MVSR ENGINEERING COLLEGE

(An Autonomous Institution)

BACHELOR OF ENGINEERING

ACADEMIC REGULATIONS , SCHEME OF INSTRUCTION & SYLLABI (R-25)

ELECTRICAL & ELECTRONICS ENGINEERING

(I & II Semesters)

ACADEMIC YEAR 2025-26

(Sponsored by Matrusri Education Society, Estd.1980

ISO 9001:2015

nirf 2020 Rank band 251-300

ACCREDITED BY NAAC NATIONAL ASSESSMENT AND ACCREDITATION COUNCIL

NBA Accredited Courses Civil,CSE,ECE, EEE,Mech & IT

Four Year BACHELOR OF ENGINEERING (B.E.) DEGREE PROGRAM

RULES and ACADEMIC REGULATIONS (R25)

(For the batches admitted from the Academic Year 2025-26 onwards)

MVSR Engineering College

Established in 1981

Affiliated to the Osmania University Hyderabad, India

Autonomous (since 2021)

Sponsored by

Matrusri Education Society, Estd.1980)

Approved by
All India Council for Technical Education (AICTE) India
An ISO 9001:2015 Certified and NAAC India Accredited Institution

Offers
National Board of Accreditation (NBA), India
accredited B.E. Programs in:
CIVIL, CSE, CSE (AI & ML), CSE (DS), CSE (IOT), CSIT,
ECE, EEE, IT, MECH

website: www.mvsrec.edu.in

Counseling Codes:
TSEAMCET/TSECET/TSICET: MVSR; PGECET: MVSR1

B.E. PROGRAMME
(Full-time)

INDEX
of
ACADEMIC RULES & REGULATIONS

ACADEMIC RULES AND REGULATIONS For

Four Year Degree Programme in Engineering of

MVSR Engineering College

(For the batch admitted in2025-26 (R-25))

PREAMBLE: All the Rules and Regulations, here in after specified shall be read as a whole for the purpose of interpretation. Any reference to college in these Rules and Regulations stands for MVSR Engineering College. In case of arising a doubt, the interpretation of the Academic Council, the Statutory Body constituted as per UGC regulations of the college is final. The Academic council has the powers to make amendments to these regulations whenever necessary and shall be approved by Governing Body (GB).

ABBREVIATIONS:

AC	Academic Council
AICTE	All India Council for Technical Education
BE	Bachelor of Engineering
BoS	Board of Studies
GB	Governing Body
C	Credits
CGPA	Cumulative Grade Point Average
CIE	Continuous Internal Evaluation
CP	Credit Point
D	Drawing
GO	Government Order
GP	Grade Point
L	Lecture
MOOC	Massive Open Online Course
MVSREC	MVSR Engineering College
NPTEL	National Programme on Technology Enhanced Learning
P	Practical
SEE	Semester End Examination
SGPA	Semester Grade Point Average
SWAYAM	Study Webs of Active Learning for Young and Aspiring Minds
T	Tutorial
UG	Under Graduate
UGC	University Grants Commission

NOMENCLATURE:

S. No.	Keywords	Definition
1	**Governing Body**	Highest administrative body of the Institute. GB is an authority as per the AICTE/ UGC regulations and responsible to perform functions as may be necessary and deemed fit for the proper development of the institution.
2	**Academic Council**	Highest academic body of the Institute and is responsible for the maintenance of standards of instruction, education and examination within the Institute. Academic Council is an authority as per the AICTE / UGC regulations and has the right to take decisions on all academic matters including academic research.
3	**Academic Year**	A period that is necessary to complete courses of study. It consists of two consecutive (one odd +one even) semesters.
4	**Autonomous Institute**	An Institute designated as 'Autonomous' by University Grants Commission (UGC), New Delhi in concurrence with the affiliating University i.e., Osmania University, Hyderabad and Telangana State Government.
5	**Board of Studies**	An authority, as defined in UGC regulations, constituted by the Principal for each of the department separately. The board is responsible for curriculum design and update in respect of all the programmes offered by a department.
6	**Course**	Usually referred to, as „papers" is a component of a programme. All courses need not carry the same weightage. The learning objectives and learning outcomes are defined for each course. A course is designed to comprise lectures/ tutorials/ laboratory work field work/ outreach activities/ project work/vocational training/viva seminars/ term papers/ assignments/ presentations/self-study etc. or a combination of some of these.
7	**Course Evaluation**	Continuous Internal Evaluation (CIE) in the Semester & Semester End Examination (SEE) constitutes the main assessment prescribed for each course.
8	**Continuous Internal Evaluation (CIE)**	To be normally conducted by the course instructor which includes class tests, problem solving exercises, group discussions, assignments, quizzes, mini-projects & seminars conducted anytime throughout the semester.
9	**Credit**	A unit by which the course work is measured. One credit is equivalent to one lecture hour of teaching (lecture or tutorial) or two hours of practical / field work per week.
10	**Grade Point**	It is a numerical weight allotted to each letter grade on a 10-point scale. A+ =10, A = 9, B = 8, C = 7, D = 6, E = 5 and F = 0.
11	**Credit Point**	A product of grade point and number of credits for a course.

12	**Cumulative Grade Point Average (CGPA)**	It is a measure of overall cumulative performance, of a student in all semesters. The CGPA is the ratio of total credit points secured by a student in various courses in all semesters and the sum of th total credits of all courses in all the semesters of the program. It i expressed up to two decimal places.
13	**Programme**	A programme or specialization of a degree programme like Civil Engineering, Mechanical Engineering etc.
14	**Curriculum**	Curriculum incorporates all the courses that are offered in a specific programme. It also indicates the planned interaction of students with instructional content, materials and resources.
15	**Degree**	A student who fulfills all the programme requirements is eligible to receive a degree.
16	**Grading**	To be normally done using Letter Grades as qualitative measure o achievement in each Course like: A+ (Outstanding), A (Excellent) B (Very Good), C (Good), D (Average), E (Pass), F (Fail) based on the marks (%) scored in (CIE+SEE) of the course and conversion to grade done by relative/absolute grading.
17	**Mandatory Courses**	Compulsory non-credit courses that a student need to studyas prescribed in the programme.
18	**Massive Open Online Courses (MOOC)**	Open access online courses aimed at providing ways to learn new skills.
19	**Revision of Regulations, Curriculum and Syllabi**	The institution, from time to time may revise, amend or change the regulations, scheme of examinations, curriculum and syllabi with the approval of the academic council.
20	**Semester End Examination(SEE)**	To be normally conducted at the institutional level which will cover the entire course syllabi. The SEE questions are to be set from each unit. The questions are to be based on Blooms Taxonomy
21	**Semester**	Each year of study is divided into two semesters. Semester shall consist of 16 weeks of academic work excluding Semester End Examination and Evaluation.
22	**Semester Grade Point Average (SGPA)**	It is a measure of performance of work done in a semester. It is ratio of total credit points secured by a student in various theory and lab courses offered in each semester and the total course credits taken during that semester. It shall be expressed up to two decimal places.

I. ADMISSION PROCEDURE

1. A candidate for admission to the Four Year Degree Programme in Engineering must have passed the Intermediate Examination of the Board of Intermediate Education, Government of Telangana with Mathematics, Physics and Chemistry as optional courses, or any other examination recognized by the Government of Telangana as equivalent there to.

2. A candidate will be admitted strictly in accordance with the guidelines issued by State Government of Telangana from time to time.

II. DURATION AND PROGRAMMES OF STUDY

The duration of the programme is eight semesters (four years) such as I, II, III, IV, V, VI, VII and VIII. Each academic year shall comprise of two semesters.

Instruction per semester including Internal Examinations	---	16 weeks
Preparation holidays (includes practical exams)	---	02 weeks

No admission/ readmission/ promotion are entertained after four weeks of the commencement of instruction of semester in I, II, III and IV years.

In case there are any court cases consequent to which the authorities are compelled to admit any candidate after the announced last date of admissions, the admission (seat) of such a student would be reserved for the subsequent year on a supernumerary basis.

No refund of Tuition fee will be made after the commencement of instruction for students who wish to cancel their admission.

1. The following programmes of study are offered by the college.

S. No	Programme
i).	Civil Engineering
ii).	Computer Science and Engineering
iii).	Computer Science and Engineering (Data Science)
iv).	Computer Science and Engineering (AI &ML)
v).	Computer Science and Engineering (IOT-CS-BCT)
vi).	Computer Science and Information Technology
vii).	Electrical and Electronics Engineering
viii).	Electronics and Communication Engineering
ix).	Information Technology
x).	Mechanical Engineering

The schedule of study of all programmes is regulated by the Academic council of MVSR Engineering College.

2. Candidate who fails to fulfill all the requirements for the award of the degree as specified here in after within (N+2) academic years from the time of admission, *as per the UGC Guidelines on determination of uniform span period (UGC Letter No. F-12-1/2015 (CPP-II) dated and 15.10.2015 and Osmania University letter No.336/M/Acad.I/2016 dated 21.03.2016)*, will forfeit his/her seat in the programme and his/her admission will stand cancelled, where "N" is the number of years of programme of study. For four year regular B.E. degree programme maximum duration of study is (N+ 2) =4 +2 = 6 years.

   Candidate admitted to the second year under lateral entry scheme shall fulfill all the requirements for the award of the degree as specified here in after within (N+2=3+2=5) five academic years from the time of admission failing which he/she will forfeit his/her seat and his/her admission will stand cancelled.

III. RULES AND REGULATIONS OF ATTENDANCE

1. Candidates admitted to a particular programme of study are required to pursue **Regular programme of study** before they are permitted to appear for the Semester End Examination.
2. **A regular programme of study** means putting in attendance of not less than 75% in each semester.
3. In special cases and for sufficient cause shown, the Academic Council (AC) may condone the deficiency in attendance to the extent of 10% on medical grounds subject to the submission of medical certificate (signed by Competent Authority) along with the payment of condonation fee too.. However, in respect of women candidates who seek condonation of attendance due to pregnancy, the Academic Council (AC) on the specific recommendations may condone the deficiency in attendance to the extent of 15% (as against 10% condonation for others) on medical grounds (Valid Medical certificate) subject to submission of medical certificate to this effect. Such condonation is permitted only once during the programme of study. Medical certificate along with the fitness is to be submitted within a week days on reporting to the class work.

   * **Shortage of attendance below 65 % shall in no case be condoned.**
4. The fee for condonation of attendance on medical grounds shall be Rs. 2000/- (Rupees Two Thousand only) payable through DD/ Banker Cheque drawn in favour of Principal, MVSR Engineering College.
5. Attendance of N.C.C / N.S.S Camps or Inter collegiate or Inter-University or Inter State or International matches or debates or Educational Excursions or such other Inter University activities as approved by the authorities involving journeys outside the city in which the college is situated will not be counted as absence.

   i. Such absence shall not exceed four weeks per semester of the total period of instructions.

   ii. Such leave should be availed with prior permission from the Principal and not be availed more than twice during the programme of study.

   iii Without any prior permission, such leave shall be treated as absence.

   iv While calculating the attendance, the number of classes not attended in each subject shall be added to the numerator.

6. The attendance shall be calculated on the aggregate of courses from the date of commencement of classes/ date of readmission in case of detained candidates as per the almanac.
7. In case of candidates who fail to put in the required attendance in a programme of study, he/she shall be detained in the same semester and will not be permitted to appear for the Semester End Examination. Such candidates shall have to seek readmission into the same semester during the subsequent year in order to appear for the examination after fulfilling the attendance requirements and on payment of requisite tuition fee.

IV. SCHEME OFINSTRUCTIONS AND EXAMINATION

1. Instructions in various courses in each semester of all four years shall be provided by the college as per the scheme of instruction and syllabi prescribed. All students have to register for the courses offered in the Semester before starting of that particular semester.

2. The total number of credits for all eight semesters is 160 as per AICTE Model Curriculum

3. The distribution of marks/grade* based on Continuous Internal Evaluation (CIE) and the Semester End Examination (SEE) shall be as follows:

Subject	Continuous Internal Evaluation (CIE)	Semester End Examination (SEE)
Each theory subject	**40 ****	**60 ******
Each practical or drawing Subject for which less than 6 periods / week are provided in the scheme of instruction	**25 ****	**50**
Each practical or drawing Subject for which 6 or mor Periods/week are provided in the scheme of instruction	**50 *****	**100**
Project Work – I	**50 #**	**---**
Project Work – II	**50 #**	**100 ##**

Total marks = CIE + SEE

***** Grades are allotted based on the marks secured in CIE and SEE as per the following criteria.

Academic Performance	Grade		Grade points
	Letter	Description	
90% ≤ Marks ≤ 100%	**A +**	Outstanding	10
80% ≤ Marks < 90%	**A**	Excellent	9
70% ≤ Marks < 80%	**B**	Very Good	8
60% ≤ Marks < 70%	**C**	Good	7
50% ≤ Marks < 60%	**D**	Average	6
40% ≤ Marks < 50%	**E**	Pass	5
0% ≤ Marks < 40%	**F**	Fail	0
	AB	Absent	

** Out of **40** CIE marks for theory, 10 marks are allotted for Assignments/Tutorials/Quizzes etc. (At least two assignments and two quizzes are to be conducted) in the course. The rest of the **30** marks are allotted to internal tests. Two internal tests will be conducted in each semester. Each test will carry **30** marks, out of which 6 marks for PART-A (compulsory), consisting of three short answer questions and from Part- B two questions consisting of subjective questions are to be attempted from the remaining three questions and each question carries **12** marks. Average of two tests plus marks obtained in assignments/tutorials/quizzes etc. will be taken as CIE marks.

*** Out of 25/50 CIE marks for Practical/drawing, 10/ 20 are allotted for viva- voce exam / Quiz test, 15/30 marks for laboratory record/drawing sheets and observations.

The SEE question paper will contain two parts, Part-A and Part-B. Part- A is for 10 Marks consisting 5 questions one from each unit, student should attempt all questions and each question carries 02 Marks. Part-B carries 50 marks with five questions (each Question carries 10 marks) covering all the five units with internal choice. Questions in part-B may have subdivision.

In theory subject, a candidate shall score i) 40% marks in Semester End Exam and ii) 40% of marks in Continuous Internal Evaluation and Semester End Exam (CIE+SEE) together, in a particular Course, to be declared as 'PASS' in that Course.

In Practical course, a candidate shall score i) 50% marks in Semester End Exam and ii) 50% of marks in Continuous Internal Evaluation and Semester End Exam (CIE+SEE) together, in a particular subject, to be declared as 'PASS' in that subject.

The CIE evaluation of BE Project (Project Work - I & II) consists of a maximum of 50 marks which will be distributed as per the guidelines given below:

i. **30 Marks** are allocated for quality of the project work covering
   1. Literature review
   2. Innovation/ Originality
   3. Methodology and
   4. Relevance / Practical application which will be awarded by the supervisor.

ii. **20 Marks** are allocated to candidate's performance in terms of viva-voce examination and overall subject knowledge. Marks will be awarded by the committee constituted by the HoD.

The evaluation of BE Project (Project Work - II) for Semester End Examination consists of a maximum of 100 marks which will be distributed as per the guidelines given below:

iii. **50 Marks** are allocated for quality of the project work covering
   a. Literature review
   b. Innovation / Originality
   c. Methodology and
   d. Relevance/ Practical application, which will be awarded jointly by the internal and external examiners.

iv. **50 Marks** are provided for candidate's presentation and performance in terms of viva-voce examination and overall subject knowledge. Out of 50 Marks 30 marks will be awarded by the internal examiner and 20 marks by the external examiner concerned.

Note:

i. A course that has CIE but no SEE as per scheme is treated as Pass/ Fail for which pass marks are 40% of CIE marks.

ii. Mandatory courses shall not carry any credits but, securing **40% of total marks**, shall be **necessary requirement** for the student to qualify for the **award of Degree.**

I. The details of instruction period, examination schedule, vacation etc. shall be notified by the Principal, MVSR Engineering College.

II. The medium of instruction and examination shall be English.

III. At the end of each semester, SEE shall be held as prescribed in the respective Schemes of Examination. The examinations pertaining to the semester just ended, will be called, regular examinations and the examinations pertaining to the other semesters will be called supplementary examinations. To enable the B.E. Final Year students to complete the program

requirements in time, there shall be a Make-up / Supplementary Exam for VIII semester only, which will be scheduled within one month of publication of results of VIII semester regular examinations.

IV. The examinations prescribed may be conducted by means of written papers, practical and viva-voce, inspection of certified CIE work in Drawing and Laboratories and Workshop, or by means of any combination of these methods as may be deemed necessary. Candidates will be required to produce complete Lab Records of the Practical work done by them in each practical examination, along with other materials prepared or collected as part of Laboratory work / Project.

V. All the general rules for examinations (given under item no. X) shall be adhered to.

VI. A candidate shall be deemed to have fully passed a course, if he/she secures

- A minimum of 40% marks for each theory course in the Semester End Examination (SEE)
- A minimum of 40% marks (E – Grade) for each theory course considering both CIE and SEE.
- A minimum of 50% marks for each Practical/ Drawing/ Project work in the Semester End Examination (SEE)
- A minimum of 50% marks (D – Grade) for each Practical/ Drawing/ Project work considering both CIE and SEE.

Important note: The candidate has to mandatorily appear at the SEE in all the Practical/Laboratory/Drawing Courses irrespective of marks secured under CIE.

VII. In case of hearing impaired, orthopedically handicapped and visually challenged candidates, 10% reduction in pass marks in each subject is admissible as per G.O. Ms. No.150, dated 31-08-2006.

VIII. If a candidate desires to have his/her answer scripts revaluated, he/she can apply for it as per the college norms and notification of the College Examination Branch.

IX. A candidate can also obtain a photocopy of the corrected answer book of the theory courses of SEE only against payment. For more details in this regard, the press note of the College Examination Branch after the declaration of results may be referred.

V. RULES OF PROMOTION

S. No.	Semester/ Class	Conditions to be fulfilled	
1.	From I-Semester to II-Semester	Regular programme of study of B.E. I-Semester	
2.	From II-Semester to III-Semester	a)	Regular programme of study of B.E. II-Semester
		b)	Must have earned at least 25% of credits (rounded to the next nearest integer) prescribed for B.E. I-Semester and II-Semester.
3.	From III-Semester to IV-Semester	Regular programme of study of B.E. III-Semester	
4.	From IV-Semester to V-Semester	a)	Regular programme of study of B.E. IV-Semester

		b)	No. of backlog credits, if any of B.E. I, II, III and IV Semester put together shall not exceed 25% (rounded to the next nearest integer) of the total number of credits prescribed for the B.E. III & IV-Semester
5.	From V-Semester to VI-Semester	Regular programme of study of B.E. V-Semester	
6.	FromVI- Semester to VII- Semester	a)	Regular programme of study of B.E. VI-Semester
		b)	Number of backlogs credits if any of B.E. I II,III, IV V and VI Semester put together shall not exceed 25% (rounded to the next nearest integer) of the total number of credits prescribed for the B.E. V & VI-Semester
7.	FromVII-Semester to VIII- Semester	Regular programme of study of B.E. VII-Semester	

Note: 1. Ifa candidate has more than permitted number of credits as backlogs, he/she will be detained.

2. The candidate who wishes to take readmission into the year in which he/she is detained will have to pay the total tuition fee of that year and all the credits earned during that year shall become null and void.

VI. GRADING SYSTEM

1. Candidates who have passed all the examinations of the B.E. Degree Programme shall be awarded Cumulative Grade Point Average (CGPA) in accordance with the grade secured by them in all eight Semesters taken together, including the CIE marks secured in those semesters. The grade secured shall be shown in the memorandum of marks as per the performance in CIE and SEE.
   A minimum CGPA of 5 is required for the award of Degree. The consolidated memorandum of marks will reflect the credits/ grade scored in each course.

1. Semester Grade Point Average (SGPA) & Cumulative Grade Point Average (CGPA)

Calculation:

a) $$\text{SGPA} = \frac{\sum_{i=1}^{p} (\text{Letter Grade Point}_i \times \text{Credits}_i)}{\sum_{i=1}^{p} \text{Credits}_i}$$

Where i = 1, 2, …..p represent the number of courses in a particular semester. SGPA is calculated upto second decimal point and it is calculated only when all courses in that semester are Cleared/ Passed.

b) $$\text{CGPA} = \frac{\sum_{j=1}^{m} [(\text{SGPA})_j \times (\text{Total Credits})_j]}{\sum_{j=1}^{m} \text{Total Credits}_j}$$

where j= 1, 2, ….m represent the number of semesters of the entire programme.

CGPA at a given point of Semester is calculated up to second decimal point. It is calculated only when total credits earned are equal to total credits prescribed as per scheme up to a semester in which the candidate has last appeared for SEE.

c) Courses in which the candidate has failed are not included in computing SGPA/ CGPA.

VII. AWARD OF DEGREE

The degree of bachelor of engineering will be conferred on candidate who has pursued a regular programme of study of four academic years (three academic years for candidates admitted in II-Year under lateral entry scheme), as hereinafter prescribed in the scheme of instruction and has passed all the examinations as prescribed in the scheme of examinations.

Note: For **mandatory and audit courses (non-credit),** student shall be awarded a Grade without any credit. This shall not be counted for the computation of SGPA/CGPA.

VIII. AWARD OF GOLD MEDAL

(i) A student securing highest CGPA in **single attempt** is eligible for award ofGold Medal.

(i) **A readmitted** student is not eligible for Gold medal.

IX. IMPROVEMENT OF OVERALL SCORE

1. A candidate who wishes to improve his/her overall score may do so within one academic year immediately after having passed all the examinations of the B.E. degree programme, by reappearing in not more than two semesters (all courses pertaining to the semester taken together) examinations without violating the rule mentioned in the item II.3.

2. For the award of the overall score, he/she will have the benefit of the higher SGPA secured in the corresponding semester(s).

X. GENERAL RULES OF EXAMINATIONS

1. Application for permission to appear in any examination shall be made available online through college website (www.mvsrec.edu.in) as per the notification.

2. When a candidate's application is found in order and he/she is eligible to appear in Semester End Examination (SEE), the College Examination Branch shall furnish him with a Hall-Ticket, enabling the candidate to appear in the Semester End Examination. The Hall- Ticket shall have to be produced by the Candidate before he/she is admitted to the premises where the Examination is likely to be held.

3. A candidate who does not present himself/herself for examination for any reason whatsoever, excepting shortage of attendance, shall not be entitled to claim refund of the whole or part of the examination fee, for subsequent Examination(s).

4. A candidate after he/she has been declared successful in the all examinations, shall be given a provisional certificate stating the year of examination, the branch in which he/she was examined and, the overall grade secured. However, the candidates have to obtain degree certificate (convocation) from the Examination Branch, Osmania University, Hyderabad.

5. No candidate shall be allowed to put in attendance for a programme or appear at examinations for different degrees and different faculties simultaneously.

6. Students who have appeared once in any examination of the programme need not put in fresh attendance, if they wish to reappear at the corresponding examination, notwithstanding the fact that the college may have introduced new courses. They will, however, have to appear at the examinations according to the scheme of examination any syllabi in force.

XI. TRANSITORY REGULATIONS

1. Whenever a course or scheme of instruction is changed in a particular semester/year, two more examinations immediately following thereafter shall be conducted according to the old syllabus/regulations, provided the content in the course has changed more than 40%.

2. Candidates not appearing at the examinations or failing in them shall take the examination subsequently according to the changed syllabus/regulations.

XII. RANGE OF CREDITS

1. A regular student will be eligible to get an Under Graduate degree in Engineering if he/she secures the credits as specified in the Scheme of Instruction and Examinations.

   A lateral entry student shall be declared eligible to get an Under Graduate degree in Engineering if he/she

   i. Secures required credits as specified in the Scheme of Instruction and Examinations from Semester - III to Semester - VIII
   ii. Qualifies bridge courses and mandatory courses specified if anyduring Semester - I and Semester – II

XIII. MALPRACTICE AND AWARD OF PUNISHMENT

Schedule on the Nature of Malpractice and Award of Punishment

"Examination" inthis context refers to allthe papers taken bythe candidate onthe same hall-ticket.

MALPRACTICE AND AWARD OF PUNISHMENT

S. No	Malpractice	Award of Maximum Punishment
1	Possession of the prohibited (written or printed) papers, books, notes during the examination period but which were not used.	Shall be debarred from appearing at the subsequent papers of the examination apart from cancelling the result of the examination in which he/she had indulged in malpractice.
2	Matter relevant to the examination being written on any part of the body or on the clothes worn, or in the instrument, wrapping, etc.	-do-
3	Attempting to take help from any prohibited papers, notes, written or printed matter, writings on the walls, furniture and attempting to take help from or giving help to other regarding answer to any question or questions ofthe examination paper.	-do-

4	Taking help from or consulting of prohibited written or printed material; consulting and/or taking help from or helping other examinee during the examination period inside the examination hall or outside it; with or without their consent, or helping other candidate to receive help from anyone else.	-do-
5	An examinee who attempts to disclose his/her identity to the paper valuer by writing his/her roll number at a place other than the place prescribed for it, or by writing his/her name or any coded message or an examinee who makes an appeal to the paper valuer in the answer book.	Cancelling the result of that paper
6	Writing such as invocation of God's name in any form.	To be ignored
7	Writing on the question paper or other papers; the answer to questions, rough work, etc., with no intention of passing it on to another examinee.	To be warned not to do so.
8	Using abusive and obscene language in the answer book.	Cancellation of the result of that paper
9	Examinee allowing or destroying prohibited material found in his possession or acting in any other manner with a view to destroy evidence.	Cancellation of the result of all examinations taken or proposed to be taken during that session and prohibiting his/her admission to or continuation in any course for a period of one year.
10	Refusing to obey instructions of the Chief Superintendent/Invigilator.	Cancelling the result of that paper
11	Smuggling an answer book/additional answer book/ matter into or out of the examination hall.	Cancellation of the result of all examinations taken or proposed to be taken during that session and prohibiting his/her admission to or continuation in any course for a period of one year.

12	Inserting in or removing from the answer book/additional answer book of any sheet.	-do-
13	Substituting wholly or partly an answer book/additional answer book.	-do-
14	Impersonation even at a single examination.	To be dealt with as per law
15	Cases of examinees when conspiring to interchange in Roll Nos.	Cancellation of the result of all examinations taken or proposed to be taken during that session and prohibiting their admission to any course for a period of one year.
16	Creation of disturbance or otherwise misbehaving in and around the examination hall during or before the examination.	Cancelling the results of all examinations taken or proposed to be taken during that session and prohibiting admission in to or continuation in any course of study for a period of two years.
17	Guilty of assaulting/abusing intimidating any person connected with the examination work any time before, during or after the examination.	Cancelling the resultof all examinations taken or proposed to be taken during that session and the next session and prohibiting admission into or continuation in any course for a period of two years.
18	Punishments for malpractices not defined here would be recommended on the merits of the individual cases by the malpractices committee.	

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Annexure -I
Academic Regulations for B.E. with Minor program

From the academic year 2023-24 onwards MVSREC (Autonomous) has introduced a brand new Minor Degree program for the batch admitted in 2021-22 (First Autonomous Bath) to embark on a journey of exploration and expand their knowledge in cutting-edge fields like Data Science, AI&ML, Additive Manufacturing and design, IoT and Innovation & Entrepreneurship.

1. The **Bachelor of Engineering (B. E.) with Minor** program focuses on the fundamental principles of multiple Engineering disciplines, critical & analytical thinking and the ability to develop a distinctive approach to the interdisciplinary problems.

The key objectives ofoffering B.E. with Minor programare:

- To expand the domain knowledge of the students in one of the other branches of engineering.
- To increase the employ ability of under graduate students keeping in view of better opportunity in inter disciplinary areas of engineering &technology.
- To provide an opportunity to students to pursue their higher studies in the inter-disciplinary areas in addition to their own branch of study.
- To offer the knowledge in the areas which are identified as emerging Technologies/thrust areas of Engineering.

2. Minor courses and the offering Departments

S.No.	Minor Program	Eligible branch of students	@Offering Department	Award of Degree
1.	Artificial Intelligence & Machine Learning	All branches, except B.E. in IT, CSE and Allied branches	CSE	"B. E. in Branch name with Minor in Artificial Intelligence & Machine Learning"
2.	Cyber Security	All branches, except B. E inCSE & IT	CSE	"B. E. in Branch name with Minor in Cyber Security"
3.	Data Science	All branches, except B. E In IT, CSE and Allied branches	IT	"B.E.in branch name with Minor In Data Science"
4.	IOT	All branches, except B.E in ECE, CSE(IOT)	ECE	"B.E. in branch name with Minor in IOT"
5.	Innovation and Entrepreneurship	All branches.	Management Science /MBA	"B.E. in branch name with Minor in Innovation and Entrepreneurship"

6.	Sustainable Energy Engineering	All branches, except B.E in EEE	EEE	"B.E.in branch name with Minor in Sustainable Energy Engineering
7.	Construction Management & Administration	All branches, except B.E in Civil Engineering	Civil Engineering	"B.E.in branch name with Minor in Construction Management & Administration
8.	Additive Manufacturing and design	All branches, except B.E in Mechanical Engineering& Auto Mobile Engineering	Mechanical Engineering	"B.E.in branch name with Minor in3D Printing and Design
9.	Quantum Technologies	All branches, except B.E in ECE	ECE	"B.E.in branch name with Minor in Quantum Technologies"

B. Academic Regulations for B.E. Degree with Minor programs

1. The weekly instruction hours, internal & external evaluation and award of grades are on par with regular 4-Years B. E. program.
2. For B. E. with Minor, a student needs to earn additional 18 credits (over and above the required 160 credits for B. E degree). The list of courses of each Minor program, their respective credits weightage and semester-wise break- up of the courses are enclosed as Annexure. All these 18 credits need to be completed in III year and IV year only.
3. After registering for the Minor programme, if a student is unable to earn all the required 18 credits in a specified duration (n+2), he/she shall not be awarded Minor degree. However, if the student earns all the required 160 credits of B.E., he/she will be awarded only B. E degree in the concerned branch.
4. There is no transfer of credits from Minor program courses to regular B. E. degree course& vice versa.
5. These 18 credits are to be earned from the additional Courses offered by the host department in the college as well as from the MOOCS platform.
6. For the course selected under MOOCS platform following guidelines may be followed:

   a. Prior to registration of MOOCS courses, formal approval of the courses, by the University is essential. University before the issue of approval considers the parameters like the institute / agency which is offering the course, syllabus, credits, duration of the programme and mode of evaluation etc.

b. Minimum credits for MOOCS course must be equal to or more than the credits specified in the Minor course structure provided by the University.

c. Only Pass-grade/marks or above shall be considered for inclusion of grades in minor grade memo.

d. Any expenses incurred for the MOOCS courses are to be met by the students only.

7. The choice to opt/take a Minor program is purely on the choice of the students.

8. The student shall be given a choice of withdrawing all the courses registered and/or the credits earned for Minor program at any time; and in that case the student will be awarded only B. E. degree in the concerned branch on earning the required credits of 160.

9. The student can choose onlyone Minor program along with his/her basic engineering degree.

10. The B.E. with a Minor program shall be offered from the AY 2023-24 onwards. The students who are pursuing their III year I semester in the current academic year can register for the Minor program if they fulfill the eligibility criteria.

11. A student can graduate with a Minor if he/she fulfills the requirements for his/her regular B.E. program as well as fulfills the requirements for Minor program.

Note:-

i. The institute shall maintain a record of students registered and pursuing their Minor programs, program-wise and parent branch- wise. The same report will be sent to the University once the enrolment process is complete.

ii. The Institute / Department will prepare the time-tables for each Minor course offered without any overlap / clash with other courses of study in the respective semesters

5. Eligibility conditions for the student to register for Minor course

a) A student can opt for B.E. degree with Minor program if she/he has good academic record and must have min CGPA of 6.5 till II Year I Semester (III semester) at the time of entering into III year I semester.

b) Prior approval of mentor and Head of the Department for the enrolment into Minor program, before commencement of III year I Semester (V Semester), is mandatory

c) If more than 50% of the students in a branch fulfil the eligibility criteria (as stated above), the number of students given eligibility should be limited to 50%.

6. Registration for the courses in Minor Program

a) At the beginning of each semester, just before the commencement of classes, students shall register for the courses which they wish to take in that semester.

b) The students should choose a course from the list against each semester (from Minors course structure) other than the courses they have studied/registered for regular B.E. programme. No course should be identical to that of the regular B.E course. The students should take the advice of faculty mentors while registering for a course at the beginning of semester.

c) The maximum number of courses for the Minor is limited to two (three in case of inclusion of lab) in a semester along with regular semester courses.

d) The registration fee to be collected from the students by the College is Rs**. 1000/-** per one credit.

e) A fee for late registration may be imposed as per the norms.

B.E. (EEE) I – SEMESTER

S. No.	Course Code	Course Title	Scheme of Instruction				Scheme of Examination			Credits
			L	T	P/D	Contact Hrs/ week	CIE	SEE	Duration of SEE (Hr.)	
Theory Courses										
1	U25BSN01CH	Engineering Chemistry	3	-	-	3	40	60	3	3
2	U25BSN02MT	Calculus	3	1	-	4	40	60	3	4
3	U25ESN01CS	Programming for Problem Solving using C	3	-	-	3	40	60	3	3
4	U25ESN01EE	Basic Electrical Engineering	2	-	-	2	40	60	3	2
5	U25ESN01ME	Design Thinking	1	1	-	2	40	60	3	2
Practical/ Laboratory Courses										
6	U25BSN81CH	Engineering Chemistry Lab	-	-	3	3	25	50	3	1.5
7	U25BSN81MT	Computational Mathematics Lab	-	-	2	2	25	50	3	1
8	U25ESN81CS	Programming for Problem Solving using C Lab	-	-	3	3	25	50	3	1.5
9	U25ESN81EE	Basic Electrical Engineering Lab	-	-	2	2	25	50	3	1
10	U25ESN81CE	Engineering Graphics			3	3	25	50	3	1.5
Total			**12**	**2**	**13**	**27**	**325**	**550**	**-**	**20.5**

* **3 Weeks** induction program will be organized before commencement of the coursework of Semester – I

BS: Basic Science,
ES: Engineering Science
HS: Humanities and Social Sciences

L: Lecture
T: Tutorial
P: Practical
D: Drawing

CIE: Continuous Internal Evaluation
SEE: Semester End Evaluation

Note:

1. Each contact hour is a clock hour
2. The duration of the practical class is two hours, however it can be extended wherever necessary, to enable the student to complete the experiment.

Course Code	Course Title						Core / Elective
U25BSN01CH	**Engineering Chemistry (CSE, CSE-DS, IOT, AIML, CSIT, ECE, EEE, CE, MECH, IT)**						Core
Prerequisite	**Contact Hours per Week**				**CIE**	**SEE**	Credits
	L	**T**	**D**	**P**			
--	3	--	--	--	**40**	**60**	**3**

Course Objectives: Students will be able to

- Understand and apply fundamental concepts of electrochemistry including cell potentials, electrode systems, and potentiometric methods to solve engineering-related problems.
- Explain various energy sources and batteries, their construction, working principles, and applications, including fuel cells and chemical fuels relevant to engineering systems.
- Analyze the causes and mechanisms of corrosion and water chemistry parameters and evaluate methods for corrosion control and water treatment in engineering contexts.
- Describe molecular spectroscopy techniques and interpret spectral data to identify chemical substances and their properties relevant to engineering materials.
- Explain the chemistry, classification, and applications of engineering polymers, conducting polymers, and composite materials used in modern engineering fields.

Course Outcomes: On successful completion of the course, Students will be able to

- **Explain** and differentiate between electrolytic and galvanic cells, calculate cell potentials using Nernst equation, and determine pH using electrode systems in electrochemical analysis
- **Evaluate** the suitability of chemical fuels for engineering applications including environmental considerations and compare different types of batteries and fuel cells, analyze their working principles.
- **Describe** types and mechanisms of corrosion, **analyze** factors influencing corrosion and select prevention methods. Estimate various types of hardness of water and subsequent softening by ion exchange and reverse osmosis method.
- **Categorize** the ranges of electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques and apply Beer-Lambert's Law for the determination of concentration in chemical **analysis.**
- **Classify** polymers and composites based on their chemical and physical properties, **explain** conduction mechanisms in conducting polymers, and **evaluate** their engineering applications with examples.

Unit – I

Electrochemistry

Electrochemical Cells-Electrolytic and galvanic cells-notation. Cell Reaction and Cell EMF. Electrode potential, standard electrode potential. Electrochemical series and Applications. Nernst equation and its derivation, Applications -Numerical problems. Types of electrodes-Metal-metal insoluble salt electrode (Calomel electrode), Redox electrode (Quinhydrone) and Ion selective electrode (Glass electrode). Determination of pH using Quinhydrone electrode coupled with saturated Calomel electrode. Principles of potentiometric titrations

Unit – II

Energy Sources

Batteries: Definition, Types of batteries-Primary batteries; Zn-Carbon battery- Construction, working & applications. Secondary batteries; Construction, working & applications of Lead-acid, Lithium -ion batteries. Fuel Cell - Definition, Construction, Working and Applications of H_2-O_2 fuel cell.

Chemical fuels: Definition, Classification of chemical fuels based on occurrence and physical state with examples. Petroleum- Refining of crude petroleum. Cracking and its significance. Knocking, Octane Number and Cetane number. Composition, properties and uses of LPG and CNG. Blue hydrogen vs green hydrogen

Unit – III

Corrosion and Water Chemistry

Corrosion: Definition, Causes and effects. Types of corrosion - Chemical corrosion and its mechanism, Electrochemical corrosion and its mechanism. Galvanic corrosion, Concentration cell Corrosion-Waterline and Pitting corrosion. Factors affecting rate of corrosion. Corrosion control methods- Cathodic Protection –Sacrificial anode and impressed current cathode methods.

Water Chemistry: Hardness of water – Types- Units of hardness. Estimation of temporary and permanent hardness of water by EDTA method. Softening of water by Ion exchange process, Desalination of water by Reverse Osmosis. Specifications of potable water. Sterilization by Chlorination. Break-point chlorination.

Unit – IV

Molecular Spectroscopy

Regions of electromagnetic spectrum, Molecular spectroscopy.

Rotational Spectroscopy: Rotational spectra of rigid diatomic molecules – Principle, moment of inertia and energy expression (derivation not required) of a rotating rigid diatomic molecule, Energy level diagram. Selection Rules and applications.

Vibrational Spectroscopy (IR): Principle and types of Molecular Vibrations. IR spectra of diatomic molecules - simple and anharmonic oscillator, energy level diagram, selection rules and applications of IR spectroscopy.

Electronic Spectroscopy (UV-Visible Spectroscopy): Introduction to UV visible spectroscopy: Concepts of Chromophore, Auxochrome with examples. Bathochromic shift (Red shift), Hypsochromic shift (blue shift) Hyperchromic shift, Hypochromic shift. Types of electronic transitions. Allowed and forbidden transitions. Selection rule - Spin and Symmetry selection rule. Applications: Beer-Lamberts Law-derivation.

NMR Spectroscopy: Introduction to NMR Spectroscopy. Criteria for NMR activity (Magnetic and nonmagnetic nuclei), basic concepts and principle of ^1H NMR spectroscopy, Chemical shift, chemically equivalent & non-equivalent protons. Shielding and De-shielding. Applications of NMR

Unit – V

Engineering Materials

Polymers: Basic terminology - Polymer, Monomer and its functionality, and degree of polymerization. Types of Polymerizations - Chain Growth and Step Growth Polymerization with examples. Plastics, Fibers, Elastomers – Characteristics and Examples. Preparation, Properties &ss Uses of the following polymers - Bakelite, Kevlar, and Silicone Rubber.

Conducting polymers: Concept, Classification of conducting polymers with examples. Mechanism of conduction in Trans Poly-acetylene. Enhancement of conduction by p and n doping. Applications of conducting polymers.

Composite Materials: Concept, constituents of composites. Classification of composites based on matrix, reinforcement and ply. Advantages and applications of composites

Suggested Reading:

1. Sashi Chawla, Textbook of Engineering Chemistry, Dhanapathi Rai &sons, New Delhi.
2. O.G. Palanna, Engineering Chemistry, TMH Edition.
3. Puri, Sharma and Pathania, Principles of Physical Chemistry, Vishal Publishing Co.
4. Gowariker, Polymer chemistry.
5. C.N. Banwell, Fundamentals of Molecular Spectroscopy, McGraw Hill Publication.
6. Y. R. Sharma, Fundamentals of Spectroscopy Shikha Agarwal, Engineering Chemistry fundamentals and applications, Cambridge University press.

Course Code	Course Title						Core / Elective
U25BSN02MT	**Calculus (Common to All Branches)**						Core
Prerequisite	**Contact Hours per Week**				**CIE**	**SEE**	Credits
	L	**T**	**D**	**P**			
Basics in differentiation, integration and vector algebra	3	1	--	--	**40**	**60**	**4**

Course Objectives: Students will be able to

- Solve problems using mean value theorems, curvature concepts, evolutes, and Taylor's and Maclaurin's series to study and approximate functions.
- Apply partial differentiation and total derivative concepts to analyze functions of several variables and determine their local maxima and minima.
- Determine multiple integrals and apply vector differential operators to scalar and vector point functions.
- Apply integral theorems to evaluate line, surface, and volume integrals.
- Make use of Beta and Gamma functions to evaluate definite integrals.

Course Outcomes: On successful completion of the course, Students will be able to

- Solve problems based on the mean value theorems, radius of curvature, evolutes, Taylor's & Maclaurin's series.
- Solve problems based on partial derivatives, Taylor's series and maxima and minima of functions for two or more variables arising in engineering problems.
- Determine double and triple integrals of various functions and apply vector differential operator to scalar and vector point functions
- Solve problems involving line, surface, and volume integrals using Green's, Stokes', and Gauss' theorems.
- Apply Beta and Gamma functions to evaluate definite integrals

UNIT-I

Differential Calculus: Rolle 's Theorem, Lagrange's mean value theorem, Cauchy's mean value theorem(without proofs) and their applications, Taylor's and Maclaurin's series, Curvature, Radius of curvature(Cartesian form),Centre of Curvature, Evolute and Involutes. (12 hours).(CO1)

UNIT-II

Multivariable Calculus: Functions of two variables, partial derivatives, total differentials and total derivastives, derivatives of composite and implicit functions (chain rule), Jacobian, Taylor's series for functions of two variables, maxima and minima of functions of two variables, Lagrange's method of undetermined multipliers.(11 hours)(CO2)

UNIT-III

Multiple Integrals and Vector Differentiation: Double integrals and Triple integrals(Cartesian),Scalar and vector point functions, Vector operator del, Gradient, Unit normal vector, Directional derivative, Angle between surfaces, Divergence, Solenoidal vector, Curl, Irrotational vector.(12 hours) (CO3)

UNIT-IV

Vector Integration: Line integral-work done, Surface integral, Volume integral, Stokes' theorem, Green's theorem in a plane, Gauss divergence theorem(without proofs) and their verifications. (11 hours)(CO4)

UNIT-V

Special Functions: Gamma function, Beta function, properties of Gamma and Beta functions, relation between Beta and Gamma functions, evaluation of definite integrals using Beta and Gamma functions.(10 hours)(CO5)

Prescribed text books:

1. R. K. Jain & S. R. K. Iyengar, Advanced Engineering Mathematics, Narosa Publications, 5th Edition 2016.
2. B. S. Grewal, Higher Engineering Mathematics, Khanna Publications, 44thEdition,2018.

Suggested Readings:

1. B.V. Ramana, Higher Engineering Mathematics, 23rd reprint,2015.
2. N. P. Bali, M. Goyal, A text book of Engineering Mathematics, Laxmi publications,2010
3. Erwin Kreyszig, Advanced Engineering Mathematics, John Wiley, 9th Edition, 2012.
4. Calculus and Analytic Geometry by George B. Thomas Jr. and Ross L. Finney.
5. Calculus: One -Variable Calculus with An Introduction to Linear Algebra, Vol 1 by Tom M. Apostol.
6. Schaum's outlines Vector Analysis by Murray R, Spiegel, Second Edition.

Course Code	Course Title						Core / Elective
U25ESN01CS	**Programming for Problem Solving using C**						Core
Prerequisite	**Contact Hours per Week**				**CIE**	**SEE**	Credits
	L	**T**	**D**	**P**			
Basics of Arithmetic and Logical Problem Solving	3	--	--	--	**40**	**60**	**3**

Course Objectives: Students will be able to

- To impact basic knowledge about simple algorithms for arithmetic and logical problems.
- To enable them how to implement conditional branching and Iteration
- To understand how to decompose a problem into functions and synthesize a complete program.
- To enable them to use arrays, pointers, strings and structures in solving problems.
- To make them understand the use of files to perform read and write operations.

Course Outcomes: On successful completion of the course, Students will be able to

- Draw flowcharts and write algorithms to solve programming problems.
- Demonstrate the principles of structural programming to design solutions.
- Apply the concepts of control structures, sorting techniques and functions to produce a better program.
- Analyze programming problems to choose among arrays, strings, executing recursive functions and store data using structures.
- Understand concepts of pointers and applications of files.

UNIT I

Introduction to computers: Introduction to components of a computer system, Operating system

Number system: Decimal, binary, octal, hexa decimal systems.

Algorithms/Flowcharts: Logical and Numerical problem solving Unit II

Introduction to C Programming: Structure of C, Execution phases in C (Compiler, interpreter, Linker, loader), C-tokens, syntax and semantics in compilation, Identifiers, variables, keywords, Data Types, Operators, precedence and associativity rules, Expression evaluation, Type conversion.

Selection statements: simple if, if-else, else-if ladder, nested if-else, switch.

Iteration statements: while, do-while, for, Unconditional statements: break, continue, goto, return

UNIT- II

Arrays: 1-D arrays, Searching Techniques- Linear Search and Binary search, Sorting algorithms-Bubble sort and selection sort

2-D arrays: Matrices- Matrix addition and subtraction, Matrix multiplication, Transpose of a matrix.

UNIT-III

Functions: Taxonomy of functions, built-in functions, parameter passing techniques- call by value, call by reference, Passing arrays to functions.

Recursion: Definition Iteration vs Recursion, Example programs: GCD, Factorial, sum of digits, Fibonacci

Storage classes: auto, register, static, extern

UNIT-IV

Structures: Defining and accessing structured data, Array of structures, passing structure to function, nested structures, Difference between structure and union

Pointers: Introduction to pointers, Defining pointers, pointer arithmetic, Null pointer, generic pointer, double pointers, passing pointer to function- call by address, Accessing structure using pointer, self- referential structure, Dynamic memory allocation.

UNIT-V

Strings: Definition and Declaration, Pre-defined string functions, user-defined string functions- length, copy, concatenation, reverse, comparision

Preprocessor directives: Macros, #define, #if, #elif

File Handling: Introduction, File operations, File modes, read/write operations on a file

Text Books:

1. Jeri R. Hanly and Elliot B.Koffman, “Problem solving and Program Design in C” 7th Edition, Pearson
2. B.A. Forouzan and R.F. Gilberg “Computer Science A structured programming approach using C,”Cengage Learning, (3rd Edition)

Reference Books:

1. “C How to program” by Paul Deitel & Harvey Deitel 7th edition,PHI
2. “Computer Fundamentals and Programming in C” - A.K. Sharma,Universities Press,2nd edition,2018
3. “Programming in ANSI C” - E. Balagurusamy, TMH, 2008
4. Byron Gottfried - “Theory and practice of Programming with C”, Schaum‟s Outline McGrawHill,1990
5. Programming in C”- Pradip Dey,Manas Ghosh, Oxford University Press, 2nd edition
6. Brian W Kernighan and Dennis M Ritchie, “The C programming Language”, Prentice Hall of India,1988

Course Code	Course Title						Core / Elective
U25ESN01EE	**Basic Electrical Engineering (Common to All Branches)**						Core
Prerequisite	**Contact Hours per Week**				**CIE**	**SEE**	Credits
	L	**T**	**D**	**P**			
--	2	--	--	--	**40**	**60**	**2**

Course Objectives: Students will be able to

- Provide an understanding of basics in Electrical circuits.
- Explain the working principles of Electrical Machines.
- Get overview of basic electrical installations and calculation of energy consumption

Course Outcomes: On successful completion of the course, Students will be able to

- Analyze DC circuits and apply network theorems.
- Define ac quantities and analyze AC circuits
- Illustrate the construction, operation and performance of DC Machines.
- Comprehend the construction and working principles of AC machines.
- Identify electrical safety, installation and measure energy consumption.

UNIT – I

DC Circuits: Electrical Circuit Elements (R, L and C), Ohms Law, Kirchhoff's current and voltage Laws, series and parallel circuits with DC excitation, Superposition, Thevenin and Norton Theorems (Elementary treatment)

UNIT-II

AC Circuits: Introduction to Alternating Current Basic definitions – *rms* and average values, real power, reactive power, apparent power, power factor, Analysis of Single-phase AC circuits consisting of R, L, C, and RL, RC, RLC combinations (series only) (Elementary treatment).

UNIT-III

DC Machines: Faraday's Laws, Fleming's right-hand and left-hand rules, Construction.
DC Generators: working principle, types, magnetization characteristics of separately DC generator, applications.
DC Motors: types, applications and DC shunt motor working principle (Elementary treatment)

UNIT - IV

AC Machines: Transformer: working principle, *emf* equation, losses and efficiency.
Three phase Induction Motor: construction and working principle only
Single-phase induction motor: working of Capacitor start & capacitor run motor only, applications.

UNIT – V

Electrical Safety & Installations: Fuses, MCB, Earthing, Wires and Cables.

Energy consumption: Calculations, Tariff: simple and two-part tariff

Text Books:

1. Hughes, “Electrical Technology", VII Edition, International Student-on, Addison Welsey Longman Inc., 1995.
2. J.B. Gupta, “Fundamentals of Electrical Engineering and Electronics” S.K. Kataria & Sons Publications, 2002.
3. Naidu and Kamakshaiah, “Introduction to Electrical Engineering”, McGraw Hill, 2017

Reference Books:

1. N. K. De, “Basic Electrical Engineering”, Universities Press, 2015.
2. Satish Kumar Peddapelli, G. Sridhar, “Electrical Machines – A Practical Approach”, De Gruyter Publications, 2020.

e-learning resources:

1. Fundamentals of Electrical Engineering - Course - NPTEL
2. Basic Electrical Science, Welcome to Virtual Labs
3. Electrical Circuits Virtual Lab by Amrita Vidyapeet, Welcome to Virtual Labs

Course Code	Course Title						Core / Elective
U25ESN01ME	**Design Thinking (Common to All Branches)**						Core
Prerequisite	**Contact Hours per Week**				**CIE**	**SEE**	Credits
	L	**T**	**D**	**P**			
--	1	1	--	--	**40**	**60**	**2**

Course Objectives: Students will be able to

- To enable students to understand and apply the principles, mindsets, and methods of Design Thinking for identifying user-centered problems and developing innovative, practical solutions through iterative processes.

Course Outcomes: On successful completion of the course, Students will be able to

- Understand the scope, importance, and human-centered philosophy of design thinking in innovation and problem-solving.
- Apply key design thinking mindsets such as empathy, creativity, and iteration in real-world contexts.
- Utilize tools for empathy and ideation including user interviews, journey maps, brainstorming, and mind mapping to generate innovative solutions.
- Develop and test functional and visual prototypes using appropriate methods and evaluate through user and environmental testing.
- Motivate to apply design thinking process to address real-world challenges.

Unit I:

Need of design thinking: Introduction to design thinking, definition, scope, and importance in innovation.

Key mindsets: empathy, optimism, embracing ambiguity, learning from failure, iteration, creativity.

Design thinking methodology: Empathize, Define, Ideate, Prototype, and Test with relevant examples.

Unit II:

Empathy and define phase Introduction to empathy, empathy in design thinking, role of empathy in the development of successful products.

Tools for mastering empathy: Beginners mindset, exploratory interviews, observations, empathy mapping, journey mapping.

Define phase: Framing the problem, HMW technique, storytelling, context mapping.

Unit III:

Ideation and tools for innovation: Introduction to ideation, significance of ideation stage, ideation requirements.

Ideation techniques: Brainstorming, worst idea technique, SCAMPER technique, lotus blossom technique, crazy 8 technique, evaluating ideas using SWOT analysis.

Unit IV:

Prototyping and testing: Introduction to prototyping, purpose and role in validating ideas and concepts.

Types of prototypes: Low fidelity prototyping, high fidelity prototyping, pointers for effective prototyping, critical experience prototype, critical function prototype.

Testing: Introduction, tools for testing, testing sheet, feedback capture grid, A/B testing.

Unit V:

Reflection and execution: Introduction to reflection, tools for reflection

Execution: Introduction, implementation phase, tools for implementing DT solution, scaling up and growth.

Sample case studies: Redesigning the ATM experience – IDEO case study, Hero Motor corp–Hero app, Asian paint–customer centric strategy, Apple–innovative product, Uber, Flipkart–improved customer experience, design thinking at Godrej, Tata Group, Havells–Ceiling fan development, Oral B's electric tooth brush.

Textbooks:

1. Shalini Rahul Tiwari, Rohit Rajendra Swarup, *Design thinking, A comprehensive textbook*, Wiley India Pvt Ltd, 1st ed., 2024.
2. Pavan Soni, *Design Your Thinking: The Mindsets, Toolsets and Skill Sets for Creative Problem-solving*, Penguin Random House India Pvt. Ltd., 1st ed., 2020.
3. David Lee, *Design Thinking in the Classroom*, Ulysses Press, Korea, 1st ed., 2018.

Reference books:

1. Prof. B. K. Chakravarthy, *Introduction to Design Thinking*, IDC School of Design, IIT Bombay, NPTEL Course / Supplementary Text.
2. Tim brown, *Change by Design: How Design Thinking Transforms Organizations and Inspires Innovation*, Harper Business, 5th ed. 2019.

Course Code	Course Title						Core / Elective
U25BSN81CH	**Engineering Chemistry Lab (CSE, CSE-DS, IOT, AIML, CSIT, ECE, EEE, CE, MECH, IT)**						Core
Prerequisite	**Contact Hours per Week**				**CIE**	**SEE**	Credits
	L	**T**	**D**	**P**			
--	--	--	--	3	**25**	**50**	**1.5**

Course Objectives: Students will be able to

- To enable students to **perform titrimetric estimations** such as permanganometry, dichrometry, and EDTA methods accurately for quantitative chemical analysis.
- To develop the ability to **effectively operate and interpret** results from potentiometric, conductometric, and pH metric techniques for analyzing acid-base and redox systems.
- To train students to **Validate** Beer-Lambert's law and apply spectroscopic techniques (Colorimetry) to determine concentrations of colored solutions.
- To develop competence in **measuring physical properties** like viscosity and surface tension of liquids using appropriate laboratory apparatus and methods.
- To provide practical experience in **electrochemical processes** such as electro-deposition and to understand their industrial applications.

Course Outcomes: On successful completion of the course, Students will be able to

- **Perform** volumetric and titrimetric analysis including permanganometry, dichrometry, and EDTA titration to estimate the concentration of the metal ions and Hardness in water with accuracy.
- **Operate** potentiometric, conductometric, and pH metry setups to determine concentrations of acids, bases, and redox species in single and mixed solutions.
- **Verify** the Beer-Lambert law experimentally and **estimate** concentrations of colored compounds using colorimetric analysis techniques.
- **Measure** viscosity and surface tension of liquids using Oswald's viscometer and stalagmometer and **interpret** the results in terms of liquid properties.
- **Demonstrate** electro-deposition of metals through electrolysis and **explain** its principle and applications in engineering processes.

List of experiments

1. Estimation of Fe (II) by Permanganometry.
2. Estimation of Fe (II) by Dichrometry.
3. Estimation of hardness of water by EDTA method.
4. Estimation of HCl by Potentiometry.
5. Potentiometric estimation of Iron Fe (II) by Permanganometry.
6. Estimation of HCl by Conductometry.
7. Estimation of $CH_3COOH$by Conductometry.

8. Estimation of HCl & CH_3COOH in mixture by Conductometry.
9. Estimation of HCl by pH metry.
10. Verification of Beer-Lamberts Law and estimation of Manganese in $KMnO_4$ by Colorime
11. Determination of viscosity of liquids using Oswald's viscometer
12. Determination of Surface tension by using Stalagmometer.
13. Electro deposition of Cu by electrolysis. (For demonstration)

Reference Books:

1. Vogel's textbook of Practical organic chemistry, 5thEdition.
2. Senior Practical Physical Chemistry, B.D. Khosala, A. Gulati and V. Garg (R. Chand &Co.,Delhi)
3. Textbook on experiments and Calculations in Engineering Chemistry-S.S.Dara.
4. An introduction to practical chemistry, K.K. Sharma and D.S. Sharma (Vikas Publications, NewDelhi)
5. Laboratory manual on Engineering Chemstry,S.K.Bhasin& Sudha Rani (Dhanpat Rai Publishing Company)

Course Code	Course Title						Core / Elective
U25BSN81MT	**Computational Mathematics Lab (Common to All Branches)**						Core
Prerequisite	**Contact Hours per Week**				**CIE**	**SEE**	Credits
	L	**T**	**D**	**P**			
Basics of matrices, differentiation, integration and vector algebra	--	--	--	2	**25**	**50**	**1**

Course Objectives: Students will be able to

- Demonstrate proficiency in using the MATLAB environment and its interface for solving technical computing problems.
- Explain Matrix fundamentals and calculate eigenvalues and eigenvectors.
- Solve algebraic, system of linear equations and linear differential equations using MATLAB.
- Utilize MATLAB's symbolic and mathematical tools to evaluate partial derivatives and multiple integrals.
- Apply vector differential operators to scalar and vector point functions.
- Develop and visualize mathematical functions using 2D and 3D plotting techniques in MATLAB.

Course Outcomes: On successful completion of the course, Students will be able to

- Demonstrate proficiency in using the MATLAB environment and its interface for solving technical computing problems.
- Calculate determinant, rank, Eigen values, Eigen vectors of a matrix.
- Solve algebraic, system of linear equations and linear differential equations using MATLAB LAB.
- Determine first, higher order partial derivatives and multiple integrals of various functions using MATLAB.
- Apply vector differential operator to scalar and vector point functions using MATLAB.
- Create and interpret 2D and 3D plots to represent mathematical functions and data using MATLAB's visualization tools

List of Programs:

1. Introduction and Basic operators of MATLAB/ SCI LAB. (CO1)
2. Finding roots of algebraic equation.(CO3)
3. Determinant and Rank of matrices.(CO2)
4. Solving system of linear equations using matrices.(CO3)
5. Eigenvalues and Eigenvectors.(CO2)
6. Solution of first order linear differential equations.(CO3)
7. Solution of second order linear homogeneous differential equation with constant coefficients.(CO3)

8. Evaluating multiple integrals.(CO4)
9. First and Higher Order Partial Derivatives.(CO4)
10. Gradient of Scalar Point Functions.(CO5)
11. Divergence and curl of a Vector Point Functions.(CO5)
12. Data plotting for 2D and 3D.(CO6)

Suggested reading:

Computational Mathematics Lab Manual.

Course Code	Course Title						Core / Elective
U25ESN81CS	**Programming for Problem Solving using C Lab**						Core
Prerequisite	**Contact Hours per Week**				**CIE**	**SEE**	Credits
	L	**T**	**D**	**P**			
Basic and Mathematical Problem Solving Skills	--	--	--	3	**25**	**50**	**1.5**

Course Objectives: Students will be able to

- Introduce the basic concepts of Computing environment, number systems Algorithms and flowcharts.
- Familiarize the basic constructs of C-Language – data types, operators and expressions.
- Understand modular and structured programming constructs in C.
- Learn the usage of structured data types and memory management using pointers.
- Apply the C – Programming for file Handling Operations.

Course Outcomes: On successful completion of the course, Students will be able to

- Design, implement, test and debug simple programs in the Linux environment.
- Design solutions by selecting appropriate control structures.
- Formulate modular programs using iterative and recursive functions.
- Develop programs applying structured programming concepts using arrays, strings, structures.
- Write programs to implement file handling operations.

List of Programs

1. Write a C program to demonstrate roots of a quadratic equation
2. Write a C program to find the maximum of 3 given integers
3. Write a C program to implement arithmetic calculator using switch
4. Write a C program to check whether entered year is a leap year or not
5. Write a C program to check if given number is armstrong number or not
6. Write a C program to convert decimal number to binary number
7. Write a C program to convert binary number to decimal number
8. Write a C program to demonstrate linear search
9. Write a C program to demonstrate binary search
10. Write a C program to demonstrate bubble sort
11. Write a C program to demonstrate selection sort
12. Write a C program to demonstrate matrix addition and subtraction
13. Write a C program to demonstrate matrix multiplication
14. Write a C program to demonstrate transpose of a matrix
15. Write a C program to demonstrate Call by Value.

16. Write a C program to demonstrate Call by Reference.
17. Write a C program to find factorial of a given number using recursion
18. Write a C program to find gcd of 2 given numbers using recursion
19. Write a C program to find sum of digits of a given number using recursion
20. Write a C program to display Fibonacci series using recursion
21. Write a program to display student details using structure
22. Write a program to display employee details using union
23. Write a C program to demonstrate pointer arithmetic operations
24. Write a C program to demonstrate pre-defined string functions
25. Write a C program to demonstrate a user-defined function for displaying reverse of a given string
26. Write a C program to demonstrate read and write operation on file

Course Code	Course Title						Core / Elective
U25ESN81EE	**Basic Electrical Engineering Lab (Common to All Branches)**						Core
Prerequisite	**Contact Hours per Week**				**CIE**	**SEE**	Credits
	L	**T**	**D**	**P**			
--	--	--	--	2	**25**	**50**	**1**

Course Objectives: Students will be able to

- To impart the practical knowledge and analysis of electrical circuits, theorems and transformers.
- To impart the practical knowledge on testing of DC and AC Machines and the usage of common electrical measuring instruments.

Course Outcomes: On successful completion of the course, Students will be able to

- Get an exposure to common electrical components and their ratings.
- Analyze the performance of DC and AC Circuits.
- Analyze the performance of DC and AC Machines.
- Comprehend the usage of common electrical measuring instruments.
- Test the basic characteristics of transformers and electrical machines.

Suggested List of Laboratory Experiments/ Demonstrations:

1. Demonstration of Basic safety precautions. Introduction and use of Real-life resistors, capacitors and inductors.
2. Demonstration of cut-out sections of machines: DC machine, induction machine (squirrel-cage rotor) and single-phase induction machine
3. Introduction and use of measuring instruments–voltmeter, ammeter, multi-meter, wattmeter and 1-phase energy meter,
4. Verification of KVL and KCL with DC excitation.
5. Verification of Superposition theorem with DC excitation.
6. Verification of Thevenin's theorem with DC excitation.
7. Sinusoidal steady state response of R-L, and R-C circuits.
8. Load test on a single-phase transformer.
9. Magnetization Characteristics of separately excited DC Generator
10. Brake Test on DC Shunt Motor.
11. Determination of Slip for Two & Four Pole 3-Phase Induction Motors.
12. Demonstrate Earthing Procedure
13. Wiring connection for 2-way switch.

Note: Minimum eight experiments should be conducted in the semester

Text Books:

1. Hughes, “Electrical Technology", VII Edition, International Student-on, Addison Welsey Longman Inc., 1995.
2. J.B. Gupta, “Fundamentals of Electrical Engineering and Electronics” S.K. Kataria & Sons Publications, 2002.
3. Naidu and Kamakshaiah, “Introduction to Electrical Engineering”, McGraw Hill, 2017

Reference Books:

1. N. K. De, “Basic Electrical Engineering”, Universities Press, 2015.
2. Satish Kumar Peddapelli, G. Sridhar, “Electrical Machines – A Practical Approach”, De Gruyter Publications, 2020.

e-learning resources:

1. Fundamentals of Electrical Engineering - Course - NPTEL
2. Basic Electrical Science, Welcome to Virtual Labs
3. Electrical Circuits Virtual Lab by Amrita Vidyapeet, Welcome to Virtual Labs

Course Code	Course Title						Core / Elective
U25ESN81CE	**Engineering Graphics**						Core
Prerequisite	**Contact Hours per Week**				**CIE**	**SEE**	Credits
	L	**T**	**D**	**P**			
--	--	--	--	3	**25**	**50**	**1.5**

Course Objectives: Students will be able to

- Apply principles of engineering graphics to interpret and create 2D engineering drawings manually and using CAD tools s
- Construct accurate geometrical curves like cycloids and involutes used in mechanical components
- Use AutoCAD software for 2D drafting tasks and understand the coordinate system used in CAD
- Generate isometric projections from orthographic views and vice versa for better spatial understanding

Course Outcomes: On successful completion of the course, Students will be able to

- Understand the basic principles of engineering drawing and computer-aided drafting (CAD).
- Develop skills to visualize and represent geometrical objects using 2D projections.
- Learn orthographic projections of points, lines, planes, and solids.
- Gain proficiency in AutoCAD software for drafting and designing.
- Understand and apply isometric projections and views for engineering communication

Sheet No	Description of the Topic
1	Principles of Engineering Drawing and their significance, usage of drawing instruments.
2	**Conic Sections – I:** Introduction to conic sections – General method.
3	**Conic Sections – II: C**onic sections –special methods.
4	**Cycloids** & **Involutes:** Simple cycloids & Involutes (square, circle)
5	**Scales:** Introduction to scales, plain scales
6	**Introduction to AutoCAD:** Basic commands and Coordinate system in AutoCAD
7	**Orthographic Projection:** Quadrant system and projections of points.
8	**Projections of straight lines:** Simple positions and inclined to one plane.

9	**Projections of planes:** Introduction, Simple positions and inclined to one plane.
10	**Projections of planes:** Introduction, Simple positions and inclined to one plane (AutoCAD)
11	**Projections of solids:** Introduction, Simple positions.
12	**Projection of solids:** AutoCAD and inclined to one plane.
13	**Projection of solids:** AutoCAD and inclined to one plane.
14	**Isometric projection:** Isometric views & projections – planes & solids

Suggested Readings:s

1. Bhatt, N. D., Panchal, V. M., & Ingle, P. R. (2014). Engineering Drawing. Anand: Charotar Publishing House.

2. Shah, M. B., & Rana, B. C. (2008). Engineering Drawing and Computer Graphics. New Delhi: Pearson Education.

3. Lal, S. N. (2018). Engineering Drawing with Introduction to AutoCAD. New Delhi: Cengage Learning India
Pvt. Ltd.

4. Agrawal, B., & Agrawal, C. M. (2012). Engineering Graphics. New Delhi: Tata McGraw-Hill Publishing.

5. Narayana, K. L., & Kannaiah, P. (2008). Textbook on Engineering Drawing. Chennai: Scitech Publishers.

6. CAD Software. (n.d.). Corresponding set of CAD Software Theory and User Manuals.

B.E. (EEE) II – SEMESTER

S. No.	Course Code	Course Title	Scheme of Instruction				Scheme of Examination			Credits
			L	T	P/D	Contact Hrs/ week	CIE	SEE	Duration of SEE (Hr.)	
Theory Courses										
1	U25BSN01PH	Engineering Physics	3	-	-	3	40	60	3	3
2	U25BSN01MT	Matrices and Ordinary Differential Equations	3	1	-	4	40	60	3	4
3	U25ESN02CS	Programming for Problem Solving using Python	2	-	-	2	40	60	3	2
4	U25HSN01EG	Basic English Language Skills	2	-	-	2	40	60	3	2
5	U25HSN02EG	Universal Human Values	3	-	-	3	40	60	3	3
Practical/ Laboratory Courses										
6	U25ESN84ME	Workshop & Digital Fabrication Lab	-	-	3	3	25	50	3	1.5
7	U25BSN81PH	Engineering Physics Lab	-	-	3	3	25	50	3	1.5
8	U25ESN82CS	Programming for Problem Solving using Python Lab	-	-	3	3	25	50	3	1.5
9	U25HSN81EG	English Communication Skills Lab	-	-	2	2	25	50	2	1
Total			**13**	**1**	**11**	**25**	**300**	**500**	**-**	**19.5**

* **3 Weeks** induction program will be organized before commencement of the coursework of Semester – I

BS: Basic Science,
ES: Engineering Science
HS: Humanities and Social Sciences

L: Lecture
T: Tutorial
P: Practical
D: Drawing

CIE: Continuous Internal Evaluation
SEE: Semester End Evaluation

Note:

1. Each contact hour is a clock hour
2. The duration of the practical class is two hours, however it can be extended wherever necessary, to enable the student to complete the experiment.

Course Code	Course Title						Core / Elective
U25BSN01PH	**Engineering Physics (COMMON TO CSE, CIV, MECH, EEE, IT, ECE, CSE-AIML, DS, IOT, CSIT)**						Core
Prerequisite	Contact Hours per Week				CIE	SEE	Credits
	L	T	D	P			
-	3	-	-	-	**40**	**60**	**3**

Course Objectives: Students will be able to

- Understand the fundamental concepts of semiconductors and semiconductor devices.
- Introduce the types of materials, their properties for engineering applications.
- Explain the principle of Laser technology, Optical fibers and their applications in various disciplines.
- Familiarize the principles of Quantum mechanics and its Computational techniques.
- Summarize the basic concepts of Nanoscience and Nanotechnology.

Course Outcomes: On successful completion of the course, Students will be able to

- Build a foundation for further studies in electronics and their device applications.
- Identify and describe the properties of materials used in various disciplines in Engineering.
- Summarize different types and applications of Laser sources and Optical fibers.
- Describe the principles of Quantum Mechanics and the concepts of Quantum Computing.
- Analyze Nanomaterials, their preparation methods, Applications and contrast their Characterization techniques.

UNIT-I
SEMICONDUCTOR PHYSICS AND DEVICES

Origin of energy bands in solids, Classification of Solids into Conductors, Semiconductors and Insulators based on energy gap, Intrinsic semiconductors & Extrinsic semiconductors - Expressions for Carrier concentration and conductivity in intrinsic semiconductors , Direct and Indirect band gap semiconductors, Hall effect and its applications, P-N junction diode, LED, QLED, Solar Cell,.

UNIT-II
MATERIALS IN ENGINEERING

Dielectrics-Basic definitions - Dielectric Constant, Polarization Vector, Polarizability, Electric flux density, Electric Susceptibility. Various polarization Processes- Electronic, Ionic, Orientation and Space charge polarizations (Qualitative), Ferroelectricity, Piezoelectricity, Classification of Magnetic materials- Dia, Para, Ferro, Anti-ferro and Ferri-magnetic materials, Magnetic Domains, Weiss molecular field theory of ferromagnetism, Hysteresis curve, Soft and Hard magnetic materials, Multiferroics and its applications, Superconductors and their properties, Meissner effect, Type-I and Type-II Superconductors, Applications of Superconductors.

UNIT-III
MODERN OPTICS

LASERS- Introduction, Characteristics of Lasers, Three quantum processes (Absorption, Spontaneous and Stimulated emissions), Metastable state, Population inversion, Components of LASER system, Types of LASERS- Ruby LASER, He-Ne LASER, Applications of LASERs. Introduction to Optical fiber, Basic Principle-Total internal reflection, Propagation of light through optical fiber – Expression for Numerical Aperture and Acceptance angle, Types of Optical fibers based on refractive index profile and modes of propagation- Step-Index and Graded- Index optical fibers, Losses in Optical Fibers, Sensor Applications of Optical fibers.

UNIT-IV
QUANTUM PHYSICS AND QUANTUM COMPUTATION

De-Broglie hypothesis, Davisson-Germer's experiment, Wave function and its physical significance, Schrodinger's time independent wave equation, Schrodinger's time dependent wave equation, Particle in One dimensional potential box- Energy and Wave functions, Introduction to Quantum computing, Ideas of Classical bits and Quantum bits, Basics of Quantum gates- Hadamard and CNOT, No-Cloning theorem (Qualitative), Quantum teleportation and Applications of Quantum computing.

UNIT –V
NANOTECHNOLOGY

Origin of Nano Science- Bulk, Thin films and Nano materials, Surface to volume ratio and Quantum confinement effect, properties of nanomaterials, fabrication of nanomaterials; Top-down approach- Ball milling method and Bottom-up approach- Sol-Gel method, Elementary ideas of Carbon nanotubes (CNT'S), Applications of nanomaterials, Materials characterization techniques-X-ray Diffraction, Scanning Electron Microscope and Transmission Electron Microscope , X-ray photoelectron spectroscopy and their applications.

Suggested books:

1. M.S. Avadhanulu and P.G. Kshirasagar, A text book Engineering Physics, S. Chand and Co.9th edition, 2010.
2. R.K. Gaur and S.L. Gupta, Engineering Physics, Dhanpat Rai publications, 8th edition, 2001.
3. B.K. Pandey and S. Chaturvedi, Engineering Physics, Cenage Learning India(P) Ltd., 2012
4. R. Murugesan and K. Sivaprasath, Modern Physics, S. Chand & Company, 13th edition, 2007.
5. A.K. Bandhopadya, Nano Materials, New Age International, 1st edition, 2007.
6. Enginerign Physics by Armugam
7. Engineering Physics by K.J. Pratap, et. al.
8. Nielson M.A., I.L.Chung, Quantum Computation and Quantum Information, Cambridge University Press
9. Principles of Quantum Computation and Information by G.Benenty, G.Casati, G.Strini:World Scientific.

Course Code	Course Title						Core / Elective
U25BSN01MT	**Matrices and Ordinary Differential equations (Common to All branches)**						Core
Prerequisite	Contact Hours per Week				CIE	SEE	Credits
	L	T	D	P			
Basics in Matrices, differentiation and integration	3	1	-	-	**40**	**60**	**4**

Course Objectives: Students will be able to

- Apply the concepts of linear algebra to solve systems of linear equations using rank, LU decomposition method
- Solve eigenvalue problems, and interpret quadratic forms in the context of engineering problems.
- Solve first and second order ordinary differential equations, and apply them to model physical and engineering applications.

Course Outcomes: On successful completion of the course, Students will be able to

- Apply the concept of rank to determine the consistency of system of linear equations, LU decomposition method.
- Determine eigenvalues and eigenvectors of matrices, apply the Cayley-Hamilton theorem and quadratic forms to solve mathematical problems.
- Solve first-order ordinary differential equations using standard methods, and interpret their solutions in engineering applications.
- Solve ordinary linear differential equations of higher order with constant coefficients
- Apply Laplace and inverse Laplace transforms to solve linear differential equations with initial conditions.

Unit- I

Matrices: Rank of a matrix, Elementary Row/Column operations, Echelon form, LU decomposition, Linear dependence and independence of vectors, System of homogeneous linear equations, System of non- homogeneous linear equations,(10 hours).(CO1)

Unit-II

Eigenvalues and Eigenvectors: Eigenvalues, Eigenvectors, properties of Eigenvalues, Cayley -Hamilton theorem (without proof), Quadratic forms, Reduction of quadratic form to canonical form by orthogonal transformation, Rank, Index, Signature and Nature of quadratic forms. (12 hours)(CO2)

Unit-III

Ordinary Differential Equations of First Order: Exact differential equations, Integrating factors, Linear differential equation, Bernoulli's and Riccati's equation. Applications of first order differential equations - Orthogonal trajectories of a given family of curves(Cartesian form), Newton's Law of Cooling. Picard's theorem(without proof) (12 hours). (CO3)

Unit-IV

Linear differential equations of Higher Order: Solutions of second and higher order linear homogeneous equations with constants coefficients, Solutions of non-homogeneous linear differential equations with constants coefficients, Method of variation of parameters. (10 hours)(CO4)

Unit-V

Laplace Transforms: Introduction to Laplace Transforms, Inverse Laplace transforms, Linearity property, First shifting property,Transforms of Derivatives, Transforms of Integrals, Multiplication by t^n, Division by t, unit step function, unit impulse function, Second shifting property(All properties without proofs). Convolution theorem (without proof).Solution of ordinary linear differential equations first and second order(Initial value problems) using Laplace transforms. (12 hours)(CO5)

Prescribed text books:

1. R. K. Jain & S. R. K. Iyengar Advanced Engineering Mathematics, Narosa Publications, 5th Edition, 2016.
2. B. S .Grewal, Higher Engineering Mathematics, Khanna Publications 44th Edition, 2018.

Suggested Readings:

1. B.V. Ramana, Higher Engineering Mathematics, 23rd reprint, 2015.
2. N.P. Bali, M. Goyal, A text book of Engineering Mathematics, Laxmi publications,2010.
3. Erwin Kreyszig, Advanced Engineering Mathematics, John Wiley, 9th Edition, 2012.
4. Schaum's outlines Laplace Transforms by Murray R, Spiegel, First Edition.

Course Code	Course Title						Core / Elective
U25ESN02CS	**Programming for Problem Solving using Python**						Core
Prerequisite	Contact Hours per Week				CIE	SEE	Credits
	L	**T**	**D**	**P**			
Basics of Computers and knowledge of compilers.	2	-	-	-	**40**	**60**	**2**

Course Objectives: Students will be able to

- To learn how to use lists, tuples, sets and dictionaries in python programs.
- To learn how to write control statements and defining modules in python.
- To learn how to read and write files and handle exceptions in python.
- To learn and apply object oriented concepts and creating simple Graphical User Interface in python
- To learn the basics and usage of Numpy, Pandas and Matplotlib modules.

Course Outcomes: On successful completion of the course, Students will be able to

- Understand and use the basics of python programming and core data structures like lists, set, tuple and dictionaries.
- Create, run and manipulate python programs by using python modules and writing functions.
- Understand and apply different file handling and exception handling operations.
- Understand OOP concepts and create simple GUI based applications.
- Understand OOP concepts and create simple GUI based applications.

UNIT-I

Basics of Python Programming: Features of Python, Writing and Executing First Python Program, Literal Constants, Numbers Strings, Variables and Identifiers.

Data Types: Assigning or Initializing Values to Variables, Multiple Assignment, Multiple Statements on a Single Line, Boolean Input Operation, Comments, Reserved Words, Indentation.

Operators and Expressions: Arithmetic Operators, Comparison Operators, Assignment and In-place or Shortcut Operators Unary Operators, Bitwise Operators, Shift Operators, Logical Operators, Membership Operators Identity Operators, Operators Precedence and Associativity, Expressions in Python.

Decision Control Statements: Introduction to Decision Control Statements, Selection/Conditional Branching Statements: if Statement, if-else Statement, Nested if Statements, if-elif-else Statement .Basic Loop Structures/ **Iterative Statements:** while loop, for Loop, Selecting an appropriate loop. Nested Loops, The break Statement, The continue Statement, The pass Statement, The else Statement used with Loops.

UNIT-II

Functions: Introduction, Need for Functions Function Definition, Function Call, Function Parameters, Variable Scope and Lifetime, Local and Global Variables, Using the Global Statement, Resolution of Names, The return statement, More on Defining Functions, Required Arguments, Keyword Arguments Default Arguments, Variable-length Arguments, Lambda Functions or Anonymous Functions, Recursive Functions, Greatest Common Divisor, Finding Exponents, The Fibonacci Series, Recursion vs Iteration.

UNIT-III

Modules: The from…import statement, Name of Module, Making your own Modules, The dir() function, The Python Module, Modules and Namespaces, Packages in Python, Standard Library modules.

Strings: Introduction, Concatenating, Appending, and Multiplying Strings, Strings are Immutable, String Formatting Operator, Built-in String Methods and Functions, Slice Operation, Specifying Stride While Slicing Strings, () and chr() Functions, in and not in operators, Comparing Strings, Iterating String, Operations on Strings, Concatenation, Multiplication (or String Repetition).

UNIT-IV

Data Structures in python : Sequences , **Lists** Access Values in Lists, Updating Values in Lists, Nested Lists, Cloning Lists, Basic List Operations , List Methods, List Comprehensions, Looping in Lists, Functional Programming :filter() Function, map() Function, reduce() Function

Tuple : Creating Tuple, Utility of Tuples, Accessing Values in a Tuple, Updating Tuple Deleting Elements in Tuple , Basic Tuple Operations, Tuple Assignment, Tuples for Returning Multiple Values, Nested Tuples , Checking the Index:index() method , Counting the Elements: count() Method , List Comprehension and Tuples , Variable-length Argument Tuples , The zip() Function , Advantages of Tuple over List

Sets: Creating a Set, Comparing Sets, Mathematical Set Operations, Mutable Set Operators and Methods, Set Comprehensions

Dictionaries: Creating a Dictionary, Accessing Values , Adding and Modifying an Item in a Dictionary, Modifying an Entry, Deleting Items, Sorting Items in a Dictionary, Looping over a Dictionary, Nested Dictionaries, Built-in Dictionary Functions and Methods

UNIT-V

Numpy Arrays: Introduction, creating Arrays, Indexing, Slicing, Types, copy vs View, Shape, Reshape, Iterating, Join, Split, Search, Sort, Filter

Pandas: Introduction, Series, Data Frames, Read CSV, Analyzing Data

Matplotlib: Introduction, Pyplot, Line, Labels, Scatter, Bars, Histograms, Pie Charts

Text Books:

1. Reema Thareja, ”Python programming using problem solving approach “, Oxford university
   press.

Reference Books:

1. Mark Summerfield, "Programming in Python 3:A Complete Introduction to the Python
   Language", 2nd edition, Addison-Wesley
2. Martin C. Brown,” PYTHON: The Complete Reference”, McGraw-Hill, 2001.
3. E Balagurusamy,"Introduction to Computing and Problem Solving Using Python", McGrawHill.

Course Code	Course Title						Core/Elective
U25HSN01EG	**Basic English Language Skills (Common to all branches)**						Core
Prerequisite	Contact Hours per Week				CIE	SEE	Credits
	L	T	D	P			
----	2	--	--	--	**40**	**60**	**2**

Course Objectives: The course aims at imparting the language skills to the Engineering undergraduates to

- Develop reading comprehension through exposure to a variety of texts - essays, plays, speeches, short stories, and poems.
- Enrich vocabulary through systematic word formation strategies,
- Strengthen the remedial grammar required for effective written and spoken English.
- Equip students with the necessary writing skills such as paragraphing, letter writing, précis, paraphrasing, and summarizing.
- Foster critical thinking, empathy, and awareness on social issues through literary and non-literary texts.

Course Outcomes: On successful completion of the course, Students will be able to

- Interpret and analyze diverse reading materials, identifying themes and literary elements.
- Apply vocabulary-building techniques such as prefix/suffix usage, compounding, and synonyms to enhance word usage.
- Demonstrate control over grammatical elements such as articles, tenses, voice, and narration in academic and real-world contexts.
- Compose well-structured paragraphs, letters, précis, and summaries appropriate to context and purpose.
- Reflect critically on social, environmental, and human values portrayed in the texts.

Unit- I

Reading: **Good Manners by J. C. Hill**

Vocabulary: Word formation-Prefixes, Suffixes, Root Words

Grammar: Articles, Prepositions, Determiners

Writing: Guided Writing (Expanding the outline/Writing from verbal cues)

Unit - II

Reading: **"The Proposal," a one-act play by Anton Chekhov**,

Vocabulary: Word formation- Compounding and Blending, Contractions

Grammar: Transitions, Connectives

Writing: Paragraph-writing

Unit- III

Reading: **Our House Is on Fire by Greta Thunberg**

Vocabulary: Synonyms, Antonyms, One Word Substitutes

Grammar: Tenses

Writing: Letter-writing

Unit- IV

Reading: **"The School for Sympathy," a story by E.V. Lucas**

Vocabulary: Homonyms, Homographs , Homophones, Words often confused, Idiomatic Expression

Grammar: Voice

Writing: Precis writing

Unit- V

Reading: **This Is Just Going To Hurt A Little Bit by Ogden Nash**

Vocabulary: Inclusive Language, Euphemisms

Grammar: Narration

Writing: Paraphrasing and Summarizing

Reference books:

1. Little Red Books Terry O Brien - 1. Reading and Listening Skills
2. Effective Speaking Skills
   Grammar: 1. Common Mistakes in English, Upper intermediate, CUP
3. A Practical English Grammar Exercises - Thomson and Martinet, OUP
4. English for Competitive Examinations by Saraswathi and Maya K Mudbhatkal (this book covers grammar, vocabulary, speaking, reading and writing skills)
5. Vocabulary: Know your English- Words Frequency Confused by S. Upendran - Volume 1 and 2
6. English for Engineers by NP Sudharshana & C. Savita, CUP (Includes exercises on grammar and written English)
7. English for Professionals' Sudarshan, Paul Antony (S. Chand)
8. 'Communication Skills' Sanjay Kumar & Pushp Lata (OUP India)

Course Code	Course Title						Core / Elective
U25HSN02EG	**Universal Human Values**						Mandatory
Prerequisite	**Contact Hours per Week**				**CIE**	**SEE**	Credits
	L	**T**	**D**	**P**			
Introduction to UHV during SIP	3	0	--	--	**40**	**60**	**3**

Course Objectives: Students will be able to

- Sensitize students to the need, basic guidelines, content, and process of Values and Value Education.
- Help students distinguish between values and skills, and understand the role of self-exploration as a process of self-evolution.
- Facilitate understanding of the harmony at various levels – individual, family, society, and nature.
- Promote ethical and value-based living for professional excellence and personal well-being.\
- Encourage students to develop a holistic perspective towards life and profession through the universal human values.

Course Outcomes: On successful completion of the course, Students will be able to

- Describe the need, content, and process of value education and engage in self-exploration for clarity about personal aspirations.
- Distinguish between the Self (I) and the Body and differentiate their needs to ensure health and well-being.
- Recognize trust as the foundational value in human relationships and apply it to build harmony in the family.
- Analyze social issues through the lens of justice, respect, and value-based interaction to ensure harmony in society and explain the harmony in nature at all levels of existence.
- Demonstrate an understanding of the holistic perception of harmony at all levels and adopt strategies for value-based personal and professional life.

Unit-I

Introduction to Value Education

- Understanding Core values, relationship values and Value Education,
- Self-Exploration as the process for Value Education,
- Continuous happiness and prosperity- the Basic Human Aspirations,
- Happiness and Prosperity-Current Scenario

Unit-II

Harmony in the Human Being

- Understanding Human being as the Co-existence of the Self (I) and the body
- Distinguishing between the Needs of the Self (I) and the Body
- Harmony of the Self(I) with the body
- Programme to ensure Self (I) with the Body

Unit-III
Harmony in the Family

- Harmony in the Family – the Basic Unit of Human Interaction
- "Trust" – the Foundation Value in Relationship
- Other Feeling, Justice in Human-to-Human Relationship and Respect

Unit-IV
Harmony in the Society and the Nature

- Understanding Harmony in the Society
- Understanding Harmony in the Nature
- Interconnectedness, self-regulation and Mutual Fulfillment among the Four Orders of Nature
- Realising Existence as Co-existence at all Levels and the Holistic Perception of Harmony in Existence

Unit-V
Implications of the Holistic Perception of Harmony at all levels

- Natural Acceptance of Human Values
- Definitiveness of (Ethical) Human Values
- Strategies for Transition towards Value-based Life and Profession

Readings:

Textbook and Teachers manual

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

Reference Books:

1. JeevanVidya: EK Parichaya, ANagaraj, 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 – Pundit Sunderlal
9. Rediscovering India –by Dharamphal
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)

Course Code	Course Title						Core / Elective
U25ESN84ME	**Workshop & Digital Fabrication Lab (Common to all branches)**						Core
Prerequisite	**Contact Hours per Week**				**CIE**	**SEE**	Credits
	L	**T**	**D**	**P**			
Engineering graphics, Basic computer knowledge	--	--	--	3	**25**	**50**	**1.5**

Course Objectives: Students will be able to

- To develop hands-on skills in using measuring, marking, and cutting tools within specified tolerances, gain practical exposure to engineering materials and manufacturing processes, and understand the principles, applications, and industrial relevance of 3D modeling and 3D printing.

Course Outcomes: On successful completion of the course, Students will be able to

- Explain workshop safety regulations and demonstrate compliance with standard safety procedures.
- Identify appropriate tools and apply them effectively in various engineering trades for measuring, marking, material removal, and finishing operations.
- Execute exercises related to workshop practices such as house wiring, sheet metal work, plumbing, carpentry, fitting, and welding.
- Prepare STL files through pre-processing and construct basic 3D models using modeling software.
- Apply the principles of additive manufacturing and 3D modeling tools to design, slice, and fabricate basic components using a 3D printer.

A. Trade for Exercises:

1. House wiring:

- Introduction to house wiring tools, materials and safety precautions.
- **Single lamp connection:** Understanding switches, bulbs and wiring.
- **Staircase wiring:** Two-way control of lighting from different locations.
- **Parallel and series connections:** Electrical theory and hands-on wiring of circuits.

2. Sheet metal:

- Introduction to sheet metal tools: snips, hammers, stakes etc.
- **Rectangular tray:** Measuring, marking, cutting, bending and joining.
- **Open scoop:** Pattern development and forming techniques.
- **Funnel:** Sheet development and joining.

3. Plumbing:

- Introduction to plumbing tools: pipe wrench, die set, Teflon tape etc.
- **Threading on pipes:** Manual threading practices.
- **Pipe fitting:** Preparing pipe joints with elbows, tees, reducers, couplings and unions.
- **Layout practice:** Connecting gate valves, tee fittings, reducers and other components.

4. **Carssspentry:**
    - Introduction to carpentry tools: Hand saw, chisel, mallet, marking gauge, etc.
    - **Cross half lap joint:** Cutting and assembling techniques.
    - **Lap dovetail joint:** Precision fitting and interlocking technique.
5. **Welding**:
    - Introduction to arc welding tools, equipment and processes, safety precautions.
    - **Butt joint:** Edge-to-edge welding practice.
    - **Lap joint:** Overlap welding technique.

B. Digital fabrication experiments:

1. Introduction to basic components of a computer, features of hardware and software.
2. Fundamentals of additive manufacturing (3D Printing): Principles, types, and workflow of additive manufacturing, study the working and parts of a 3D printer.
3. 3D Modeling using CAD software (SOLIDWORKS): Basics of CAD tools and creating simple 3D models.
4. Slicing and print preparation using CURA: Introduction, import models, configure print settings and generate G-codes.
5. 3D Printing Practice: Operate a 3D printer to print basic parts, perform post-processing.

C. Additional Trades for Exercises (Beyond Curriculum):

1. **Fitting:** Introduction to fitting tools: files, hacksaws, bench vices, etc., squaring and flat surface filing, filing to specific profiles, angular fitting work and finishing.
2. **Smithy**: Preparation of round rod to square, round rod to square headed bolt, S-hook.

Textbooks:

1. K. Venugopal. *Workshop Manual,* Anuradha Publications, 2012th ed., 2012.
2. K.C. John, *Mechanical Workshop,* PHI, 2nd ed., 2010.
3. Amit Bandyopadhyay, Thomas Gualtieri, Bryan Heer and Susmita Bose, *Introduction to Additive Manufacturing*, CRC Press, 2nd ed., 2019.

Reference books:

1. Hajra Choudary, *Elements of Workshop Technology,* Vol. 1, Media Promoters and Publications, 8th ed., 2008.
2. Chua Chee Kai, Leong Kah Fai, *3D Printing and Additive Manufacturing: Principles & Applications,* World Scientific, 4th ed., 2015.
3. Chua Chee Kai, Leong Kah Fai, *Rapid Prototyping: Principles & Applications,* World Scientific, 3rd ed., 2010.
4. Creality Ender-3 V3 user manual: Manualhttps://wiki.creality.com/en/ender-series/ender-3-v3/manual.sss

Course Code	Course Title						Core/Elective
U25BSN81PH	**Engineering Physics Lab COMMON TO CSE, CIV, MECH, EEE, IT, ECE, CSE-AIML, DS, IOT, CSIT)**						Core
Prerequisite	Contact Hours per Week				CIE	SEE	Credits
	L	T	D	P			
-	-	-	-	3	**25**	**50**	**1.5**

Course Objectives: Students will be able to

- Describe a Semiconducting device and determine its temperature Coefficient of Resistance, Energy Gap, Electrical Conductivity, Mobility, concentration of charge carriers and its efficiency.
- Determine the wavelength of a given laser source by using diffraction grating.
- Explain the principle of Optical Fiber and determine its Numerical Aperture, Acceptance Angle and losses.
- Interpret LCR Series and Parallel Circuit and calculate Resonant frequency of LCR Series and Parallel Circuit.
- Inspect the nature of Ferro Magnetic Materials, Dielectric Materials and Calculate their related parameters.

Course Outcomes: On successful completion of the course, Students will be able to

- **Analyze** a Semiconducting device and determine its temperature Coefficient of Resistance, Energy Gap, Electrical Conductivity, Mobility, Concentration of charge carriers and efficiency.
- **Estimate** the Wavelength of Laser source using diffraction grating.
- **Illustrate** the principle of Optical Fiber and determine its Numerical Aperture, Acceptance angle and losses.
- **Demonstrate** LCR series and Parallel circuit and calculate the resonant frequency of LCR Series & Parallel circuit.
- **Examine** the nature of ferromagnetic materials, dielectric materials; calculate their related parameters.

List of Experiments:

1. To Determine the Numerical aperture (NA), Acceptance Angle of the Optical Fiber, and to study the various losses that occur in optical fiber.
2. To determine the wave length (λ) of the given Laser source.
3. To determine V-I characteristics of the given LED and calculate the threshold voltage
4. To draw the V-I characteristics of a Solar Cell and calculate the Fill Factor and Series Resistance.
5. To draw the V -I Characteristics of P-N Junction diode and to evaluate the resistance for forward bias and reverse bias.
6. To draw the temperature characteristics of a thermistor and to evaluate the constants of the thermistor(A,B&α)
7. To determine the forbidden energy gap of given semiconductor diode
8. To study the behavior of LCR Series Resonant circuit and to estimate the resonant frequency and Q factor.

9. To study the behavior of LCR Parallel Resonant circuit and to estimate the resonant frequency and Q factor.
10. To determine the Dielectric constant of the given Dielectric materials.
11. To determine curie temperature of dielectric materials.
12. To draw the curve between the magnetizing field and the intensity of magnetization of the specimen (soft iron rod) and to find out i) Coercivity ii) Retentivity and iii) Hysteresis loss.
13. To determine the Hall coefficient, Carrier concentration and mobility of charge carriers of given semi conducting material using Hall Effect Experiment.
14. Demonstration of Virtual Lab experiments.

Course Code	Course Title						Core / Elective
U25ESN82CS	**Programming for Problem Solving using Python Lab**						Core
Prerequisite	Contact Hours per Week				CIE	SEE	Credits
	L	**T**	**D**	**P**			
Basics of Computers and knowledge of compilers.	**-**	**-**	**-**	**3**	**25**	**50**	**1.5**

Course Objectives: Students will be able to

- To impart knowledge of basic fundamentals of python and learn python built-in modules
- To improve logical skills by working with control statements, mathematical functions
- To learn about modular programming through functions and recursive programs
- To handle logical, syntax errors and define custom errors as per real world problems
- Enabling students to access files and perform operations and to introduce and work with object-oriented principles

Course Outcomes: On successful completion of the course, Students will be able to

- Implement basic syntax, semantics in python and improve logical skills
- Formulate mathematical computations, store data using strings, collection types
- Perform modular programming using functions and recursion
- Analyze and Implement OOP concepts in real world problems and handle multiple exceptions logically and syntactically.
- Implement built-in modules in various domains like big data, machine learning.

List of Programs

1. To demonstrate variables and operators
2. Read a set of numbers from the command line, add & print those numbers.
3. Display two random numbers that are to be added, the program should allow the student to enter the answer. if the answer is correct, a message of congratulations should be displayed, if the answer is wrong the correct answer should be displayed.
4. Read a date and check whether the date is valid or not, if it is valid print incremented date.
5. Read x,y and print all prime numbers between x and y where x<=y
6. Accept Three Digits and Print all Possible Combinations from the Digits
7. Check for “amicable” numbers
8. Check for “Armstrong” number
9. Check for “strong” number
10. Compute a Polynomial Equation given that the Coefficients of the Polynomial are stored in a List

11. Search the Number of Times a Particular Number Occurs in a List
12. Read a List of Words and Return the Length of the Longest One
13. Remove the ith Occurrence of the Given Word in a List where Words can Repeat
14. Count the number of alphabets, consonants, vowels, digits, special characters in a sentence
15. Store some elements in the dictionary and remove a given key from the dictionary.
16. To display which Letters are in the First String but not in the Second
17. Write a function to compute gcd, factorial, fibonacci series
18. Write a recursive function to compute gcd, factorial, fibonacci series
19. Read .csv file to print the statistical summary of each attribute and visualize the data.
20. Numpy program to compute sum of all elements, sum of each column and sum of each row of a given array.

Course Code	Course Title						Core / Elective
U25HSN81EG	**English Communication Skills Lab (Common to all branches)**						Core
Prerequisite	Contact Hours per Week				CIE	SEE	Credits
	L	T	D	P			
--	--	--	--	2	**25**	**50**	**1**

Course Objectives: Students will be able to

- Hone learners' listening skills for effective comprehension and response in academic and real-life contexts.
- Develop Neutralized Pronunciation, Intonation, Stress, and Rhythm to improve fluency and intelligibility in spoken form.
- Strengthen students' ability to engage in everyday and professional Conversations and Role-plays with confidence and clarity.
- Equip learners with practical communication tools for formal speaking situations such as Group Discussions, Interviews, and Presentations.
- Foster spontaneity, critical thinking, and team collaboration through interactive activities such as JAM , and Picture Perception.

Course Outcomes: On successful completion of the course, Students will be able to

- Listen attentively and respond appropriately to spoken content in various contexts.
- Demonstrate correct pronunciation, stress, and intonation in speech.
- Introduce themselves and others; exchange information effectively in everyday contexts.
- Use language functions such as requesting, instructing, persuading and responding appropriately.
- Think on their feet and express ideas clearly in formal oral communication tasks in spontaneous and structured formats in GDs, interviews, and presentations.

List of Activities

1. Listening for Comprehension
2. Pronunciation, Intonation, Stress, and Rhythm
3. Conversation Skills
4. Introducing Oneself and others
5. Asking for and Giving Information
6. Making Requests and Responding to them Appropriately
7. Giving Instructions and Responding to them Appropriately
8. Picture Perception
9. JAM
10. Role play
11. Group Discussions
12. Interview Skills
13. Presentation Skills

Suggested Readings:

1. Board of Editors. Language and Life: A Skills Approach. Orient BlackSwan, 2018.
2. Balasudbramanian, T. A Textbook of English Phonetics for Indian Students. Macmillan, 1981
3. CIEFL. EXERCISES IN Spoken English. Parts. I- III. Oxford University Press. Pillai,
4. Radhakrsihna G. Spoken English For You – Level II. 8the Edition. Emerald Publishers,2014.
5. Sethi, J and PV Dhamija. A Course in Phonetics and Spoken English. 2nd Edition. Prentice Hall India Learning Private Limited, 1999.
6. Conversational Skills-A Course in English Communication - For the Learners of English as a Second Language - Madhavi Apte
7. A Course in Listening and Speaking '– I & II Sasikumar, Dhamija (Foundation Books/Cambridge)
8. 'English Language Communication Skills Lab Manual' G. Rajagopalan (Vikas Publishing)
9. "Communication Skills' Sanjay Kumar & Pushp Lata (OUP India)
10. Multimedia Resources
    a. BBC Learning English
    b.Elllo.org
    c. TED Talks
    d. ESL Lab – Randall's Listening
    e. YouTube: British Council, Cambridge English

Licensed Software for 64 systems

Sky Pronunciation Suite-Young India Films Ltd

Connected Speech - Protea text software