity.

CO4: Estimate the Iron and Calcium in cement.

CO5: Calculate the hardness of water.

CO6: Understand the synthesis of Bakelite

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

List of Experiments:

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

Reference:

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

DEPARTMENT OF BASIC SCIENCE AND HUMANITIES

I Year- II Semester	Course Code: BT24BS1207	L	T	P	C
		0	0	2	1

CHEMISTRY LAB
(Common to ECE, EEE and IT)

Course Objectives:

- Verify the fundamental concepts with experiments.

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

CO1: Determine the cell constant and conductance of solutions.
CO2: Prepare advanced polymer materials.
CO3: Determine the physical properties like surface tension, adsorption and viscosity.
CO4: Estimate the Iron and Calcium in cement
CO5: Calculate the hardness of water.
CO6: Preparation of a polymer (Bakelite)

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

List of Experiments:

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

Reference:

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

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DEPARTMENT OF MECHANICAL ENGINEERING

I Year- II Semester	Course Code: BT24ME1203	L	T	P	C
		0	0	3	1.5
	ENGINEERING WORKSHOP (Common to All branches of Engineering)				

Course Objectives:

To familiarize students with wood working, sheet metal operations, fitting, electrical house wiring skills, and basic repairs of two-wheeler vehicle.

Course Outcomes:

CO1: Build carpentry fitting and forging operations in various applications.

CO2: Executing operations of foundry and sheet metal works using varies tools.

CO3: Inspect basic electrical engineering knowledge for house wiring practice

CO4: Develop a lap and butt joint using arc welding.

CO5: Develop pipe joint for different diameter of pipes

CO6: Inspect basic repair of two-wheeler vehicle .

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PS O1	PS O2
CO1	3	-	3	-	2	-	-	3	-	-	-	1	-	-
CO2	3	-	3	-	2	-	-	3	-	-	-	1	-	-
CO3	3	-	3	-	2	-	-	3	-	-	-	1	-	-
CO4	3	-	3	-	2	-	-	3	-	-	-	1	-	-
CO5	3	-	3	-	2	-	-	3	-	-	-	1	-	-
CO6	3	-	3	-	2	-	-	3	-	-	-	1	-	-

SYLLABUS

1. Demonstration: Safety practices and precautions to be observed in workshop.
2. Wood Working: Familiarity with different types of woods and tools used in wood working and make following joints.
    a) Half – Lap joint b) Mortise and Tenon joint c) Corner Dovetail joint or Bridle joint
3. Sheet Metal Working: Familiarity with different types of tools used in sheet metal working, Developments of following sheet metal job from GI sheets.
    a) Tapered tray b) Conical funnel c) Elbow pipe d) Brazing
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 tyre
5. Electrical Wiring: Familiarity with different types of basic electrical circuits and make the following connections.
    a) Parallel and series b) Two-way switch c) Godown lighting d) Tube light e) Three phase motor f) Soldering of wires
6. Foundry Trade: Demonstration and practice on Moulding tools and processes, Preparation of Green Sand Moulds for given Patterns.
7. Welding Shop: Demonstration and practice on Arc Welding and Gas welding. Preparation of Lap joint and Butt joint.
8. Plumbing: Demonstration and practice of Plumbing tools, Preparation of Pipe joints with

coupling for same diameter and with reducer for different diameters.

9. Basic repairs of Two-wheeler vehicle – Demonstration of working of two-wheeler vehicle and its repairs.

Textbooks:

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.

DEPARTMENT OF CIVIL ENGINEERING

I Year- II Semester	Course Code: BT24CE1202	L	T	P	C
		0	0	3	1.5
ENGINEERING MECHANICS & BUILDING PRACTICES LAB (Civil Engineering & allied branches)					

Course Objectives: The students completing the course are expected to

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

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

CO1: Evaluate the coefficient of friction between two different surfaces and between the inclined plane and the roller.

CO2: Verify Law of Parallelogram of forces and Law of Moment using force Polygon and bell crank lever.

CO3: Determine the Centre of gravity different configurations and

CO4: Understand the Quality Testing and Assessment Procedures and Principles of Non-Destructive Testing.

CO5: Exposure to safety practices in the construction industry.

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO 12	PS O1	PS O2
CO1	3	2	-	-	-	-	-	-	-	1	-	2	-	-
CO2	3	2	2	-	-	1	-	-	-	-	-	-	1	-
CO3	2	-	3	-	-	-	-	-	-	-	-	3	2	-
CO4	2	3	-	2	-	-	-	1	-	-	-	-	2	-
CO5	-	-	-	-	2	-	2	-	-	1	-	3	-	-

Students have to perform any 10 of the following Experiments:

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

Reference Books:

1. 1. S. Timoshenko, D. H. Young, J.V. Rao, S. Pati., Engineering Mechanics, 5th Edition, McGraw Hill Education.

DEPARTMENT OF MECHANICAL ENGINEERING

I Year- II Semester	Course Code: BT24ME1204	L	T	P	C
		0	0	3	1.5
	ENGINEERING MECHANICS LAB (Mechanical Engineering & allied branches)				

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

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

Course Outcomes:

CO1: Evaluate the coefficient of friction between two different surfaces and between the inclined plane and the roller.

CO2: Verify Law of Polygon of forces and Law of Moment using force polygon and bell crank lever.

CO3: Determine the Centre of gravity and Moment of Inertia of different configurations.

CO4: Verify the equilibrium conditions of a rigid body under the action of different force systems.

CO5: Determine the coefficients of friction of Static and Rolling friction and Centre of gravity of different plane Lamina.

CO6: Analyse the system of Pulleys and Moment of Inertia of Compound Pendulum and Flywheel.

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PO 12	PS O1	PS O2
CO1	3	3	-	2	-	-	-	-	-	-	-	1	3	3
CO2	3	3	-	2	-	-	-	-	-	-	-	1	3	3
CO3	3	3	-	2	-	-	-	-	-	-	-	1	3	3
CO4	3	3	-	2	-	-	-	-	-	-	-	1	3	3
CO5	3	3	-	2	-	-	-	-	-	-	-	1	3	3
CO6	3	3	-	2	-	-	-	-	-	-	-	1	3	3

Students have to perform any 10 of the following Experiments:
List of Experiments:
1. Verification of Law of Parallelogram of Forces.
2. Verification of Law of Triangle of Forces.
3. Verification of the Law of polygon for coplanar-concurrent forces acting on a particle in equilibrium and to find the value of unknown forces considering particle to be in equilibrium using universal force table.
4. Determination of coefficient of Static and Rolling Frictions
5. Determination of Centre of Gravity of different shaped Plane Lamina.
6. Verification of the conditions of equilibrium of a rigid body under the action of coplanar nonconcurrent, parallel force system with the help of a simply supported beam.
7. Study of the systems of pulleys and draw the free body diagram of the system.
8. Determine the acceleration due to gravity using a compound pendulum.
9. Determine the Moment of Inertia of the compound pendulum about an axis perpendicular to

the plane of oscillation and passing through its centre of mass.

10. Determine the Moment of Inertia of a Flywheel.

11. Verification of Law of Moment using Rotation Disc Apparatus and Bell Crank Lever.

References:

2. S. Timoshenko, D. H. Young, J.V. Rao, S. Pati., Engineering Mechanics, 5th Edition, McGraw Hill Education.

3. Hibbeler R.C., Engineering Mechanics: Statics and Dynamics, 14th Edition, Pearson Education, Inc., New Delhi, 2022.

DEPARTMENT OF ELECTRICAL ELECTRONICS ENGINEERING

I Year- II Semester	Course Code: BT24EE1206	L	T	P	C
		0	0	3	1.5
NETWORK ANALYSIS AND SIMULATION LABORATORY (ECE & allied branches)					

Course Objectives: Students will learn
- To gain hands on experience in verifying Kirchhoff's laws and network theorems.
- To analyze transient behavior of circuits
- To study resonance characteristics
- To determine 2-port network parameters

Course Outcomes: At the end of the course, the student will be able to
CO1: Solve Kirchhoff's laws for the given circuits
CO2: Analyze the given Network by applying various Network Theorems.
CO3: Measure the frequency response of RL & RC circuits.
CO4: Analyze the behavior of RL, RC and RLC circuit for different cases.
CO5: Develop the resonant circuit for given specifications.
CO6: Analyze and model the network in terms of all network parameters.

CO/PO /PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PS O 1	PS O 2
CO1	3	3	2	2	1	-	-	-	1	-	-	1	1	2
CO2	3	3	2	2	1	-	-	-	1	-	-	1	1	2
CO3	3	3	2	3	1	-	-	-	1	-	-	1	1	2
CO4	2	3	3	3	2	-	-	-	1	-	-	1	2	3
CO5	3	3	3	3	2	-	-	-	1	-	-	1	2	3
CO6	2	2	3	3	1	-	-	-	1	-	-	1	2	2

List of Experiments:
1. Study of components of a circuit and verification of KCL and KVL.
2. Verification of mesh and nodal analysis for DC circuits
3. Verification of Superposition theorem for DC circuits
4. Verification of Thevenin's & Norton theorems for DC circuits
5. Verification of maximum power transfer theorem for DC circuits
6. Determination of open circuit (Z) and short circuit (Y) parameters
7. Determination of hybrid (H) and transmission (ABCD) parameters
8. Find the Q Factor and Bandwidth of a Series and Parallel Resonance circuit.
9. Simulation and analysis of DC transients in RL, RC and RLC circuits.
10. Study frequency response of various 1st order RL & RC networks
11. Verification of Reciprocity theorem using simulation tools.
12. Verification of Compensation theorem using simulation tools.

Reference Books:
1. Engineering Circuits Analysis, Jack Kemmerly,William Hayt and Steven Durbin, Tata McGraw Hill Education,2020, 9thedition.
2. Network Analysis, M.E.VanValkenburg, Pearson Education, 2019, Revised Third Edition.
3. Circuit Theory, Abhijit Chakrabarti, Dhanpat Rai & Co. Publications, 8th edition, 2023

DEPARTMENT OF ELECTRICAL ELECTRONICS ENGINEERING

I Year- II Semester	Course Code: BT24EE1205	L	T	P	C
		0	0	3	1.5
	ELECTRICAL CIRCUITS LAB (EEE & allied branches)				

Course Objectives: Students will learn

- To verify Kirchhoff's laws.
- To verify the theorems of electrical circuits.
- The concept of self, mutual inductance phenomenon and measure parameters of iron cored inductor.
- About the resonance phenomenon for series/parallel RLC circuits

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

CO1: Solve the given Electrical Network by using Mesh and Nodal Analysis

CO2: Analyze the given Network by applying various Network Theorems

CO3: Draw locus diagrams of RL, RC series circuits and verify network theorems theoretically and practically

CO4: Determine self, mutual inductances and coefficient of coupling values, parameters of choke coil

CO5: Calculate the power consumed by 3-ϕ balanced and unbalanced loads

CO6: Calculate cold, hot resistance and choke coil parameters of electric lamps

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

Experiments:

1. Verification of network reduction techniques.
2. Verification of node and mesh analysis.
3. Determination of cold and hot resistance of an electric lamp
4. Determination of Parameters of a choke coil.
5. Determination of self, mutual inductances, and coefficient of coupling
6. Series resonance
7. Locus diagrams of R-L(L Variable) and R-C (C Variable)series circuits
8. Verification of Superposition theorem
9. Verification of Thevenin's and Norton's Theorems
10. Verification of Maximum power transfer theorem
11. Verification of Compensation theorem
12. Verification of Reciprocity and Millman's Theorems
13. Measurement of 3-phase power by two-wattmeter method for balanced loads
14. Measurement of 3-phase power by two-wattmeter method for unbalanced loads

Reference Books:

1. Engineering Circuits Analysis, Jack Kemmerly,William Hayt and Steven Durbin, Tata McGraw Hill Education,2020, 9thedition.
2. Network Analysis, M.E.VanValkenburg, Pearson Education, 2019, Revised Third Edition. Circuit Theory, Abhijit Chakrabarti, Dhanpat Rai & Co. Publications, 8th edition, 2023

DEPARTMENT OF BASIC SCIENCE AND HUMANITIES

I Year- II Semester	Course Code: BT24BS1210	L	T	P	C
		0	0	1	0.5

HEALTH AND WELLNESS, YOGA AND SPORTS
(Common to All branches of Engineering)

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

Course Outcomes: After completion of the course the student will be able to
CO1: Understand the importance of yoga and sports for Physical fitness and sound health.
CO2: Demonstrate an understanding of health-related fitness components.
CO3: Compare and contrast various activities that help enhance their health.
CO4: Assess current personal fitness levels.
CO5: Develop Positive Personality.
CO6: Describe the history of sports, Ancient and Modern Olympics

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	-	-	-	-	-	-	-	-	-	-	2	-	-
CO2	-	-	-	-	-	-	-	-	-	-	-	2	-	-
CO3	-	-	-	-	-	-	-	-	-	-	-	2	-	-
CO4	-	-	-	-	-	-	-	-	-	-	-	2	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	2	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	2	-	-

UNIT I Concept of health and fitness, Nutrition and Balanced diet, basic concept of immunity Relationship between diet and fitness, Globalization and its impact on health, Body Mass Index (BMI) of all age groups.
Activities:
i) Organizing health awareness programmes in community
ii) Preparation of health profile
iii) Preparation of chart for balance diet for all age groups

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

UNIT III Concept of Sports and fitness, importance, fitness components, history of sports, Ancient and Modern Olympics, Asian games and Commonwealth games.
Activities:
i) Participation in one major game and one individual sport viz., Athletics, Volleyball, Basketball, Handball, Football, Badminton, Kabaddi, Kho-kho, Table tennis, Cricket etc. Practicing general   and specific warm up, aerobics
ii) Practicing cardiorespiratory fitness, treadmill, run test, 9 min walk, skipping and running.

Reference Books:

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

General Guidelines:

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

Guidelines:

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