ACADEMIC REGULATIONS COURSE STRUCTURE

AND

DETAILED SYLLABUS

DEPARTMENT

OF

ELECTRONICS AND COMMUNICATION ENGINEERING

(Applicable for batches admitted from 2023-2024)

VVIT

VASIREDDY VENKATADRI
INSTITUTE OF TECHNOLOGY

VASIREDDY VENKATADRI INSTITUTE OF TECHNOLOGY

(Autonomous)

Approved by AICTE, Permanently Affiliated to JNTUK,

NAAC Accredited with 'A' Grade, ISO 9001:2015 Certified

Nambur (V), Pedakakani (M), Guntur (Dt.), Andhra Pradesh – 522 508

ACADEMIC REGULATIONS (R23) FOR B. TECH (REGULAR/HONORS/MINOR)

Applicable for the students of B. Tech. (Regular) from the Academic Year 2023-24 onwards

The B.Tech Degree of Jawaharlal Nehru Technological University Kakinada, Kakinada shall be conferred on candidates who are admitted to the programme and who fulfill all the requirements for the award of the Degree.

VISION

To impart quality education through exploration and experimentation and generate socially conscious engineers, embedding ethics and values, for the advancement in science and technology.

MISSION

- To educate students with a practical approach to dovetail them to industry-needs.
- To govern the institution with a proactive and professional management with passionate teaching faculty.
- To provide holistic and integrated education and achieve overall development of students by imparting scientific and technical, social and cognitive, managerial and organizational skills.
- To compete with the best and be the most preferred institution of the studious and the scholarly.
- To forge strong relationships and linkage with the industry.

OBJECTIVES

- Equip the institute with state-of-the-art infrastructure comparable to the best in the industry.
- Tap the resources of the best minds in the field as faculty and visiting faculty.
- Groom students to become global entrepreneurs and responsible citizens.
- Provide financial assistance to meritorious students.
- Requisition the services of the best HR managers to place our students in reputed industries.
- Provide conducive atmosphere to the faculty for Research & Development and ensure active participation of the students.

About ECE Department

- The department of Electronics and Communication Engineering (ECE) was established during the inception of the institute in 2007 with an annual intake of 60 students. In the academic year 2009-2010 the intake capacity rose to 120 and in theyear2013-2014itrose to 180.The department has a faculty student ratio of 1:15 as per AICTE norms. The average teaching experience is more than 5 years. So far around 2000 students have graduated. Every year our students secure placements in reputed companies like INFOSYS,TCS,TECH MAHINDRA,EFFTRONICS and VEDA IIT etc.
- The department also offers two post graduate programs in VLSI& Embedded systems and Digital Electronics and Communication Systems (DECS) with an intake of 18 in each specialization. The major goal of the department of ECE is to produce highly knowledgeable, competent and resourceful young engineers who can perform well in a wide variety of job profiles. To achieve this goal the department is putting dedicated efforts in nurturing a strong foundation both in analytical and technological aspects laid down in the curriculum. It also provides ample opportunities to students to work on mini projects, develop communication skills, explore internship opportunities in industry and take part in national and international design contests.
- The laboratory practical classes are conducted in a systematic manner, where complete plan is given at the time of commencement of the semester. The laboratories are well equipped with modern training facilities that cater to the requirements of the university syllabus. This department plays a vital role in training students of other branches of engineering too.
- The department also encourages students to take up Graduate Aptitude Test for Engineers(GATE), Graduate Record Examination (GRE) during their final year so they can pursue their higher education either in India or countries like USA, UK, Canada, Australia etc.The department has an active ECE students' forum VOICE (VVIT Organization of Innovative Communication Engineers)along with IEEE and IETE student chapters where students learn to do projects and organize technical events like symposiums, paper presentations to inculcate a broader perceptive on the profession. These efforts have culminated in the form of placements in various leading industries and organizations.

Department Vision

- To impart quality education through exploration and experimentation and generate socially conscious engineers, embedding ethics and values, for the advancement in science and technology.

Department Mission

- To educate students with a practical approach to do vetail them to industry needs.
- To govern the institution with a proactive and professional management with passionate teaching faculty.
- To provide holistic and integrated education and achieve overall development of Students by imparting scientific and technical, social and cognitive, managerial and organizational skills.
- To compete with the best and be the most preferred institution of the studious and the scholarly.
- To serve the community as disciplined responsible citizens in a rapidly changing and expanding global community.
- To forge strong relationships and linkage with the industry

1. Award of the Degree

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

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

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

(b) Award of B.Tech. degree with Honors

A student will be declared eligible for the award of the B.Tech. with Honors if he/she fulfils the following:

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

(ii) Registering for Honors is optional.

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

2. Students who fail to 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 1 (a)(i).

3. Admissions

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

4. Program related terms

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

Credit definition:

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

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

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

5. Semester/Credits:

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

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

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

iv) The Universities/HEIs can decide on the courses to be offered in the summer term depending on the availability of faculty and the number of students.

6. Structure of the Undergraduate Programme

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

S.No.	Category	Breakup of Credits (Total 160)	Percentage of total credits	AICTE Recommendation (%)
1.	Humanities and Social Science including Management (HM)	13	8 %	8 – 9%
2.	Basic Sciences (BS)	20	13 %	12 - 16%
3.	Engineering Sciences (ES)	23.5	14%	10 – 18%
4.	Professional Core (PC)	54.5	34 %	30 – 36%
5.	Electives – Professional (PE) & Open (OE); Domain Specific Skill Enhancement Courses (SEC)	33	21 %	19 - 23%
6.	Internships & Project work (PR)	16	10 %	8 – 11%
7.	Mandatory Courses (MC)	Non-credit	Non-credit	-

7. Course Classification

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

S.No.	Broad Course Classification	Course Category	Description
1.	Foundation 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 subjects related to the discipline / department / branch of Engineering
3.	Elective Courses	Professional Elective Courses (PE)	Includes elective subjects related to the parent discipline / department / branch of Engineering

		Open Elective Courses (OE)	Elective subjects which include interdisciplinary subjects or subjects in an area outside the parent discipline / department/ branch of Engineering
		Domain specific skill enhancement courses (SEC)	Interdisciplinary/job-oriented/domain courses which are relevant to the industry
4.	Project &Internships	Project	B.Tech. Project or Major Project
		Internships	Summer Internships – Community based and Industry Internships; Industry oriented Full Semester Internship
5.	Audit Courses	Mandatory non-credit courses	Covering subjects of developing desired attitude among the learners

8. Programme Pattern

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

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

iii. The minimum number of instruction days in each semester is 90 days.

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

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

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

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

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

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

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

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

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

xiii. Students shall undergo mandatory **summer internships**, for a minimum of **eight weeks duration** at the end of the **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. An undergraduate degree with **Honors** is introduced for the students having good academic record.

xvi. Each department shall take measures to implement Virtual Labs (https://www.vlab.co.in) which provide remote access to labs in various disciplines of Engineering and will help student in learning basic and advanced 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.

9. Evaluation Process

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

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

THEORY COUSES

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

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

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

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

a) Continuous Internal Evaluation

i) For theory subjects, during a semester, there shall be two mid-term examinations. The first midterm examination shall be conducted for the first two and half units of syllabus and the second midterm examination shall be conducted for the rest of the syllabus. Each **mid-term examination consists** of (i) one **online objective** examination (ii) one **descriptive** examination (iii) one **assignment** and (iv) one **Subject Seminar**.

The **online examination** (objective) shall be **10 marks** with duration of **20 minutes**, **descriptive examination** shall be for **10 marks** with a duration of **1 hour 30 minutes**, **assignment** test shall be **5 marks** with duration of **50 minutes** (Open book system with questions of L4 standard on Bloom's scale) and **Subject Seminar 5 marks**.

ii) The first **online** examination (objective) is set with **20 multiple choice questions for 10 marks** (20 questions x 1/2 marks) from first two and half units (50% of the syllabus).

iii) The first **descriptive examination** is set with **30 marks** (two questions for 12 marks and one question for 6 marks) with either or choice from first two and half units (50% of the syllabus), the student must answer all questions. The marks obtained in the subjective paper are condensed to 10 marks.

iv) The first **assignment Test** from first two and half units conducted for **20 Marks** and will be **scaled down to 5 Marks**. The test is an **open book** system, and the duration of the exam is **50 minutes**. Students can bring a maximum of three printed text books related to that subject. (Soft copies of the text books will not be allowed.) The assignments must provide broadened exposure to the course. The questions shall include problem solving approach, problem analysis & design, implementation, case studies etc.

v) For the first subject **seminar 5 marks**, each student shall be evaluated based on the presentation on any topic of his/her choice in the subject duly approved by the faculty member concerned.

In the **similar lines**, the **second mid** examinations shall be conducted on the rest of the syllabus. Any fraction in the total of mid marks shall be rounded off to the next higher mark.

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

For Example:

Marks obtained in first mid	: 25
Marks obtained in second mid	: 20
Final mid semester Marks	: (25x0.8) + (20x0.2) = 24

If the student is absent for any one midterm examination, the final mid semester marks shall be arrived at by considering 80% weightage to the marks secured by the student in the appeared examination and zero to the other.

For Example:

Marks obtained in first mid	: Absent
Marks obtained in second mid	: 25

Final mid semester Marks : (0x0.2) + (25x0.8) = 20

b) End Examination Evaluation:

End examination of theory subjects shall have the following pattern:

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

ii) **Question 1** shall contain **10 compulsory short answer questions** (2 short questions from each unit) for a total of **20 marks** such that **each question** carries **2 marks**.

iii) In each of the questions from **2 to 6**, there shall be **either/or type** questions of **10 marks each**. Students shall answer any one of them.

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

Note: End examination of theory subjects consisting of two parts of different subjects, for Example: Basic Electrical &Electronics Engineering shall have the following pattern: **Question 1** shall contain **10 compulsory short answer questions** (Fist five Questions from first two and half units and last five questions from remaining syllabus). The questions numbers **2, 3, 4(a)** shall be set by covering from first two and half units and questions numbers **4(b), 5, 6** in the remaining syllabus.

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 internal marks** and the 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 regularity/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**.

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

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

Day-to-day work shall be evaluated for **15 marks** by the concerned subject teacher based on the reports/submissions prepared in the class. And there shall be **two midterm examinations** in a semester for duration of **2 hours** each for **15 marks** with weightage of **80% to better mid marks** and **20% for the other**. The first mid exam is set with **30 marks** (two questions for 12 marks and one question for 6 marks) with either or choice from first two and half units (50% of the syllabus), the student must answer all questions. The marks obtained in the subjective paper are condensed to 15 marks. The **second mid** examinations shall be conducted on the rest of the syllabus. Any fraction in the total of mid marks shall be rounded off to the next higher mark. Finalized mid semester marks shall be arrived at by considering the marks secured by the student in both the mid examinations with 80% weightage given to the better mid exam and 20% to the other.

There shall be no objective paper in the mid semester examination. The sum of day-to-day evaluation and the mid semester marks will be the final internal marks for the subject.

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

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

e) There shall be **no external examination** for **mandatory courses** with **zero credits**. However, **attendance shall be considered** while calculating **aggregate attendance** and student shall be **declared to have passed** the mandatory course only when he/she secures a

minimum of **40%** in the **internal examinations**. In case the student fails, a re-examination shall be conducted for failed candidates for 30 marks satisfying the conditions mentioned in item 1 & 2 of the regulations.

f) The **laboratory records** and **mid semester test papers** shall be **preserved** for a **minimum of 3 years** in the **respective departments** as per the norms and shall be produced to the various committees as and when the same are asked for.

10. Skill oriented Courses

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

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

g) 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 principal.

iii) 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.

iv) The student shall be given an option to choose either the skill courses being offered by the department 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 to evaluate the grades/marks given for a course by external agencies and convert to the equivalent marks/grades.

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

11. Massive Open Online Courses (MOOCs)

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

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

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

12. Credit Transfer Policy

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

i) The **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 departments** and it is **mandatory** for the student to share **necessary information** with the **department**.

iii) The **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 **department shall notify** at the **beginning of semester** the **list** of the online learning courses **eligible for credit transfer**.

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

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

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

- List of students **who have passed MOOC** courses in the **current semester** along with the **certificate of completion**.
- **Undertaking form** filled in by the students **for credit transfer**.

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

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

13. 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.

14. Mandatory Internships Summer Internships

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

Evaluation of the summer internships shall be through the **departmental committee**. A student will be required to **submit** a summer internship **report** to the concerned department and appear for an **oral presentation** before the departmental committee comprising of Head of the Department, supervisor of the internship and a senior faculty member of the department. A certificate of successful completion from industry shall be included in the report. The **report and the oral presentation** shall **carry 50% weightage each**. It shall be evaluated for **50 external marks**. There shall be **no internal marks** for Summer Internship. A student shall secure a **minimum of 40%** of marks for successful completion. In case 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 a project report on the work carried out during the internship.

The **project report** shall be **evaluated** by an **external examiner**. The total marks for project work are **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 an **internal examiner and external examiner** appointed by the University and is evaluated for **140 marks**.

The 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.

15. Guidelines for offering a Minor

To promote interdisciplinary knowledge among the students, the students admitted into B.Tech. in a major stream/branch are eligible to obtain a 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 within the 160 credits by opting for the courses offered through various verticals/tracks under Open Electives.

16. Guidelines for offering Honors

The objective of introducing B.Tech. (Hons.) is to facilitate the students to choose additional specialized courses of their choice and build their competence in a specialized area in the UG level. The programme is the best choice for academically excellent students having a 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 an additional **15 credits** for award of B.Tech.(Honors) degree from same branch/department/discipline registered for major degree. This **is in addition to the credits** essential for obtaining the Undergraduate degree in Major Discipline (i.e., **160** credits).

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

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

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

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

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

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

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

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

them.

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

Enrolment into Honors

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

ii) The **enrolment** of students 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 for 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 students pursuing the Honors.

iii) The students enrolled in the Honors courses will be monitored continuously. An advisor/mentor from the 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 offline at the respective institutions.

17. Attendance Requirements:

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

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

iii) 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.

iv) 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.

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

vi) 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.

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

18. Promotion Rules:

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

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

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

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

And in case a student is detained for want of credits for a particular academic year by ii) & iii) above, the student may make up the credits through supplementary examinations and only after securing the required credits he/she shall be permitted to join in the V semester or VII semester respectively as the case may be.

iv) When a student is detained due to lack of credits/shortage of attendance he/she may be re-admitted when the semester is offered after fulfilment

of academic regulations. In such a case, he/she shall be in the academic regulations into which he/she is readmitted.

19. Grading:

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

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

Structure of Grading of Academic Performance

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

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

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

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

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

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

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

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

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

where "S_i" is the SGPA of the i^{th} 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 to be secured
First Class with distinction*	≥ 7.75 (Without any supplementary appearance)
First Class	≥ 7.75 (With any supplementary appearance) (or) ≥ 6.75 and < 7.75
Second Class	≥5.75 and <6.75
Pass Class	≥5 and <5.75
Fail	<5

***Note:** Students who have written supplementary examinations to fulfil the credit requirement will not be awarded First Class with Distinction. For such students the highest degree that is awarded will be First Class Only.

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

20. With–holding of Results

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

21. Multiple Entry / Exit Option

(a) Exit Policy:

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

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

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

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

(b) Entry Policy:

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

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

22. Gap Year Concept:

Gap year concept for Student Entrepreneur in Residence is introduced and outstanding students who wish to pursue entrepreneurship / become entrepreneur are allowed to take a break of one year at any time after II year to pursue full-time entrepreneurship programme/to establish startups. This period may be extended to two years at the most and these two years would not be counted for the time for the maximum time for graduation. The HoD of the respective department shall forward

such proposals submitted by the students to the Principal. An evaluation committee constituted by the Principal shall evaluate the proposal submitted by the student and the committee shall decide whether to permit the student(s) to avail the Gap Year or not.

23. Transitory Regulations

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

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

24. Minimum Instruction Days for a Semester:

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

25. Medium of Instruction:

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

26. Student Transfers:

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

27. General Instructions:

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

b. Malpractices rules-nature and punishments are appended.

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

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

e. The Universities may change or amend the academic regulations or syllabi at any time and the changes or amendments shall be made

applicable to all the students on rolls with effect from the dates notified by the Universities.

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

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

*(Effective for the students getting admitted into II year through Lateral Entry Scheme from the Academic Year **2024-2025** onwards)*

1. Award of the Degree

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

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

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

(b) **Award of B.Tech. degree with Honors**

A student will be declared eligible for the award of the B.Tech. 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 six consecutive academic years from the year of admission, shall forfeit their seat.

3. Minimum Academic Requirements

The following academic requirements have to be satisfied in addition to the requirements mentioned in item no.2

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

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

been studied up to V semester.

And in case if student is already detained for want of credits for 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 applicable for B. Tech. Four-year degree course (Regular) will hold good for B. Tech. (Lateral Entry Scheme).

* * * *

MALPRACTICE RULES
DISCIPLINARY ACTION FOR IMPROPER CONDUCT IN EXAMINATIONS

S.No.	Nature of Malpractices/Improper conduct	Punishment
1. (a)	Possesses or keeps accessible in examination hall, any paper, note book, programmable calculators, Cell phones, pager, palm computers or any other form of material concerned with or related to the subject of the examination (theory or practical) in which he is appearing but has not made use of (material shall include any marks on the body of the candidate which can be used as an aid in the subject of the examination)	Expulsion from the examination hall and cancellation of the performance in that subject only.
(b)	Gives assistance or guidance or receives it from any other candidate orally or by any other body language methods or communicates through cell phones with any candidate or persons in or outside the exam hall in respect of any matter.	Expulsion from the examination hall and cancellation of the performance in that subject only of all the candidates involved. In case of an outsider, he will be handed over to the police and a case is registered against him.
2.	Has copied in the examination hall from any paper, book, programmable calculators, palm computers or any other form of material relevant to the subject of the examination (theory or practical) in which the candidate is appearing.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted to appear for the remaining examinations of the subjects of that Semester/year. The Hall Ticket of the candidate is to be cancelled and sent to the University.
3.	Impersonates any other candidate in connection with the examination.	The candidate who has impersonated shall be expelled from examination hall. The candidate is also debarred and forfeits the seat. The performance of the original candidate who has been impersonated, shall be cancelled

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

	disturbance of any kind in and around the examination hall or organizes a walk out or instigates others to walk out, or threatens the officer-in charge or any person on duty in or outside the examination hall of any injury to his person or to any of his relations whether by words, either spoken or written or by signs or by visible representation, assaults the officer-in-charge, or any person on duty in or outside the examination hall or any of his relations, or indulges in any other act of misconduct or mischief which result in damage to or destruction of property in the examination hall or any part of the College campus or engages in any other act which in the opinion of the officer on duty amounts to use of unfair means or misconduct or has the tendency to disrupt the orderly conduct of the examination.	in that subject and all other subjects the candidate(s) has (have) already appeared and shall not be permitted to appear for the remaining examinations of the subjects of that semester/year. The candidates also are debarred and forfeit their seats. In case of outsiders, they will be handed over to the police and a police case is registered against them.
7.	Leaves the exam hall taking away answer script or intentionally tears of the script or any part thereof inside or outside the examination hall.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
8.	Possess any lethal weapon or firearm in the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate

		has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat.
9.	If student of the college, who is not a candidate for the particular examination or any person not connected with the college indulges in any malpractice or improper conduct mentioned in clause 6 to 8.	Student of the college expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat. Person(s) who do not belong to the College will be handed over to police and, a police case will be registered against them.
10.	Comes in a drunken condition to the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year.
11.	Copying detected on the basis of internal evidence, such as, during valuation or during special scrutiny.	Cancellation of the performance in that subject and all other subjects the candidate has appeared including practical examinations and project work of that semester / year examinations.
12.	If any malpractice is detected which is not covered in the above clauses 1 to 11 shall be reported to the University for further action to award suitable punishment.	

Prohibition of ragging in educational institutions Act 26 of 1997

Salient Features

- Ragging within or outside any educational institution is prohibited.
- Ragging means doing an act which causes or is likely to cause Insult or Annoyance of Fear or Apprehension or Threat or Intimidation or outrage of modesty or Injury to a student

	Imprisonment upto		Fine Upto
Teasing, Embarrassing and Humiliation	6 Months	+	Rs. 1,000/-
Assaulting or Using Criminal force or Criminal intimidation	1 Year	+	Rs. 2,000/-
Wrongfully restraining or confining or causing hurt	2 Years	+	Rs. 5,000/-
Causing grievous hurt, kidnapping or Abducts or rape or committing unnatural offence	5 Years	+	Rs. 10,000/-
Causing death or abetting suicide	10 Months	+	Rs. 50,000/-

In case any emergency call Toll Free No. 1800 425 1288

LET US MAKE VVIT A RAGGING FREE CAMPUS

ABSOLUTELY NO TO RAGGING

1. Ragging is prohibited as per Act 26 of A.P. Legislative Assembly, 1997.
2. Ragging entails heavy fines and/or imprisonment.
3. Ragging invokes suspension and dismissal from the College.
4. Outsiders are prohibited from entering the College and Hostel without permission.
5. Girl students must be in their hostel rooms by 7.00 p.m.
6. All the students must carry their Identity Cards and show them when demanded
7. The Principal and the Wardens may visit the Hostels and inspect the rooms any time.

In case any emergency call Toll Free No. 1800 425 1288

LET US MAKE VVIT A RAGGING FREE CAMPUS

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FIRST YEAR

COURSE STRUCTURE AND SYLLABUS

B.TECH. - COURSE STRUCTURE – R23
(Applicable from the academic year 2023-24 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

I B.TECH - I SEMESTER

S.N	Course Code	Subjects	L/D	T	P	Credits
1	BS&H	Linear Algebra & Calculus	3	0	0	3
2	BS&H	Chemistry	3	0	0	3
3	ES	Basic Electrical and Electronics Engineering	3	0	0	3
4	ES	Engineering Graphics	1	0	4	3
5	ES	Introduction to Programming	3	0	0	3
6	ES	IT Workshop	0	0	2	1
7	BS&H	Chemistry Lab	0	0	2	1
8	ES	Electrical and Electronics Engineering Workshop	0	0	3	1.5
9	ES	Computer Programming Lab	0	0	3	1.5
10	BS&H	NSS/NCC/Scouts & Guides/Community Service	0	0	1	0.5
11	LS	Life Skills-I	2	0	0	0
		Total Credits	**20.5**			

I B.TECH - II SEMESTER

S.N	Course Code	Subjects	L/D	T	P	Credits
1	BS&H	Communicative English	2	0	0	2
2	BS&H	Engineering Physics	3	0	0	3
3	BS&H	Differential Equations & Vector Calculus	3	0	0	3
4	ES	Basic Civil & Mechanical Engineering	3	0	0	3
5	PC	Network Analysis	3	0	0	3
6	BS&H	Communicative English Lab	0	0	2	1
7	BS&H	Engineering Physics Lab	0	0	2	1
8	ES	Engineering Workshop	0	0	3	1.5
9	PC	Network Analysis & Simulation Lab	0	0	3	1.5
10	BS&H	Health and wellness, Yoga and sports	0	0	1	0.5
11	LS	Life Skills-II	2	0	0	0
		Total Credits	**19.5**			

SECOND YEAR

COURSE STRUCTURE AND SYLLABUS

B.TECH. - COURSE STRUCTURE – R23
(Applicable from the academic year 2024-25 onwards)

II B. TECH - I SEMESTER

S.N	Subject Code	Subjects	L/D	T	P	Credits
1	23EC3T01	Probability theory and stochastic process	3	0	0	3
2	23SH3T06	Universal Human Values– Understanding Harmony and Ethical Human Conduct	2	1	0	3
3	23EC3T02	Signals and Systems	3	0	0	3
4	23EC3T03	Electronic Devices and Circuits	3	0	0	3
5	23EC3L01	Switching Theory and Logic Design	3	0	0	3
6	23EC3L02	Electronic Devices and Circuits Lab	0	0	3	1.5
7	23EC3L03	Signals and Systems Lab	0	0	3	1.5
8	23CS3S03	Data Structures using C	0	1	2	2
9	23SH3N01	Environmental Science	2	0	0	-
10	23EC3N01	Life Skills – III	2	0	0	0
		Total Credits	**16**	**2**	**08**	**20**

II B. TECH - II SEMESTER

S.N	Subject Code	Subjects	L/D	T	P	Credits
1		Managerial Economics and Financial Analysis	2	0	0	2
2		Linear Control Systems	3	0	0	3
3		Electromagnetic Waves and Transmission Lines	3	0	0	3
4		Electronic Circuit Analysis	3	0	0	3
5		Analog Communications	3	0	0	3
6		Switching Theory and Logic Design Lab	0	0	3	1.5
7		Electronic Circuit Analysis lab	0	0	3	1.5
8		AI Tools and Machine Learning	0	1	2	2
9		Design Thinking & Innovation	1	0	2	2
10		Life Skills – IV	2	0	0	0
		Total Credits	**15**	**1**	**10**	**21**
Mandatory Community Service Project Internship of 08 weeks duration during summer Vacation						

I B. TECH	LINEAR ALGEBRA AND CALCULUS	L	T	P	C
I SEMESTER		3	0	0	3

Course Objectives:

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

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

CO1: Develop and use of matrix algebra techniques that are needed by engineers for practical applications. (L6)

CO2: Determine the eigenvalues and eigenvectors of a matrix or a linear transformation and using them to diagonalize a matrix. (L5)

CO3: Utilize mean value theorems to real life problems. (L3)

CO4: Familiarize with functions of several variables which is useful in optimization. (L3)

CO5: Familiarize with double and triple integrals of functions of several variables in two dimensions using Cartesian and polar coordinates and in three dimensions using cylindrical and spherical coordinates. (L3)

UNIT-I: MATRICES

Rank of a matrix by Echelon form and 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: EIGENVALUES, EIGENVECTORS AND ORTHOGONAL TRANSFORMATION

Eigenvalues, Eigenvectors, and their properties - Diagonalization of a matrix - Cayley-Hamilton theorem (without proof), finding inverse and power of a matrix by Cayley-Hamilton theorem - Quadratic form and nature of a

quadratic form - Reduction of quadratic form to canonical form by orthogonal transformation.

UNIT-III: CALCULUS

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

UNIT-IV: PARTIAL DIFFERENTIATION AND APPLICATIONS (MULTIVARIABLE CALCULUS)

Functions of several variables: Continuity and Differentiability - Partial derivatives - Total derivatives - Chain rule - Taylor's and Maclaurin's series expansion of functions of two variables - Jacobians - Functional dependence - Maxima and minima of functions of two variables - Method of Lagrange's multipliers.

UNIT-V: MULTIPLE INTEGRALS (MULTIVARIABLE CALCULUS)

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

Textbooks:

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

Reference Books:

1. Thomas Calculus, George B. Thomas, Maurice D. Weir and Joel Hass, Pearson Publishers, 2018, 14th Edition.
2. Advanced Engineering Mathematics, R. K. Jain and S. R. K. Iyengar, Alpha

Science International Ltd., 2021 5th Edition (9th reprint).

3. Advanced Modern Engineering Mathematics, Glyn James, Pearson publishers, 2018, 5th Edition.
4. Advanced Engineering Mathematics, Micheael Greenberg, Pearson publishers, 9th edition. Higher Engineering Mathematics, H. K. Das, Er. Rajnish Verma, S. Chand Publications, 2014, Third Edition (Reprint 2021).

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I B.TECH	CHEMISTRY	L	T	P	C
I SEMESTER		3	0	0	3

Course Objectives:

- To familiarize engineering chemistry and its applications.
- To understand the significance of Schrodinger wave equation and molecular orbital theory
- To apply advanced materials for engineering applications.
- To train the students on the principles and applications of electrochemistry - batteries and fuel cells.
- To know the significance of polymers and composites (FRP's) in household appliances, aerospace, and automotive industries.
- To summarize the instrumental methods and their applications.

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

CO1: Apply the principles of quantum mechanics to solve the problems like particle in a one-dimensional box.

CO2: Demonstrate and distinguish the principle of Band diagrams in the application of semiconductors, conductors & superconductors.

CO3: Analyze the materials usage in construction of batteries, fuel cells and electrochemical sensors.

CO4: Synthesize some important polymers, analyze the properties and applications of thermosetting, thermoplastics, elastomers& conducting polymers.

CO5: Compare and apply the principles of spectroscopy to elucidate the molecular structure and functional group analysis.

UNIT I: STRUCTURE AND BONDING MODELS

Fundamentals of Quantum mechanics, Schrodinger Wave equation, significance of Ψ and Ψ^2, particle in one dimensional box, molecular orbital theory – bonding in homo- and heteronuclear diatomic molecules – energy level diagrams of O2 and CO, etc. π-molecular orbitals of butadiene and benzene, calculation of bond order.

UNIT II: MODERN ENGINEERING MATERIALS

Semiconductors – Introduction, Classification, intrinsic and extrinsic Si-semiconductors, applications

Super conductors-Introduction, Types of superconductors, Meissner effect applications.

Supercapacitors: Introduction, Basic Concept-Classification – Applications.

Nano materials: Introduction, classification of nanomaterials, properties and applications of Fullerenes, carbon nano tubes and Graphene nanoparticles.

UNIT III ELECTROCHEMISTRY AND APPLICATIONS

Electrochemical cell, Nernst equation, Electrochemical series - significance, potentiometry- potentiometric titrations (redox titrations), concept of conductivity, conductivity cell, conductometric titrations (acid-base titrations).

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

Primary cells – Zinc-air battery, Secondary cells –lithium-ion batteries-working of the batteries including cell reactions; Fuel cells, working of hydrogen-oxygen fuel cell–. Polymer Electrolyte Membrane Fuel cells (PEMFC).

UNIT IV POLYMER CHEMISTRY

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

Plastics – Thermoplastics and Thermosettings, Preparation, properties, and

applications of – PVC, Teflon, Bakelite, Nylon-6,6, carbon fibres (CFRP& GFRP).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), Polys Lactic Acid (PLA).

UNIT V INSTRUMENTAL METHODS AND APPLICATIONS

Types of electromagnetic spectrum, Absorption of radiation: Beer-Lambert's law, UV-Visible Spectroscopy, types of electronic transitions, Applications of UV-Visible Spectroscopy IR spectroscopy: fundamental modes molecular vibrations and selection rules, functional group region, fingerprint region, Applications of IR- Spectroscopy, NMR spectroscopy-Basic Principle, Chemical shift, 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. Textbook of Polymer Science, Fred W. Billmayer Jr, 3rd Edition.

I B.TECH	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING	L	T	P	C
I SEMESTER		3	0	0	3

Course Objectives

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

Course Outcomes

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

CO1: Remembering the basic electrical elements and different fundamental laws. **(Remember)**

CO2: Understand the construction and operation of AC and DC machines, measuring instruments. **(Remember, Understand)**

CO3: Understand the different power generation mechanisms, Electricity billing concept, important safety measures related to electrical operations & understand the basic operation of Semiconductor Devices **(Remember, Understand)**

CO4: Understand the operation of different electronics circuits. **(Remember, Understand)**

CO5: Understand the Boolean Algebra theorems, simplify and design logic circuits and elements of sequential logic circuits. **(Remember, Understand)**

UNIT 1: DC & AC CIRCUITS

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

AC Circuits: A.C. Fundamentals: Equation of AC Voltage and current, waveform, time period, frequency, amplitude, phase, phase difference,

average value, RMS value, form factor, peak factor, Voltage and current relationship with phasor diagrams in R, L, and C circuits, Concept of Impedance, Active power, reactive power and apparent power, Concept of power factor (Simple Numerical problems).

UNIT 2: MACHINES AND MEASURING INSTRUMENTS

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

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

UNIT 3A: ENERGY RESOURCES, ELECTRICITY BILL, SAFETY MEASURES

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

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

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.

UNIT 3B: 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. (Elementary Treatment only)

UNIT 4: 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. (Elementary Treatment only).

UNIT 5: 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)

Content Beyond the syllabus: Digital Multi-meters (Block diagram).

Text books

1. Basic Electrical Engineering, D. C. Kulshreshtha, Tata McGraw Hill, 2019, First Edition.
2. Power System Engineering, P.V. Gupta, M.L. Soni, U.S. Bhatnagar and A. Chakrabarti, DhanpatRai& Co, 2013 .
3. Fundamentals of Electrical Engineering, Rajendra Prasad, PHI publishers, 2014, Third Edition.
4. R. L. Boylestad& Louis Nashlesky, Electronic Devices & Circuit Theory, Pearson Education, 2021.
5. R. P. Jain, Modern Digital Electronics, 4th Edition, Tata Mc Graw Hill, 2009

Reference books

1. Basic Electrical Engineering, D. P. Kothari and I. J. Nagrath, Mc Graw Hill, 2019, Fourth Edition

2. Principles of Power Systems, V.K. Mehtha, S.Chand Technical Publishers, 2020
3. Basic Electrical Engineering, T. K. Nagsarkar and M. S. Sukhija, Oxford University Press, 2017
4. Basic Electrical and Electronics Engineering, S. K. Bhatacharya, Person Publications, 2018, Second Edition.
5. R. S. Sedha, A Textbook of Electronic Devices and Circuits, S. Chand & Co, 2010.
6. SantiramKal, Basic Electronics- Devices, Circuits and IT Fundamentals, Prentice Hall, India, 2002.
7. R. T. Paynter, Introductory Electronic Devices & Circuits – Conventional Flow Version, Pearson Education,2009.

e- Resources & other digital material

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

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I B.TECH	ENGINEERING GRAPHICS (First angle projection only)	L	T	P	C
I SEMESTER		1	0	4	3

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 and lines
- To improve the visualization skills for better understanding of plane surfaces and 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 Orthographic projection.

Course Outcomes

1. Upon successful completion of the course, the student will be able to
2. **CO1:** Constructions of various engineering curves {**Apply level, KL3**}
3. **CO2:** Apply the principle of orthographic projection to points and lines {**Apply level, KL3**}
4. **CO3:** Understand and draw the projection of planes and solids inclined to both planes in first quadrant {**Understand level, KL2**}
5. **CO4:** Use the knowledge of sectional views and Development of Solid Surfaces in Real time Applications {**Apply level, KL3**}
6. **CO5:** Develop isometric drawings of simple objects reading the orthographic projections of those objects {**Analyze level, KL4**}

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 method **(Eccentricity method),** Cycloids, Involutes, Normal and tangent to Curves.

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 Lines Inclined to both the reference planes, Midpoint problems.

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.

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 in **simple position only.**

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).**

Learning Resources

Text books

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

Reference books

1. Engineering Drawing, K.L. Narayana and P. Kannaiah, Tata McGraw Hill, 2013.
2. Engineering Drawing, M.B.Shah and B.C. Rana, Pearson Education Inc,2009.
3. Engineering Drawing with an Introduction to AutoCAD, Dhananjay Jolhe, Tata McGraw Hill, 2017.
4. AutoCAD 2018 Training Guide (English, Paperback, Sagar Linkan)

Websites

- https://www.autodesk.com.au/campaigns/autocad-tutorials
- https://nptel.ac.in/courses/112104172

I B.TECH	INTRODUCTION TO PROGRAMMING COMMON TO ALL BRANCHES	L	T	P	C
I SEMESTER		3	0	0	3

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 the basics of computers, the concept of algorithms and algorithmic thinking.

CO2: Analyze a problem and develop an algorithm to solve it.

CO3: Implement various algorithms using the C programming language.

CO4: Understand more advanced features of C language.

CO5: Develop problem-solving skills and the ability to debug and optimize the code.

UNIT I INTRODUCTION TO PROGRAMMING AND PROBLEM-SOLVING

Introduction: History of Computers, Basic organization of a computer: ALU, input-output units, memory.

Problem solving techniques: Algorithmic approach, characteristics of algorithm, Algorithms, flowcharts (Using Dia Tool).

Introduction to Programming: Languages & types, Basics of a Computer Program- basic structure of a C program, C Tokens – Literals, Primitive Data

Types, Keywords, operators, Variables, and Constants, Basic Input and Output, Operations, Type Conversion, and Casting.

UNIT II CONTROL STRUCTURES

Decision making: Simple sequential programs Conditional Statements (if, if-else, switch),

Iterative Statements: Loop - for, while, do-while, unconditional branching - break and continue.

UNIT III ARRAYS AND STRINGS

Arrays: indexing, memory model, programs with an array of integers, two-dimensional arrays

Strings: Introduction to Strings.

UNIT IV POINTERS & USER-DEFINED DATA TYPES

Pointers: dereferencing and address operators, pointer and address arithmetic, array manipulation using pointers, Dynamic memory management.

User-defined data types: Structures and Unions.

UNIT V Functions & File Handling

Functions: Introduction to Functions, Function Declaration and Definition, Function call Return Types and Arguments, modifying parameters inside functions using pointers and arrays as parameters. Scope and Lifetime of Variables,

File Handling: Basics of File Handling

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

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I B.TECH	IT WORKSHOP	L	T	P	C
I SEMESTER		0	0	2	1

Course Objectives:

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

Course Outcomes:

CO1: Perform Hardware troubleshooting.

CO2: Understand Hardware components and interdependencies.

CO3: Safeguard computer systems from viruses/worms.

CO4: Document/ Presentation preparation.

CO5: Perform calculations using spreadsheets.

PC Hardware & Software Installation

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

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

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

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

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

Internet & World Wide Web

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

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

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I B.TECH	ELECTRICAL AND ELECTRONICS ENGINEERING WORKSHOP	L	T	P	C
I SEMESTER		0	0	2	1

Preamble: Electrical and Electronics Engineering Workshop Lab provides the essential facilities to the students to augment their concepts about the fundamentals of Electrical and Electronics Engineering.

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

Course Objectives: The student should be able to

- To understand the Electrical circuit design concept, operation of Electrical Machines and Transformer,control the speed of three phase induction motors, measurement of resistance, power, and power factor.
- To apply the theoretical concepts and operating principles to derive mathematical models for circuits, Electrical machines and measuring instruments.
- To analyzethe various characteristics of electrical circuits, electrical machines and measuring instruments.
- To understand the usage of electronic measuring instruments.
- To Plot and discuss the characteristics of various electron devices.

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

CO1, Analyse the Electrical circuit design concept; measurement of resistance, power, power factor; concept of wiring and operation of Electrical Machines and Transformer. (L2)

CO2, Apply the theoretical concepts and operating principles to derive mathematical models for circuits, Electrical machines and measuring instruments, calculations for the measurement of resistance, power and power factor. (L3)

CO3, Analyse various characteristics of electrical circuits, electrical machines and measuring instruments.(L4)

CO4, Understand the usage of electronic measuring instruments.(L2)

CO5, Plot and discuss the characteristics of various electron devices.(L3)

LIST OF EXPERIMENTS

Any Ten of the following experiments are to be conducted:

1. Verification of KCL and KVL
2. Verification of Superposition theorem
3. Measurement of Resistance using Wheat stone bridge
4. Magnetization Characteristics of DC shunt Generator
5. Measurement of Power and Power factor using Single-phase wattmeter
6. Calculation of Electrical Energy for Domestic Premises
7. Plot V-I characteristics of PN Junction diode A) Forward bias B) Reverse bias.
8. Plot V – I characteristics of Zener Diode and its application as voltage Regulator.
9. Implementation of half wave and full wave rectifiers
10. Plot Input & Output characteristics of BJT in CE and CB configurations
11. Frequency response of CE amplifier.
12. Verification of Truth Table of AND, OR, NOT, NAND, NOR, Ex-OR, Ex-NOR gates using ICs.

List of Additional Experiments: Any of the two experiments are to be conducted.

1. Measurement of Earth Resistance using Megger.
2. Simulation of RC coupled amplifier with the design supplied
3. Verification of Truth Tables of S-R, J-K& D flip flops using respective ICs
4. Measurement of parameters of choke coil.

Learning Resources

Text books

1. Basic Electrical Engineering, D. C. Kulshreshtha, Tata McGraw Hill, 2019, First Edition
2. R. L. Boylestad& Louis Nashlesky, Electronic Devices & Circuit Theory, Pearson Education, 2021.

Reference books:

1. Power System Engineering, P.V. Gupta, M.L. Soni, U.S. Bhatnagar and A. Chakrabarti, DhanpatRai& Co, 2013.
2. Fundamentals of Electrical Engineering, Rajendra Prasad, PHI publishers, 2014, Third Edition.
3. R. P. Jain, Modern Digital Electronics, 4th Edition, Tata McGraw Hill, 2009
4. R. T. Paynter, Introductory Electronic Devices & Circuits – Conventional Flow Version, Pearson Education,2009.

e- Resources & other digital material

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

I B.TECH	CHEMISTRY LAB	L	T	P	C
I SEMESTER		0	0	2	1

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 Bakelite materials.
- CO3: Measure the strength of an acid present in any given ample/specimen.
- CO4: Estimate the amount of Vitamin-C present in soft drinks.
- CO5: Verify Beer-Lambert's law.

List of Experiments:

1. Determination of Strength of an acid in Pb-Acid battery.
2. Determination of Hardness of a groundwater sample.
3. Conductometric titration of strong acid vs. strong base.
4. Conductometric titration of weak acid vs. strong base.
5. Determination of cell constant and conductance of solutions.
6. Potentiometry - determination of redox potentials and emfs.
7. pH metry/ pH metric titration of strong acid Vs strong base.
8. Preparation of a Bakelite.
9. Determine the strength of given KMnO4 by colorimetry (Verification of Lambert-Beer's law).
10. Estimation of Ferrous Iron by Dichrometry .
11. Estimation of Iron by Permanganometry.
12. Measurement of 10Dq by spectrophotometric method.
13. Wavelength measurement of sample through UV- Visible Spectroscopy.
14. Identification of simple organic compounds by IR.
15. Preparation of nanomaterials by precipitation method.
16. Estimation of Vitamin-C present in soft drink.

Note: A student can choose any 10 experiments from the above list.

Reference:

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

I B.TECH	COMPUTER PROGRAMMING LAB	L	T	P	C
I SEMESTER		0	0	3	1.5

Course Objectives:

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

Course Outcomes:

CO1: Read, understand, and trace the execution of programs written in C language.

CO2: Select the right control structure for solving the problem.

CO3: Develop C programs which utilize memory efficiently using programming constructs like pointers.

CO4: Develop, Debug and Execute programs to demonstrate the applications of arrays, functions, basic concepts of pointers in C.

UNIT I

WEEK 1

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

Suggested Experiments/Activities:

Tutorial 1: Problem-solving using Computers.

Lab1: Familiarization with programming environment

i) Basic Linux environment and its editors like Vi, Vim & Emacs etc.

ii) Exposure to Turbo C, gcc

iii) Writing simple programs using printf(), scanf()

WEEK 2

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

Suggested Experiments /Activities:

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

Lab 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

WEEK 4

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

Suggested Experiments/Activities:

Tutorial4: Operators and the precedence and as associativity:

Lab4: Simple computational problems using the operator' precedence and associativity

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

WEEK 5

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

Suggested Experiments/Activities:

Tutorial 5: Branching and logical expressions:

Lab 5: Problems involving if-then-else structures.

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

WEEK 6

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

for loop in addition to structured jump constructs like break and continue including when each of these statements is more appropriate to use.

Suggested Experiments/Activities:

Tutorial 6: Loops, while and for loops

Lab 6: Iterative problems e.g., the sum of series

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

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

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

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

I B.TECH	NSS/NCC/SCOUTS & GUIDES/COMMUNITY SERVICE	L	T	P	C
I SEMESTER		0	0	1	0.5

Course Objectives:

- The objective of introducing this course is to impart discipline, character, fraternity, teamwork, and social consciousness among the students and engage 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 to fellow beings and downtrodden people.

CO5: Develop leadership skills and civic responsibilities.

UNIT I: ORIENTATION

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

Activities:

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

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) Organising Zero-waste day.
v) Digital Environmental awareness activity via various social media platforms.
vi) Virtual demonstration of different eco-friendly approaches for sustainable living.
vii) Write a summary on any book related to environmental issues.

UNIT III: Community Service Activities

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

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.

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I B.TECH	LIFE SKILLS-I	L	T	P	C
I SEMESTER		2	0	0	0

Course Outcomes: After completion of the course the student will be able to

CO1: To convert difficult data into equations and find solutions by various methods and means using Algebra.

CO2: Application of Number system usage in daily life.

CO3: Enhance the logical abilities on various series and analogies (number, letter and verbal).

CO4: Implementing logical classification, coding and decoding (number, letter and verbal).

CO5: Understand the importance of effective communication skills, usage of contextual vocabulary

CO6: Understand the importance of grammar for effective communication.

The Life Skills course is divided into three components – Part-A. Quantitative Ability, Part-B. Reasoning Ability and Part-C. Verbal Ability.

Part-A: Quantitative Ability: Almost all competitive examinations test the candidate for quantitative aptitude, especially recruitment test, public service examinations management courses, where they evaluate the student's thinking prowess and analytical skills. Critical analysis of problems asked in examination reveal that they are designed to correlate multiple topics and the test taker is expected to identify those link points and come out with an out-of-box unique solution. The purpose of the test is to assess arithmetic abilities, logic, analysis, problem solving and decision-making skills.

Part-B: Reasoning Ability: Reasoning ability is the ability to draw connections between factors, and the ability to synthesize a message from a body of information. Reasoning ability of the aspirants for jobs or courses is tested by means of a verbal reasoning test non-verbal reasoning. Thus,

reasoning is a highly specialized thinking which helps an individual to explore mentally the cause & effect relationship of an event or solution of a problem by adopting some well-organized systematic steps based on previous experience combined with present observation. Most of the recruitment tests consist of questions to assess the reasoning ability of the students.

Part-C: Verbal Ability: The dramatic changes in global economies have been matched with the transformation in technology and these have an impact on education as well the workplace. Life skills provide students with important skills such as independent thinking, social skills, situational awareness, and communication skills needed in the campus and future workplaces. They equip the student with the requisite tools for all round development, and the requisite non-academic skills to enrich their lives.

Part-A: Quantitative Ability

Unit-1: Module 1: Linear equation or simple equation and Algebraic equation

Module 2: Number System – Prime Factorization, divisibility of a factorial number, number of zeroes, unit digit and remainders, Examples, and practice problems.

Unit-2: Module 3: LCM AND HCF – Definitions of LCM and HCF, Methods of finding LCM and HCF using Prime Factorization method and Division Method, Examples, and practice problems.

Module 4: Ratio, proportion, and variation – Definition of Ratios and Proportions, Meaning of Ratios and Proportions, Properties of Ratios, Formulas, differences between Ratios and Proportions, Examples, and practice problems.

Part-B: Reasoning Ability

Unit-3: - Module 5: Series

Module 6: Analogy

Unit-4: - Module 7: Classification

Module 8: Coding and Decoding

Part-C: Verbal Ability

Unit-5: - Module 5: Functional English; Ad-lib/ impromptu speaking sessions; JAM sessions

Module 6: Writing paragraphs (describing a process, reporting an incident, explaining an experience); Summarizing TED talks; and Letter Writing

Unit-6: Module 7: Time management; Stress Management; and Emotional intelligence

Module 8: Interpersonal skills; Team dynamics; and Leadership development

Reference Books

1. Quantitative Aptitude for Competitive Examination by Dr R S Agarwal
2. Fast Track Objective Arithmetic Paperback – 2018 by Rajesh Verma
3. Teach Yourself Quantitative Aptitude, by Arun Sharma
4. The Pearson Guide to Quantitative Aptitude for Competitive Examination by Dinesh Khattar
5. Quantitative Aptitude for all Competitive Exam by Abhijit Gupta
6. Quantitative Aptitude Quantum CAT by Sarvesh K. Verma
7. How to Prepare for Data Interpretation by Arun Sharma
8. Logical Reasoning Data Interpretation by Nishit K. Sinha
9. Analytical Reasoning (2018-2019) Session by MK Panday
10. How to Crack Test of Reasoning by Jaikishan and Premkishan [Arihant]
11. Logical Reasoning and Data Interpretation for CAT & other MBA exams by K. Sinha Nishit [Pearson]
12. Reasoning for Competitive Exams by K. Sinha Nishit [Pearson]

13. How to Prepare for Logical Reasoning for CAT by Arun Sharma [McGraw Hill]
14. Shortcuts in Reasoning (Verbal, Non-Verbal, Analytical & Critical) for Competitive Exams by Disha Experts
15. Visual Intelligence for Beginners by Matthew Alcot
16. McCarthy, Michael& Felicity O'Dell. English Vocabulary in Use beginner, Cambridge University Press, 2017.
17. McCarthy, Michael & Felicity O'Dell. English Vocabulary in Use Upper-Intermediate, Cambridge University Press, 2017.
18. McCarthy, Michael & Felicity O'Dell. English Vocabulary in Use Advanced, Cambridge University Press, 2017.
19. Sonmez, John. Soft Skills: The Software Developer's Life, Manning Publications, 2014.
20. Tulgan, Bruce. Bridging the Soft Skills Gap: How to Teach the Missing Basics to Today's Young Talent, Pan Macmillan India, 2016.

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I B.TECH	COMMUNICATIVE ENGLISH	L	T	P	C
II SEMESTER		2	0	0	2

Course Objectives:

- To facilitate effective listening, speaking, reading, and writing skills among the students.
- To enhance the LSRW skills in their comprehending abilities, oral presentations, reporting useful information and providing knowledge of grammatical structures and vocabulary.
- To help the students to make them effective in speaking and writing skills and to make them industry ready.

Course Outcomes

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

CO1: Understand the context, topic, and pieces of specific information from social ortransactional dialogues.

CO2: Apply grammatical structures to formulate sentences and correct word forms.

CO3: Analyze discourse markers to speak clearly on a specific topic in informal discussions.

CO4: Evaluate reading / listening texts and to write summaries based on globalcomprehension of these texts.

CO5: Create a coherent paragraph, essay, and resume.

UNIT I

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

Lesson: "How to Fashion Your Own Brand of Success" by Howard Whitman

Listening: Identifying the topic, the context, and specific pieces of information by listeningto 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 ofinformation.

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)**

Lesson: **"How to Conquer the Ten Most Common Causes of Failure" by Louis Binstock**

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

Speaking: Discussion in pairs/small groups on specific topics followed by short structuretalks.

Reading: Identifying sequence of ideas; recognizing verbal techniques that help to linkthe 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**

Lesson: **"How to Develop Your Strength to Seize Opportunities" by Maxwell Maltz**

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**

Lesson: **"How to Raise Your Self-Esteem and Develop Self-confidence" by James W Newman**

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)

Lesson: "How to Eliminate Your Bad Habits" by Benjamin Franklin

Listening: Identifying key terms, understanding concepts and answering a series ofrelevant 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 andusage (articles, prepositions, tenses, subject verb agreement)

Vocabulary: Technical Jargons

Text Books

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)
3. University of Success: OG Mandino Jaico Impression 2019 (5 Selected Lessons)

Reference Books:

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

Web Resources

GRAMMAR:

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

VOCABULARY

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

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I B.TECH	ENGINEERING PHYSICS	L	T	P	C
II SEMESTER		3	0	0	3

Course Objectives:

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

Course Outcomes:

CO1: Analyze the intensity variation of light due to polarization, interference and diffraction.

CO2: Familiarize with the basics of crystals and their structures.

CO3: Explain fundamentals of quantum mechanics and apply it to one dimensional motion of particles.

CO4: Summarize various types of polarization of dielectrics and classify the magnetic materials.

CO5: Explain the basic concepts of Quantum Mechanics and the band theory of solids.

CO6: Identify the type of semiconductor using Hall effect.

UNIT-I: WAVE OPTICS

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

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

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's equation – complex dielectric constant – frequency dependence of polarization– dielectric loss.

Magnetic Materials: Introduction – magnetic dipole moment – magnetization – magnetic susceptibility and permeability – atomic origin of magnetism – classification of magnetic materials: Dia, para, ferro, anti-ferro & ferrimagnetic materials – domain concept for ferromagnetism & domain walls (Qualitative) – hysteresis – soft and hard magnetic materials.

UNIT – IV: QUANTUM MECHANICS AND FREE ELECTRON THEORY

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

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.

TEXT BOOKS

1. "Applied Physics" by T. Vijaya Krishna, T. Madhu Mohan, B. K. Pandey, Manoj K. Harbola, S. Chaturvedi - Cengage, 2020.
2. "A Text book of Engineering Physics" by 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 –Shatendra Sharma, Jyotsna Sharma, Pears on Education, 2018.
2. Engineering Physics"-Sanjay D.Jain, D.Sahasrabudhe and Girish, University Press.2010
3. Engineering Physics -M. R. Srinivasan, New Age international publishers (2009).
4. Fundamentals of Physics- Halliday, Resnick and Walker, Wiley (2006).
5. Physics for Scientists & Engineers, Serway and Jewett, Cengage (2019).

Web Resources:

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

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I B.TECH	DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS	L	T	P	C
II SEMESTER		3	0	0	3

Course Objectives:

- To enlighten the learners in the concept of differential equations and multivariable calculus.
- To furnish the learners with basic concepts and techniques at plus two level to lead them 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 the differential equations related to various engineering fields. (L3)

CO2: Solve the second and higher order differential equations and its applications. (L3)

CO3: Identify solution methods for partial differential equations that model physical processes. (L3)

CO4: Interpret the physical meaning of different operators such as gradient, curl and divergence. (L5)

CO5: Estimate the work done against a field, circulation and flux using vector calculus. (L5)

UNIT-I: DIFFERENTIAL EQUATIONS OF FIRST ORDER AND FIRST

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)

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

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

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

UNIT-V: Vector integration

Line integral - Circulation - Work done - Surface integral, flux - Green's theorem in the plane (without proof) - Stoke's theorem (without proof) - Volume integral - Gauss divergence theorem (without proof) and related problems.

Textbooks:

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

Reference Books:

1. Thomas Calculus, George B. Thomas, Maurice D. Weir and Joel Hass, Pearson Publishers, 2018, 14th Edition.
2. Advanced Engineering Mathematics, Dennis G. Zill and Warren S. Wright, Jones and Bartlett, 2018.
3. Advanced Modern Engineering Mathematics, Glyn James, Pearson

publishers, 2018, 5th Edition.

4. Advanced Engineering Mathematics, R. K. Jain and S. R. K. Iyengar, Alpha Science International Ltd., 2021 5th Edition (9th reprint).
5. Higher Engineering Mathematics, B. V. Ramana, Mc Graw Hill Education, 2017.

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I B.TECH	BASIC CIVIL AND MECHANICAL ENGINEERING	L	T	P	C
II SEMESTER		3	1	0	3

BASIC CIVIL ENGINEERING

Course Objectives:

- Get familiarized with the scope and importance of Civil Engineering sub-divisions and introduction to basic civil engineering materials and construction techniques.
- 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.

Course Outcomes:

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

CO1: Understand various sub-divisions of Civil Engineering and to appreciate their role in ensuring better society and understand the basic characteristics of Civil Engineering Materials and attain knowledge on prefabricated technology.

CO2: Know the concepts of surveying and to understand the measurement of distances, angles, and levels through surveying.

CO3: Realize the importance of Transportation in nation's economy and the engineering measures related to Transportation and importance of Water Storage and Conveyance Structures so that the social responsibilities of water conservation will be appreciated.

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 - IIIA

TRANSPORTATION ENGINEERING: Importance of Transportation in Nation's economic development- Types of Highway Pavements- Flexible Pavements and Rigid Pavements - Simple Differences. Basics of Harbor, 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).

Text Books

1. M. S. Palanichamy, Basic Civil Engineering, McGraw Hill Education, 4th edition, 2017
2. S. S. Bhavikatti, Basic Civil Engineering, New Age International, 2010
3. Srikrishna A. Dhale and Kiran M. Tajne, Basics of Civil Engineering, 2014.

Reference Books:

1. G. Shanmugam and M. S. Palanichamy, Basic Civil and Mechanical Engineering, McGraw Hill Education, 2018.
2. S. Gopi, Basic Civil Engineering, Pearson, 2018
3. Introduction to Civil Engineering, Course Material, IIT Madras.

BASIC MECHANICAL ENGINEERING

Course objectives:

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

CO4: Understand the different manufacturing processes {**Understand level, KL2**}

CO5: Demonstrate the working of different mechanical power transmission systems and Basics of robotics. {**Understand level, KL2**}

CO6: Understand the working principles of Various power plants {**Understand level, KL2**}

UNIT-IIIB

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: Classification of Engineering materials &Their applications: Metals-Ferrous and Non-ferrous, Ceramics, Composites, Smart materials. Definition of Strength, Hardness, Ductility and Toughness

UNIT-IV

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

MECHANICAL POWER TRANSMISSION: Belt Drives, Chain, Rope drives, Gear Drives and their applications.

INTRODUCTION TO ROBOTICS: Joints & links, configurations, and applications of robotics

UNIT-V

POWER PLANTS: working principle of Steam, Diesel, Hydro, Nuclear power plants.

THERMAL ENGINEERING: working principle of Boilers (Cochran boiler, Babcock and Wilcox boiler, La Mont boiler), Refrigeration cycle (Ideal Vapour Compression refrigeration cycle) and air-conditioning system (Summer air-conditioning system), IC engines, Otto cycle, Diesel cycle, 2-Stroke and 4-Stroke engines, SI/CI Engines, Components of Electric and Hybrid Vehicles

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

Textbooks

1. Internal Combustion Engines by V.Ganesan, By Tata McGraw Hill publications (India) Pvt. Ltd.
2. A Tear book of Theory of Machines by S.S. Rattan, Tata McGraw Hill Publications, (India) Pvt. Ltd.
3. An introduction to Mechanical Engg by Jonathan Wicker and Kemper Lewis, Cengage learning India Pvt. Ltd.

Reference Books:

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

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I B.TECH	NETWORK ANALYSIS	L	T	P	C
II SEMESTER		3	0	0	3

Course objectives: The student should be able to

- 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 behaviour of circuits in time and frequency domains
- To teach concepts of resonance
- To introduce open circuit, short circuit, transmission, hybrid parameters and their interrelationship

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

CO1: Understand basic electrical circuits with nodal and mesh analysis. **{Understand level, KL2}**

CO2: Analyze the circuit using network simplification theorems. **Analyze level, KL3}**

CO3: Find Transient response and Steady state response of a network. **{Determine level, KL3}**

CO4: Analyze electrical networks in the Laplace domain. **{Analyze level, KL4}**

CO5: Compute the parameters of a two-port network. **{Apply level, KL4}**

UNIT I

TYPES OF CIRCUIT COMPONENTS, Types of Sources and Source Transformations, Mesh analysis and Nodal analysis, problem solving with resistances only including dependent sources also. Principal of Duality with examples.

NETWORK THEOREMS: Thevenin's, Norton's, Milliman's, Reciprocity, Compensation, Substitution, Superposition, Max Power Transfer- problem solving using dependent sources also.

UNIT II

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

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, problem solving using Laplace transforms also.

UNIT IV

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: 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.

Content Beyond the syllabus:

Ladder Network, Delay Circuits Analysis (Elementary treatment only)

Learning Resources

Text books

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

Reference books:

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

e- Resources & other digital material

1) https://nptel.ac.in/courses/108/104/108104139/
2) https://nptel.ac.in/courses/108/105/108105159/
3) https://nptel.ac.in/courses/108/105/10745105129/

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I B.TECH	COMMUNICATIVE ENGLISH LAB	L	T	P	C
II SEMESTER		0	0	2	1

Course Objectives:

- To expose the students to a variety of self-instructional, learner friendly modes of language learning.
- To train the students in basic communication skills and also make them ready to face job interviews.

Course Outcomes:

CO1: Understand the different aspects of the English language proficiency with emphasis on LSRW skills.

CO2: Apply communication skills through various language learning activities.

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

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

CO5: Create effective career objectives.

List of Topics:

1. Vowels & Consonants
2. Neutralization/Accent Rules
3. Communication Skills & JAM
4. Role Play or Conversational Practice
5. E-mail Writing
6. Resume Writing, Cover Letter, SOP
7. Group Discussions-Methods & Practice
8. Debates - Methods & Practice

9. PPT Presentations/ Poster Presentation

10. Interview Skills

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

Web Resources:

Spoken English:

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

Voice & Accent:

1. https://www.youtube.com/user/letstalkaccent/videos
2. https://www.youtube.com/c/EngLanguageClub/featured

3. https://www.youtube.com/channel/UC_OskgZBoS4dAnVUgJVexc
4. https://www.youtube.com/channel/UCNfm92h83W2i2ijc5Xwp_IA

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I B.TECH	ENGINEERING PHYSICS LAB	L	T	P	C
II SEMESTER		0	0	2	1

Course Objectives:

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

Course Outcomes: 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.

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 photo electric 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

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

Web Resources:

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

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I B.TECH	ENGINEERING WORKSHOP	L	T	P	C
II SEMESTER		0	0	3	1.5

Course objectives:

- To familiarize students with wood working, sheet metal operations, fitting and electrical house wiring skills

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

CO1: Identify workshop tools and their operational capabilities (KL1)

CO2: Practice on manufacturing of components using workshop trades including fitting, carpentry, foundry, and welding (KL2)

CO3: Apply fitting operations in various applications (KL3)

CO4: Apply basic electrical engineering knowledge for House Wiring Practice (KL3)

List of Experiments:(Student has to complete Two experiments in each Trade)

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 oftwo-wheeler tyre

5. **Electrical Wiring:** Familiarity with different types of basic electrical circuits and makethe following connections.
   a) Parallel and series
   b) Two-way switch
   c) Godown lighting
   d) Tube light
   e) Threephase 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 withcoupling for same diameter and with reducer for different diameters.

Textbooks:

1. Basic Workshop Technology: Manufacturing Process, Felix W.; Independently Published,2019. Workshop Processes, Practices and Materials; Bruce J. Black, Routledgepublishers, 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

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I B.TECH	NETWORK ANALYSIS AND SIMULATION LAB	L	T	P	C
II SEMESTER		0	0	3	1.5

Preamble: NETWORK ANALYSIS AND SIMULATION LAB provides the essential facilities to the students to augment their concepts about the fundamentals of Networks and Simulation.

- To impart knowledge on the fundamental laws & theorems of electrical circuits, and calculations.
- To impart knowledge on the principles of transient analysis and fundamentals of two port networks.

Course Objectives: The student should be able to

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

CO1: Verify Kirchhoff's laws and network theorems. (L3)

CO2: Measure time constants of RL & RC circuits. (L3)

CO3: Analyze behavior of RLC circuit for different cases. (L4)

CO4: Design resonant circuit for given specifications. (L5)

CO5: Characterize and model the network in terms of all network arameters. (L3)

LIST OF EXPERIMENTS

Any Ten of the following experiments are to be conducted:

1. Verification of series & Parallel DC circuits response.
2. Verification of mesh and nodal analysis for AC circuits
3. Verification of Thevenin's& Norton theorems for AC circuits
4. Verification of maximum power transfer theorem for AC circuits

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

List of Additional Experiments:

1. To Measure 3-phase active power using two watt meter method.
2. Study of components of a circuit and Verification of KCL and KVL using MATLAB
3. Verification of Superposition theorem for AC circuits using MATLAB

References:

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

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I B.TECH	HEALTH AND WELLNESS, YOGA AND SPORTS	L	T	P	C
II SEMESTER		0	0	1	0.5

Course Objectives

- The main objective of introducing this course is to help the students maintain their mental and physical wellness by balancing emotions in their lives. 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

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:

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

General Guidelines:

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

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I B.TECH	LIFE SKILLS-II	L	T	P	C
II SEMESTER		2	0	0	0

Course Outcomes: After completion of the course the student will be able to:

CO 1: Enhance application skills in Business Mathematics.

CO 2: Implementation of Mathematical skills in Business.

CO 3: To improve logical visualization and counting in series, analogies and classification (non-verbal reasoning).

CO 4: Implementation of arrangement in circular and row form in daily life.

CO 5: Appreciate the importance of job requisites and attaining them.

CO 6: Recognize the importance of goal setting and building of a ethical, and personal value system.

Part-A: Quantitative Ability

Unit-1: Module 1: PERCENTAGE - Formula of percentages, Finding percentages, percentage differences, changes in percentages, computing table of percentages, fraction to percentage and vice versa, Examples and practice problems.

Module 2: PROFIT and LOSS

Unit-2: - Module 3: DISCOUNT

Module 4: PARTNERSHIP

Part-B: Reasoning Ability

Unit-3: Module 5: Counting Figures

Module 6: Non-Verbal Reasoning

Unit-4: - Module 7: Finding Missing Terms

Module 8: Arrangements

Part-C: Verbal Ability

Unit-5: - Module 9: Understanding professional communication; Contextual Usage of selected vocabulary; Contextual understanding of vocabulary in a paragraph.

Module 10: Parts of speech; Subject-verb agreement; Tenses

Unit-6: - Module 11: Introduction to employability /life skills; Career guidance; Personal grooming and projecting a positive self-image.

Module 12: Goal setting & Planning; Ethics, values & Attitude

Reference Books

1. Quantitative Aptitude for Competitive Examination by Dr R S Agarwal
2. Fast Track Objective Arithmetic Paperback – 2018 by Rajesh Verma
3. Teach Yourself Quantitative Aptitude, by Arun Sharma
4. The Pearson Guide to Quantitative Aptitude for Competitive Examination by Dinesh Khattar
5. Quantitative Aptitude for all Competitive Exam by Abhijit Gupta
6. Quantitative Aptitude Quantum CAT by Sarvesh K. Verma
7. Reasoning Ability for Competitive Examination by Dr R S Agarwal
8. A Modern Approach to Logical Reasoning (2019-20 Session) by R.S. Aggarwal [S. Chand]
9. How to Prepare for Logical Reasoning for CAT by Arun Sharma [McGraw Hill]
10. Multidimensional Reasoning by Mishra and Kumar Dr. Lal [Upkar's]
11. A Modern Approach to Verbal & Non-Verbal Reasoning (2019-20 Session) by R.S. Aggarwal [S. Chand]
12. A New Approach to Reasoning Verbal & Non-Verbal by B.S. Sijwali and Indu Sijwali [Arihant]
13. Analytical Reasoning (2018-2019) Session by MK Panday
14. How to Crack Test of Reasoning by Jaikishan and Premkishan [Arihant]
15. Logical Reasoning and Data Interpretation for CAT & other MBA exams by K. Sinha Nishit [Pearson]
16. Reasoning for Competitive Exams by K. Sinha Nishit [Pearson]
17. Shortcuts in Reasoning (Verbal, Non-Verbal, Analytical & Critical) for Competitive Exams by Disha Experts
18. Visual Intelligence for Beginners by Matthew Alcot
19. Logical Reasoning & Data Interpretation by Nishit K. Sinha

20. McCarthy, Michael& Felicity O'Dell. English Vocabulary in Use beginner, Cambridge University Press, 2017.
21. McCarthy, Michael & Felicity O'Dell. English Vocabulary in Use Upper-Intermediate, Cambridge University Press, 2017.
22. McCarthy, Michael & Felicity O'Dell. English Vocabulary in Use Advanced, Cambridge University Press, 2017.
23. Sonmez, John. Soft Skills: The Software Developer's Life, Manning Publications, 2014.
24. Tulgan, Bruce. Bridging the Soft Skills Gap: How to Teach the Missing Basics to Today's Young Talent, Pan Macmillan India, 2016

II B.TECH	PROBABILITY THEORY AND STOCHASTIC PROCESS	L	T	P	C
I SEMESTER		3	0	0	3

Course Objectives:

- To give students an introduction to elementary probability theory, in preparation to learn the concepts of statistical analysis, random variables and stochastic processes.
- To mathematically model the random phenomena with the help of probability theory Concepts.
- To introduce the important concepts of random variables and stochastic processes.
- To analyze the LTI systems with the stationary random process as input.

UNIT - I

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

UNIT - II

OPERATION ON ONE RANDOM VARIABLE - EXPECTATIONS: Expected Value of a Random Variable, Function of a Random Variable, Moments about the Origin, Central Moments, Variance and Skew, Chebychev's Inequality, Characteristic Function, Moment Generating Function, Transformations of a Random Variable: Monotonic and Non-monotonic Transformations of Continuous Random Variable, Transformation of a Discrete Random Variable.

UNIT - III

MULTIPLE RANDOM VARIABLES: Vector Random Variables, Joint Distribution Function and its Properties, Marginal Distribution Functions, Conditional Distribution and Density – Point Conditioning, Conditional Distribution and Density – Interval conditioning, Statistical Independence. Sum of Two Random Variables, Sum of Several Random Variables, Central Limit Theorem, (Proof not expected). Unequal Distribution, Equal Distributions.

OPERATIONS ON MULTIPLE RANDOM VARIABLES: Joint Moments about the Origin, Joint Central Moments, Joint Characteristic Functions, Jointly Gaussian Random Variables: Two Random Variables case, N Random Variable case, Properties, Transformations of Multiple Random Variables, Linear Transformations of Gaussian Random Variables

UNIT - IV

RANDOM PROCESSES – TEMPORAL CHARACTERISTICS: The Random Process Concept, Classification of Processes, Deterministic and Nondeterministic Processes, Distribution and Density Functions, concept of Stationarity and Statistical Independence. First-Order Stationary Processes, Second Order and Wide-Sense Stationarity, (N^{th}-Order) and Strict-Sense Stationarity, Time Averages and Ergodicity, Mean-Ergodic Processes, Correlation-Ergodic Processes, Autocorrelation Function and Its Properties, Cross-Correlation Function and Its Properties, Covariance Functions, Gaussian Random Processes, Poisson Random Process.

UNIT - V

RANDOM PROCESSES - SPECTRAL CHARACTERISTICS: The Power Density Spectrum: Properties, Relationship between Power Spectrum and Autocorrelation Function, The Cross-Power Density Spectrum, Properties, Relationship between Cross-Power Spectrum and Cross-Correlation Function.

LINEAR SYSTEMS WITH RANDOM INPUTS: Random Signal Response of Linear Systems: System Response – Convolution, Mean and Mean-squared

Value of System Response, Autocorrelation Function of Response, Cross-Correlation Functions of Input and Output. Spectral Characteristics of System Response: Power Density Spectrum of Response, Cross-Power Density Spectrum of Input and Output.

Course Outcomes:

After completion of the course, the student will be able to

- Mathematically model the random phenomena and solve simple probabilistic problems.
- Identify different types of random variables and compute statistical averages of these random variables.
- Characterize the random processes in the time and frequency domains.
- Analyze the LTI systems with random inputs.

Textbooks:

1. Probability, Random Variables & Random Signal Principles, Peyton Z. Peebles, TMH, 4th Edition, 2001.
2. Probability Theory and Stochastic Processes, Y. Mallikarjuna Reddy, universities press, 4th edition, 2013.
3. Schaum's Outline of Probability, Random Variables, and Random Processes.

Reference books:

1. Probability, Random Variables and Stochastic Processes, Athanasios Papoulis and S.Unnikrisha, PHI, 4th Edition, 2002.
2. Principles of Communication systems by Taub and Schilling (TMH), 2008.
3. Statistical Theory of Communication – S.P Eugene Xavier, New Age Publications, 2003.
4. R.P. Singh and S.D. Sapre, “Communication Systems Analog & Digital”, TMH, 1995.
5. Henry Stark and John W.Woods, “Probability and Random Processes with Application to Signal Processing”, Pearson Education, 3rd Edition.

6. George R. Cooper, Clave D. MC Gillem, “Probability Methods of Signal and System Analysis”, Oxford, 3rd Edition, 1999.

e- Resources & other digital material:

1. https://nptel.ac.in/courses/108/106/108106163/
2. https://nptel.ac.in/courses/108/104/108104100/
3. https://nptel.ac.in/courses/108/105/108105065/
4. https://nptel.ac.in/courses/117/104/117104074/
5. https://nptel.ac.in/courses/117/101/117101055/
6. https://nptel.ac.in/courses/108/106/108106075/

II B.TECH	UNIVERSAL HUMAN VALUES – UNDERSTANDING HARMONY AND ETHICAL HUMAN CONDUCT	L	T	P	C
I SEMESTER		2	1	0	3

Course Objectives:

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

Course Outcomes:

- Define the terms like Natural Acceptance, Happiness and Prosperity (L1, L2)
- Identify one's self, and one's surroundings (family, society nature) (L1, L2)
- Apply what they have learnt to their own self in different day-to-day settings in real life (L3)
- Relate human values with human relationship and human society. (L4)
- Justify the need for universal human values and harmonious existence (L5)
- Develop as socially and ecologically responsible engineers (L3, L6)

Course Topics

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

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

UNIT I

Introduction to Value Education (6 lectures and 3 tutorials for practice session)

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

Lecture 2: Understanding Value Education

Tutorial 1: Practice Session PS1 Sharing about Oneself Lecture 3: self-exploration as the Process for Value Education

Lecture4: Continuous Happiness and Prosperity – the Basic Human Aspirations

Tutorial 2: Practice Session PS2 Exploring Human Consciousness

Lecture 5: Happiness and Prosperity – Current Scenario Lecture 6: Method to Fulfill the Basic Human Aspirations Tutorial 3: Practice Session PS3 Exploring Natural Acceptance

UNIT II

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

Lecture 7: Understanding Human being as the Co-existence of the self and the body.

Lecture 8: Distinguishing between the Needs of the self and the body

Tutorial 4: Practice Session PS4 Exploring the difference of Needs of self and body.

Lecture 9: The body as an Instrument of the self Lecture 10: Understanding Harmony in the self

Tutorial 5: Practice Session PS5 Exploring Sources of Imagination in the self

Lecture 11: Harmony of the self with the body

Lecture 12: Programme to ensure self-regulation and Health

Tutorial 6: Practice Session PS6 Exploring Harmony of self with the body

UNIT III

Harmony in the Family and Society (6 lectures and 3 tutorials for practice session)

Lecture 13: Harmony in the Family – the Basic Unit of Human Interaction

Lecture 14: 'Trust' – the Foundational Value in Relationship

Tutorial 7: Practice Session PS7 Exploring the Feeling of Trust Lecture 15: 'Respect' – as the Right Evaluation

Tutorial 8: Practice Session PS8 Exploring the Feeling of Respect Lecture 16: Other Feelings, Justice in Human-to-Human Relationship Lecture 17: Understanding Harmony in the Society

Lecture 18: Vision for the Universal Human Order

Tutorial 9: Practice Session PS9 Exploring Systems to fulfil Human Goal

UNIT IV

Harmony in the Nature/Existence (4 lectures and 2 tutorials for practice session)

Lecture 19: Understanding Harmony in the Nature

Lecture 20: Interconnectedness, self-regulation and Mutual Fulfilment among the Four Orders of Nature

Tutorial 10: Practice Session PS10 Exploring the Four Orders of Nature

Lecture 21: Realizing Existence as Co-existence at All Levels

Lecture 22: The Holistic Perception of Harmony in Existence

Tutorial 11: Practice Session PS11 Exploring Co-existence in Existence.

UNIT V

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

Lecture 23: Natural Acceptance of Human Values Lecture 24: Definitiveness of (Ethical) Human Conduct

Tutorial 12: Practice Session PS12 Exploring Ethical Human Conduct

Lecture 25: A Basis for Humanistic Education, Humanistic Constitution and Universal Human Order

Lecture 26: Competence in Professional Ethics

Tutorial 13: Practice Session PS13 Exploring Humanistic Models in

Education Lecture 27: Holistic Technologies, Production Systems and Management Models-Typical Case Studies

Lecture 28: Strategies for Transition towards Value-based Life and Profession

Tutorial 14: Practice Session PS14 Exploring Steps of Transition towards Universal Human Order

Practice Sessions for UNIT I – Introduction to Value Education PS1 Sharing about Oneself

PS2 Exploring Human Consciousness PS3 Exploring Natural Acceptanc

Practice Sessions for UNIT II – Harmony in the Human Being PS4 Exploring the difference of Needs of self and body

PS5 Exploring Sources of Imagination in the self PS6 Exploring Harmony of self with the body

Practice Sessions for UNIT III – Harmony in the Family and Society PS7 Exploring the Feeling of Trust

PS8 Exploring the Feeling of Respect

PS9 Exploring Systems to fulfil Human Goal

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

PS11 Exploring Co-existence in Existence

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

PS12 Exploring Ethical Human Conduct

PS13 Exploring Humanistic Models in Education

PS14 Exploring Steps of Transition towards Universal Human Order

READINGS:

Textbook and Teachers Manual

Textbook

- R R Gaur, R Asthana, G P Bagaria, A Foundation Course in Human Values and Professional Ethics, 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-47-1
- TTeacher's Manual
- R R Gaur, R Asthana, G P Bagaria,Teachers' Manual for A Foundation Course in Human Values and Professional Ethics, 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-53-2

Reference Books

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

Mode of Conduct:

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

Tutorial hours are to be used for practice sessions.

While analyzing and discussing the topic, the faculty mentor's role is in pointing to essential elements to help in sorting them out from the surface

elements. In other words, help the students explore the important or critical elements.

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

Scenarios may be used to initiate discussion. The student is encouraged to take up "ordinary" situations rather than" extra-ordinary" situations. Such observations and their analyses are shared and discussed with other students and faculty mentor, in a group sitting.

Tutorials (experiments or practical) are important for the course. The difference is that the laboratory is everyday life, and practical are how you behave and work in real life. Depending on the nature of topics, worksheets, home assignment and/or activity are included. The practice sessions (tutorials) would also provide support to a student in performing actions commensurate to his/her beliefs. It is intended that this would lead to development of commitment, namely behaving and working based on basic human values.

It is recommended that this content be placed before the student as it is, in the form of a basic foundation course, without including anything else or excluding any part of this content. Additional content may be offered in separate, higher courses. This course is to be taught by faculty from every teaching department, not exclusively by any one department.

Teacher preparation with a minimum exposure to at least one 8-day Faculty Development Program on Universal Human Values is deemed essential.

Online Resources:

1. https://fdp-si.aicte-india.org/UHV-II%20Class%20Notes%20&%20Handouts/UHV%20Handout%201-Introduction%20to%20Value%20Education.pdf
2. https://fdp-si.aicte-india.org/UHV-

II%20Class%20Notes%20&%20Handouts/UHV%20Handout%202-Harmony%20in%20the%20Human%20Being.pdf

3. https://fdp-si.aicte-india.org/UHV-II%20Class%20Notes%20&%20Handouts/UHV%20Handout%203-Harmony%20in%20the%20Family.pdf
4. https://fdp-si.aicte-india.org/UHV%201%20Teaching%20Material/D3-S2%20Respect%20July%2023.pdf
5. https://fdp-si.aicte-india.org/UHV-II%20Class%20Notes%20&%20Handouts/UHV%20Handout%205-Harmony%20in%20the%20Nature%20and%20Existence.pdf

II B.TECH	SIGNALS and SYSTEMS	L	T	P	C
I SEMESTER		3	0	0	3

Course Objectives:

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

UNIT- I: INTRODUCTION:

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

UNIT–II: FOURIER SERIES AND FOURIER TRANSFORM:

Fourier series representation of continuous time periodic signals, properties of Fourier series, Dirichlet's conditions, Trigonometric Fourier series and Exponential Fourier series, Relation between Trigonometric and Exponential Fourier series, Complex Fourier spectrum. Deriving Fourier transform from Fourier series, Fourier transform of arbitrary signal, Fourier transform of standard signals, Fourier transform of periodic signals, properties of Fourier

transforms, Fourier transforms involving impulse function and Signum function. Introduction to Hilbert Transform, Related problems.

UNIT-III: ANALYSIS OF LINEAR SYSTEMS:

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

UNIT–IV: CORRELATION:

Auto-correlation and cross-correlation of functions, properties of the correlation function, Energy density spectrum, Parseval's theorem, Power density spectrum, Relation between Convolution and correlation, Detection of periodic signals in the presence of noise by correlation, Extraction of signal from noise by filtering.

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

UNIT–V: LAPLACE TRANSFORMS:

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

Z–TRANSFORMS:

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

TEXTBOOKS:

1. Signals, Systems & Communications-B.P.Lathi,BS Publications,2003.
2. Signals and Systems- A.V. Oppenheim, A.S. Willsky and S.H. Nawab,PHI, 2ndEdn,1997
3. Signals & Systems-Simon Haykin andVanVeen, Wiley,2nd Edition,2007

REFERENCEBOOKS:

1. Principles of Linear Systems and Signals– BP Lathi, Oxford University Press, 2015
2. Signals and Systems– TK Rawat, Oxford University Press,2011

CourseOutcomes:

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

- Differentiate the various classifications of signals and systems
- Analyze the frequency domain representation of signals using Fourier concepts
- Classify the systems based on their properties and determine the response of LTI Systems.
- Know the sampling process and various types of sampling techniques.
- Apply Laplace and z-transforms to analyze signals and Systems (continuous & discrete).

II B. TECH	ELECTRONIC DEVICES AND CIRCUITS	L	T	P	C
I SEMESTER		3	0	0	3

Course Objectives:

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

UNIT-I: Review of Semiconductor Physics: Mobility and Conductivity, Intrinsic and extrinsic semiconductors**,** Hall effect, continuity equation, law of junction, Fermi Dirac function, Fermi level in intrinsic and extrinsic Semiconductors. **(Textbook: 1)**

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

UNIT-II:

Special Semiconductor Devices: Zener Diode, Breakdown mechanisms, Zener diode applications, Varactor Diode, LED, Photodiode, Tunnel Diode, UJT, PNPN Diode, SCR, Construction, operation and V-I characteristics. **(Textbook: 1)**

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

UNIT- III:

Transistor Characteristics: Junction transistor, transistor current components, transistor equation in CB configuration, transistor as an amplifier, characteristics of transistor in Common Base, Common Emitter and Common Collector configurations, Ebers-Moll model of a transistor, punch through/ reach through, Phototransistor, typical transistor junction voltage values. **(Textbook: 1)**

Transistor Biasing and Thermal Stabilization: Need for biasing, operating point, load line analysis, BJT biasing- methods, basic stability, fixed bias, collector-to-base bias, self-bias, Stabilization against variations in V_{BE}, Ic, and β, Stability factors, (S, S', S''), Bias compensation, Thermal runaway, Thermal stability. **(Textbook: 1)**

UNIT- IV:

Small Signal Low-Frequency Transistor Amplifier Models

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

UNIT- V: FET: FET types, JFET operation, characteristics, small signal model of JFET. **(Textbook: 1)MOSFET:** MOSFET Structure, Operation of MOSFET: operation in triode region, operation in saturation region, MOSFET as a variable resistor, derivation of V-I characteristics of MOSFET, Channel length modulation, MOS transconductance, MOS device models: MOS small signal model, PMOS Transistor, CMOS Technology, Comparison of Bipolar and MOS devices. **(Textbook: 3)CMOS amplifiers:** General Considerations, Common Source Stage, Common Gate Stage, Source Follower, comparison of FET amplifiers. **(Textbook: 3)**

Text Books:

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

References:

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

Course Outcomes:

- Apply the basic concepts of semiconductor physics.
- Understand the formation of a p-n junction and how it can be used as a p-n junction as a diode in different modes of operation.

- Analyze the construction, and working principle of Semiconductor Devices and Diode Circuits
- Know the need for transistor biasing, various biasing techniques for BJT and FET and stabilization concepts with necessary expressions
- Apply small-signal low-frequency transistor amplifier circuits using BJT and FET in different configurations

II B. TECH	SWITCHING THEORY and LOGIC DESIGN	L	T	P	C
I SEMESTER		3	0	0	3

Course Objectives:

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

UNIT – I

REVIEW OF NUMBER SYSTEMS & CODES:

Representation of numbers of different radix, conversation from one radix to another radix, r-1's compliments and r's compliments of signed members. Grey code, 4-bit codes; BCD, Excess-3, 2421, 84-2-1 code, etc. Error detection & correction codes: parity checking, even parity, odd parity, Hamming code.

BOOLEAN THEOREMS AND LOGIC OPERATIONS:

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

UNIT – II

MINIMIZATION TECHNIQUES:

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

COMBINATIONAL LOGIC CIRCUITS DESIGN:

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

UNIT – III

COMBINATIONAL LOGIC CIRCUITS DESIGN USING MSI &LSI:

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

INTRODUCTION OF PLD's:

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

UNIT – IV

SEQUENTIAL CIRCUITS I:

Classification of sequential circuits (synchronous and asynchronous), operation of NAND & NOR latches and flip-flops; truth tables and excitation tables of RS flip-flop, JK flip-flop, T flip-flop, D flip-flop with reset and clear terminals. Conversion from one flip-flop to another flip-flop. Design of 5ripple counters, design of synchronous counters, Johnson counter, ring counter. Design of registers - Buffer register, control buffer register, shift register, bi-directional shift register, universal shift, register

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

UNIT – V

SEQUENTIAL CIRCUITS II:

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

TEXTBOOKS:

1. Switching and finite automata theory Zvi.KOHAVI, Niraj.K.Jha 3rd Edition, Cambridge
UniversityPress,2009
2. Digital Design by M.MorrisMano, Michael D Ciletti,4th editionPHIpublication,2008
3. Switching theory and logic design by Hill and Peterson**,** Mc-Graw Hill TMH edition, 2012.

REFERENCES:

1. Fundamentals of Logic Design by Charles H. Roth Jr, Jaico Publishers, 2006
2. Digital electronics by R S Sedha.S.Chand & Company Limited, 2010
3. Switching Theory and Logic Design by A. Anand Kumar, PHI Learning Pvt ltd, 2016.
4. Digital logic applications and design by John M Yarbough, Cengage learning, 2006.
5. TTL 74-Series data book.

Course Outcomes:

- Classify different number systems and apply them to generate various codes.
- Use the concept of Boolean algebra in minimization of switching functions
- Design different types of combinational logic circuits.
- Apply knowledge of flip-flops in designing Registers and counters
- The operation and design methodology for synchronous sequential circuits and algorithmic state machines.

- Produce innovative designs by modifying traditional design techniques.

II B. TECH	ELECTRONIC DEVICES AND CIRCUITS LAB	L	T	P	C
I SEMESTER		0	0	3	1.5

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

List of Experiments:(A minimum of Ten Experiments has to be performed)

1. clipper circuit using diode
2. Clamping circuit using diode
3. Rectifiers (without and with c-filter)

   Part A: Half-wave Rectifier

   Part B: Full-wave rectifier
4. BJT Characteristics (CE Configuration)

   Part A: Input Characteristics

   Part B: Output Characteristics
5. FET Characteristics (CS Configuration)

   Part A: Drain Characteristics

   Part B: Transfer Characteristics
6. SCR Characteristics
7. UJT Characteristics
8. Transistor Biasing
9. CRO Operation and its Measurements

10. BJT-CE Amplifier
11. Emitter Follower-CC Amplifier
12. FET-CS Amplifier

Equipment required:

- Regulated Power supplies
- Analog/Digital Storage Oscilloscopes
- Analog/Digital Function Generators
- Digital Multi-meters
- Decade Resistance Boxes/Rheostats
- Decade Capacitance Boxes
- Ammeters (Analog or Digital)
- Voltmeters (Analog or Digital)
- Active & Passive Electronic Components.

II B. TECH	SIGNALS AND SYSTEMS LAB	L	T	P	C
I SEMESTER		0	0	3	1.5

I. Generation of Basic Signals (Analog and Discrete)

1. Unit step
2. Unit impulse
3. Unit Ramp
4. Sinusoidal
5. Signum

II. Operations on signals

1. Addition & Subtraction
2. Multiplication & Division
3. Maximum & minimum

III. Energy and power of signals, even and odd signals

IV. Transformation of the independent variable

1. Shifting (Delay & Advance)
2. Reversing
3. Scaling

V. Convolution & Deconvolution

VI. Correlation

VI. Fourier Series Representation

VIII. Fourier Transform and Analysis of Fourier Spectrum

IX. Laplace Transforms

X. Z-Transforms

II B. TECH	DATA STRUCTURES USING C	L	T	P	C
I SEMESTER		3	0	0	3

List of Experiments:

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

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

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

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

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

6. Write a program for Linear Search and Binary search.
7. Write a program to implement Bubble Sort and Selection Sort.
8. Write a program to implement Merge sort and Quick sort.
9. Write a program to implement Stacks and Queues.
10. Write a program to implement a Singly Linked List.
11. Write a program to implement a Doubly Linked list.
12. Write a program to implement a Binary Search Tree.

II B. TECH	ENVIRONMENTAL SCIENCE	L	T	P	C
I SEMESTER		2	0	0	-

Course Objectives:

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

Course Outcomes:

- Grasp the multidisciplinary nature of environmental studies and various renewable and non-renewable resources.
- Understand flow and bio-geo-chemical cycles and ecological pyramids.
- Understand various causes of pollution and solid waste management and related preventive measures.
- About rainwater harvesting, watershed management, ozone layer depletion and wasteland reclamation.
- Casus of population explosion, value education and welfare programmes.

UNIT–I

Multidisciplinary Nature Of Environmental Studies: – Definition, Scope and Importance –Need for public awareness. Natural Resources: Renewable and non-renewable resources – Natural resources and associated problems – Forest resources – Use and over – exploitation, deforestation, case studies – Timber Extraction – Mining, dams and other effects on forest and tribal people – Water resources – Use and utilization of surface and groundwater – Floods, drought, conflicts over water, dams – benefits and problems–Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies– Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.– Energy resources:

UNIT–II

Ecosystems: Concep to fan ecosystem.–Structure and function of an ecosystem–Producers, consumers and decomposers – Energy flow in the

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

a. Forest ecosystem.

b. Grassland ecosystem

c. Desert ecosystem

d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

Biodiversity And Its Conservation: Introduction Definition: genetic, species and ecosystem diversity–Bio-geographical classification of India–Value of biodiversity: consumptive use, Productive use, social, ethical, aesthetic and option values – Biodiversity at global, National and local levels – India as a mega-diversity nation – Hot-sports of biodiversity – Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts–Endangered and endemic species of India –Conservation of biodiversity: In-situand Ex-situ conservation of biodiversity.

UNIT–III

Environmental Pollution: Definition, Cause, effects and control measures of:

a. Air Pollution.
b. Water pollution
c. Soil pollution
d. Marine pollution
e. Noise pollution
f. Thermal pollution
g. Nuclear hazards

Solid Waste Management: Causes, effects and control measures of urban and industrial wastes – Role of an individual in prevention of pollution – Pollution case studies – Disaster management: floods, earthquakes, cyclones and landslides.

UNIT–IV

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

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

UNIT–V

Human Population And The Environment: Population growth, variation among nations. Population explosion – Family Welfare Programmes. – Environment and human health – Human Rights – Value Education– HIV/AIDS–Women and Child Welfare–Role of Information Technology in Environment and human health–Case studies. Field Work: Visit to a local area to document environmental assets River/ forest grassland/ hill/ mountain – Visit to a local polluted site- rban/Rural/Industrial/Agricultural Study of common plants, insects, and birds–river, hills lopes, etc..

Textbooks:

- Textbook of Environmental Studies for Undergraduate Courses Erach Bharucha for University Grants Commission, Universities Press.
- Palaniswamy,“Environmental Studies”, Pearson Education
- S.AzeemUnnisa,“Environmental Studies” Academic Publishing Company
- K.RaghavanNambiar,“Textbook of Environmental Studies for Undergraduate Courses as per UGC model syllabus”, Scitech Publications (India), Pvt. Ltd.

Reference Books:

- Deeksha Dave and E.Sai Baba Reddy, “Textbook of Environmental Science”, Cengage Publications.
- M.Anji Reddy,“Textbook of Environmental Sciences and Technology”, BSPublication.
- J.P.Sharma, Comprehensive Environmental studies, Laxmi publications.
- J.Glynn Henry and Gary W.Heinke, “Environmental Sciences and Engineering”, Prentice Hall of India Private limited
- G.R.Chatwal, “A Text Book of Environmental Studies” Himalaya Publishing House

- Gilbert M.Masters and WendellP.Ela, “Introduction to Environmental Engineering and Science, Prentice Hall of India Private Limited.

II B. TECH	Life Skills III	L	T	P	C
I SEMESTER		2	0	0	0

The Life Skills course is divided into three components – Part-A. Quantitative Ability, Part-B. Reasoning Ability and Part-C. Verbal Ability.

Part-A: Quantitative Ability: Almost all competitive examinations test the candidate for quantitative aptitude, especially recruitment test, public service examinations management courses, where they evaluate the student's thinking prowess and analytical skills. Critical analysis of problems asked in examination reveal that they are designed to correlate multiple topics and the test taker is expected to identify those link points and come out with an out-of-box unique solution. The purpose of the test is to assess arithmetic abilities, logic, analysis, problem solving and decision-making skills.

Part-B: Reasoning Ability: Reasoning ability is the ability to draw connections between factors, and the ability to synthesize a message from a body of information. Reasoning ability of the aspirants for jobs or courses is tested by means of a verbal reasoning test non-verbal reasoning. Thus, reasoning is a highly specialized thinking which helps an individual to explore mentally the cause & effect relationship of an event or solution of a problem by adopting some well-organized systematic steps based on previous experience combined with present observation. Most of the recruitment tests consistof questions to assess the reasoning ability of the students.

Part-C: Verbal Ability: The dramatic changes in global economies have been matched with the transformation in technology and these have an impact on education as well the workplace. Life skills provide students with important skills such as independent thinking, social skills, situational awareness and communication skills needed in the campus and future workplaces. They equip the student with the requisite tools for all round development, and the requisite non-academic skills to enrich their lives.

Prerequisite:Learnability Quotient (LQ)

Course Outcomes:

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

CO1 Application of utilization of man power and estimated work done along with the wages paid Calculating volumes of pipes and cisterns, consumption of liquid and their application in daily life.

CO2 Calculating, applying and estimating time, speed and distance in boats, streams, races and games

CO 3 Analyzing data using Venn diagrams based on SET theory; Calculate and determine the direction and distance among various objects.

CO 4 Analysis of measuring to time, be it huge or less, by means of Clocks and Calendars; Identifying the relationship among various individuals by various methods

CO5 Understand practical dimensions of intercultural and non-verbal communication employ functional English in professional context effectively

CO6 Able to frame impactful sentences thereby enhancing potential language proficiency and develop competencies that are essential to address sustainable development challenges

Part-A: Quantitative Ability

Unit-1: - Module 1: Time and Work

Module 2 Pipes and Cisterns

Unit-2: - Module 3: Time, Distance and Speed

Module 4: Boats and Streams

Part-B: Reasoning Ability

Unit-3: - Module 5: Logical Venn Diagrams

Module 6: Directions

Unit-4: - Module 7: Blood Relations

Module 8: Clocks & Calendars

Part-C: Verbal Ability

Unit-5: - Module 5: Body Language

Cross-cultural Communication

Networking Skills

Module 6: Reading Comprehension

Listening Comprehension

Drawing Inferences

Unit-6: Module 7: Spellings

Synonyms and Antonyms

One-word Substitutes

Module 8: Idioms

Phrasal Verbs

Analogies

Reference Books

1. Quantitative Aptitude for Competitive Examination by Dr R S Agarwal
2. Fast Track Objective Arithmetic Paperback – 2018 by Rajesh Verma
3. Teach Yourself Quantitative Aptitude, by Arun Sharma
4. The Pearson Guide to Quantitative Aptitude for Competitive examination by Dinesh Khattar
5. Quantitative Aptitude for all Competitive Exam by Abhijit Gupta
6. Quantitative Aptitude Quantum CAT by Sarvesh K. Verma
7. How to Prepare for Data Interpretation by Arun Sharma
8. Logical Reasoning Data Interpretation by Nishit K. Sinha
9. Analytical Reasoning (2018-2019) Session by MK Panday

10. How to Crack Test Of Reasoning by Jaikishan and Premkishan [Arihant]
11. Logical Reasoning and Data Interpretation for CAT & other MBA exams by K. Sinha Nishit [Pearson]
12. Reasoning for Competitive Exams by K. Sinha Nishit [Pearson]
13. How to Prepare for Logical Reasoning for CAT by Arun Sharma [McGrawHill]
14. Shortcuts in Reasoning (Verbal, Non-Verbal, Analytical & Critical) for Competitive Exams by Disha Experts
15. Visual Intelligence for Beginners by Matthew Alcot
16. McCarthy, Michael& Felicity O'Dell. English Vocabulary in Use beginner, Cambridge University Press, 2017.
17. McCarthy, Michael& Felicity O'Dell. English Vocabulary in Use Upper-Intermediate, Cambridge University Press, 2017.
18. McCarthy, Michael& Felicity O'Dell. English Vocabulary in Use Advanced, Cambridge University Press, 2017.
19. Sonmez, John. Soft Skills: The Software Developer's Life, Manning Publications, 2014.
20. Tulgan, Bruce. Bridging the Soft Skills Gap: How to Teach the Missing Basics to Today’s Young Talent, Pan Macmillan India, 2016.

II B. TECH	Linear Control Systems	L	T	P	C
II SEMESTER		3	0	0	3

Course objectives:

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

UNIT I - INTRODUCTION

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

UNIT II – TRANSFER FUNCTION REPRESENTATION

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

TIME RESPONSE ANALYSIS

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

UNIT III – STABILITY ANALYSIS IN S-DOMAIN

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

Root Locus Technique:

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

UNIT IV

Frequency response analysis: Introduction, Correlation between time and frequency response, Polar Plots, Bode Plots, Nyquist Stability Criterion

UNIT V – CLASSICAL CONTROL DESIGN TECHNIQUES

Compensation techniques – Lag, Lead, Lead-Lag Controllers design infrequency Domain, PID Controllers. State Space Analysis of Continuous Systems Concepts of state, state variables and state model, derivation of state models from block diagrams, Diagonalization- Solving the Time invariant state Equations- State Transition Matrix and its Properties – Concepts of Controllability and Observability.

TEXTBOOKS:

1. Automatic Control Systems 8th edition– by B.C.Kuo – John Wiley and Sons, 2003.

2. Control Systems Engineering –by I. J.Nagrathand M.Gopal, New Age International (P) Limited, Publishers, 2nd edition, 2007

3. Modern Control Engineering–by Katsuhiko Ogata–Pearson Publications, 5th edition, 2015.

REFERENCE BOOKS:

1. Control Systems by A.Nagoorkani, RBA Publications, 3 edition, 2017.

2. Control Systems by A.Anandkumar, PHI, 2 Edition, 2014.

Course Outcomes:

- This course introduces the concepts of feedback and its advantages to various control systems
- The performance metrics to design the control system in the time domain and frequency domain are introduced.
- Control systems for various applications can be designed using time-domain and frequency-domain analysis.
- In addition to the conventional approach, the state space approach for the analysis of control systems is also introduced.

II B. TECH	Electromagnetic Waves and Transmission Lines	L	T	P	C
II SEMESTER		3	0	0	3

Course Objectives:

The main objectives of this course are to:

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

UNIT I:

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

UNIT II:

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

Maxwell's Equations (Time Varying Fields): Faraday's Law and Transformer EMF, Inconsistency of Ampere's Law and Displacement Current

Density, Maxwell's Equations in Different Final Forms and Word Statements, Conditions at a Boundary Surface, Illustrative Problems.

UNIT III:

EM Wave Characteristics : Wave Equations for Conducting and Perfect Dielectric Media, Uniform Plane Waves – Definition, All Relations Between E & H, Sinusoidal Variations, Wave Propagation in Lossy dielectrics, lossless dielectrics, free space, wave propagation in good conductors, skin depth, Polarization & Types, Illustrative Problems.

Reflection and Refraction of Plane Waves – Normal and Oblique Incidences, for both Perfect Conductor and Perfect Dielectrics, Brewster Angle, Critical Angle and Total Internal Reflection, Surface Impedance, Poynting Vector and Poynting Theorem, Illustrative Problems.

UNIT IV:

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

UNIT V:

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

TEXTBOOKS:

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

REFERENCE BOOK:

1. Engineering Electromagnetics – William H. Hayt, John A. Buck, Jaleel M. Akhtar, TMH, 9th edition, 2020.

2. Electromagnetic Field Theory and Transmission Lines –G. S. N. Raju, Pearson Education 2006

3. Electromagnetic Field Theory and Transmission Lines: G Sasi Bhushan Rao, Wiley India 2013.

4. Networks, Lines and Fields John D. Ryder, Second Edition, Pearson Education, 2015.

Course Outcomes:

After learning the course, the student will be able to:

- Determine electric field intensity using Coulomb's law and Gauss's law.
- Determine magnetic field intensity using Biot-Savarts Law and Ampere's Circuital Law.
- Analyze the electromagnetic wave propagation in dielectric and conducting media.
- Examine the primary and secondary constants of different types of transmission lines.
- Derive the expressions for input impedance, reflection coefficient, and VSWR of transmission lines and calculate these parameters using a Smith chart.

II B. TECH	ELECTRONIC CIRCUIT ANALYSIS	L	T	P	C
II SEMESTER		3	0	0	3

Course Objectives:

The main objectives of this course are:

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

UNIT-I Small Signal High Frequency Transistor Amplifier models:

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

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

UNIT-II

Multistage Amplifiers: Classification of amplifiers, methods of coupling**, c**ascaded transistor amplifier and its analysis, analysis of two stage RC coupled amplifier, high input resistance transistor amplifier circuits and their

analysis-Darlington pair amplifier, Cascode amplifier, Boot-strap emitter follower, Differential amplifier using BJT.

UNIT-III

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

Unit-IV

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

UNIT-V

Power Amplifiers: Classification of amplifiers (A to H), Class A power Amplifiers, Class B Push-pull amplifiers, Complementary symmetry push-pull amplifiers, Class AB power amplifiers, Class-C power amplifiers, Thermal stability and Heat sinks.

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

Textbooks:

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

References:

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

Course Outcomes:

At the end of this course, the student can able to

- Design and analysis of small signal high-frequency transistor amplifier using BJT and FET.
- Design and analysis of multistage amplifiers using BJT and FET and Differential amplifiers using BJT.
- Derive the expressions for frequency of oscillation and condition for oscillation of RC and LC oscillators and their amplitude and frequency stability concept.
- Know the classification of the power and tuned amplifiers and their analysis with performance comparison

II B. TECH	ANALOG COMMUNICATIONS	L	T	P	C
II SEMESTER		3	0	0	3

Course Outcomes:

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

- Describe the Modulation and Demodulation techniques of standard AM.
- Compare different types of Amplitude Modulation and Demodulation techniques.
- Analyse the concepts of generation and detection of Angle Modulated signals.
- Outline the Radio Receivers with different sections.
- Interpret the Radio Transmitters completely.
- Illustrate the noise performance in Analog Modulation techniques and also the concepts of Pulse Analog Modulation and Demodulation techniques.

Unit – I

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

Unit – II

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

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

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

Unit – III

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

Unit – IV

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

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

Unit – V

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

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

Text Books:

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

Reference Books:

- Electronics & Communication Systems, George Kennedy, Bernard Davis, S R M Prasanna, TMH, 6th Edition, 2017.
- Communication Systems, R P Singh, S D Sapre, TMH, 3nd Edition, 2017.

- Communication Systems (Analog and Digital), Dr. Sanjay Sharma, Katson Books, 7th Reprint Edition, 2018

Web Links:

- http://nptel.ac.in/courses/117102059/ Prof. Surendra Prasad.
- https://ict.iitk.ac.in/wp-content/uploads/EE320A-Principles-Of-Communication-CommunicationSystems-4ed-Haykin.pdf.
- https://www.scribd.com/document/266137872/sanjay-sharma-pdf.
- http://bayanbox.ir/view/9144090835198890 86/Book-Modern-Digital-And-AnalogCommunication-Systems-4th-edition-by-Lathi.pdf.
- https://soaneemrana.org/onewebmedia/ELECTRONICS%20COMMUNICATION%20SYSTEM%20BY%20GEORGE%20KENNEDY.pdf

II B. TECH	SWITCHING THEORY and LOGIC DESIGN LAB	L	T	P	C
II SEMESTER		0	0	3	1.5

List of Experiments:

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

Additional Experiments:

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

II B. TECH	ELECTRONIC CIRCUIT ANALYSIS LAB	L	T	P	C
II SEMESTER		0	0	3	1.5

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

List of Experiments: (A minimum of Ten Experiments has to be performed)

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

Equipment required: Software:

i. Multisim/Equivalent Industrial Standard Licensed simulation software tool.

ii. Computer Systems with required specifications

Hardware Required:

1. Regulated Power supplies

2. Analog/Digital Storage Oscilloscopes
3. Analog/Digital Function Generators
4. Digital Multimeters
5. Decade Resistance Boxes/Rheostats
6. Decade Capacitance Boxes
7. Ammeters (Analog or Digital)
8. Voltmeters (Analog or Digital)
9. Active & Passive Electronic Components

II B. TECH	Life Skills IV	L	T	P	C
II SEMESTER		2	0	0	0

The Life Skills course is divided into three components – Part-A. Quantitative Ability, Part-B. Reasoning Ability and Part-C. Verbal Ability.

Part-A: Quantitative Ability: Almost all competitive examinations test the candidate for quantitative aptitude, especially recruitment tests and public service examination management courses, where they evaluate the student's thinking prowess and analytical skills. Critical analysis of problems asked in examination reveal that they are designed to correlate multiple topics and the test taker is expected to identify those link points and come out with an out-of-box unique solution. The purpose of the test is to assess the arithmetic abilities, logical, analysis, problem solving and decision-making skills.

Part-B: Reasoning Ability: Reasoning ability is the ability to draw connections between factors, and the ability to synthesize a message from a body of information. Reasoning ability of the aspirants for jobs or courses is tested by means of a verbal reasoning test non-verbal reasoning. Thus, reasoning is a highly specialized thinking which helps an individual to explore mentally the cause & effect relationship of an event or solution of a problem by adopting some well-organized systematic steps based on previous experience combined with present observation. Most of the recruitment tests consist of questions to assess the reasoning ability of the students.

Part-C: Verbal Ability:

Prerequisite: Learnability Quotient (LQ)

Course Outcomes: After completion of the course the student will be able to:

CO 1	Calculating, applying and estimating time, speed and distance in boats, streams, races and games.
CO 2	Implementing mean, median and mode in day-to-day application.
CO 3	Enhance the logical abilities to find out deductions of statements (logical) and connectives of statements through various methodologies.
CO 4	Improve the abilities problem solving skills and to solve relationship of letters and numbers using arithmetical operations
CO 5	Able to frame impactful sentences thereby enhancing potential language proficiency

CO 6	Develop competencies that are essential to address sustainable development challenges

Part-A: Quantitative Ability

Unit-1: - **Module 1:** Races and Games
Module 2: Geometry and Mensuration

Unit-2: - **Module 3:** Sequences
Module 4: Statistics

Part-B: Reasoning Ability

Unit-3: - **Module 5:** Syllogisms
Module 6: Logical Connectives

Unit-4: - **Module 7:** Cubes and Dice
Module 8: Crypto Arithmetic

Part-C: Verbal Ability

Unit-5: - **Module 9:** Conflict Management
Social Responsibility/Sustainable Development
Creative Thinking
Module 10: Cloze test
Correction of Errors
Ordering of Words

Unit-6: - Module 11: e-mail Writing
Oral Presentations
PowerPoint Presentations
Module 12: Ethical Approach to Technology
Adaptability
Empathy

Reference Books

1. Quantitative Aptitude for Competitive Examination by Dr R S Agarwal
2. Fast Track Objective Arithmetic Paperback – 2018 by Rajesh Verma
3. Teach Yourself Quantitative Aptitude, by Arun Sharma
4. The Pearson Guide to Quantitative Aptitude for Competitive Examination by Dinesh Khattar
5. Quantitative Aptitude for all Competitive Exam by Abhijit Gupta
6. Quantitative Aptitude Quantum CAT by Sarvesh K. Verma
7. Reasoning Ability for Competitive Examination by Dr R S Agarwal
8. A Modern Approach to Logical Reasoning (2019-20 Session) by R.S. Aggarwal [S. Chand]
9. How to Prepare for Logical Reasoning for CAT by Arun Sharma [McGraw Hill]
10. Multidimensional Reasoning by Mishra and Kumar Dr. Lal [Upkar's]

11. A Modern Approach to Verbal & Non-Verbal Reasoning (2019-20 Session) by R.S. Aggarwal [S. Chand]
12. A New Approach to Reasoning Verbal & Non-Verbal by B.S. Sijwali and Indu Sijwali [Arihant]
13. Analytical Reasoning (2018-2019) Session by MK Panday
14. How to Crack Test Of Reasoning by Jaikishan and Premkishan [Arihant]
15. Logical Reasoning and Data Interpretation for CAT & other MBA exams by K. Sinha Nishit [Pearson]
16. Reasoning for Competitive Exams by K. Sinha Nishit [Pearson]
17. Shortcuts in Reasoning (Verbal, Non-Verbal, Analytical & Critical) for Competitive Exams by Disha Experts
18. Visual Intelligence for Beginners by Matthew Alcot
19. Logical Reasoning & Data Interpretation by Nishit K. Sinha
20. McCarthy, Michael& Felicity O'Dell. English Vocabulary in Use beginner, Cambridge University Press, 2017.
21. McCarthy, Michael & Felicity O'Dell. English Vocabulary in Use Upper-Intermediate, Cambridge University Press, 2017.
22. McCarthy, Michael & Felicity O'Dell. English Vocabulary in Use Advanced, Cambridge University Press, 2017.
23. Sonmez, John. Soft Skills: The Software Developer's Life, Manning Publications, 2014.
24. Tulgan, Bruce. Bridging the Soft Skills Gap: How to Teach the Missing Basics to Today’s Young Talent, Pan Macmillan India, 2016.