Study Scheme & Syllabus of

Bachelor of Technology

(1st/2nd Semester)

Batch 2024 & Onwards

(For Chandigarh Engineering College, Jhanjeri, An Autonomous College)

By

Department of Academics & Approved by BoS & Academic Council

IK Gujral Punjab Technical University
Chandigarh Engineering College, Jhanjeri, An Autonomous College
Bachelor of Technology (B. Tech 1st year batch 2024 & onwards)

Bachelors of Technology 2nd Semester
It is an Under Graduate (UG) Programme of 4 years duration (8 semesters)
Eligibility for Admission: As per AICTE norms.
Scheme followed by the following Branches:

- ✓ B. Tech CSE
- ✓ B. Tech AIML
- ✓ B. Tech Robotics & AI
- ✓ B.Tech. CSE (Data Science)

Second Semester **Group A** **Contact Hours: 25**

Course Code	Type of Course	Course Title	Hours per Week			Marks Distribution		Total Marks	Credits
			T	P	C	Internal	External		
USC104	UC-Sci	Chemistry and Environmental Study	3	2	4	50	50	100	4
USC102	UC-Sci	Linear Algebra and Differential Equations	4	0	4	50	50	100	4
UCS101	UC-Engg	Introduction to Programming	3	2	4	50	50	100	4
UVC202	NGCR	Indian Constitution (Online NGCR)	2	0	2	100	0	100	2
UHM102	UC-H&M	English for Effective Communication	2	2	3	50	50	100	3
USS101	UC-H&M	Industry Specific Communication	3	0	3	50	50	100	3
TOTAL			**17**	**6**	**20**	**350**	**250**	**600**	**20**

***These are the minimum contact hrs. allocated. The contact hrs. may be increased by the departments as per the requirement of the subject.**

Note : 1. Indian Constitution (Compulsory) (Online NGCR) will be offered as mandatory Non-Graded credit course. Indian Constitution course will have internal evaluation only.

IK Gujral Punjab Technical University
(Chandigarh Engineering College, Jhanjeri, An Autonomous College)
Bachelor of Technology (B. Tech 1st year batch 2024 & onwards)

Bachelors of Technology 2nd Semester
It is an UnderGraduate (UG) Programme of 4 years duration (8 semesters)
Eligibility for Admission: As per AICTE norms.
Scheme followed by the following Branches:

- ✓ B. Tech AI&DS
- ✓ B. Tech CSE (IOT and Cyber Security including Block Chain Technology)

Second Semester **Group B** **Contact Hours: 29**

Course Code	Type of Course	Course Title	Hours per Week			Marks Distribution		Total Marks	Credits
			T	P	C	Internal	External		
USC103	UC-Sci	Modern Physics	3	2	4	50	50	100	4
USC102	UC-Sci	Linear Algebra and Differential Equations	4	0	4	50	50	100	4
UEC101	UC-Engg	Basic Electrical and Electronics Engineering	3	2	4	50	50	100	4
UCS102	UC-Engg	Problem Solving using Python	3	2	4	50	50	100	4
UHM102	UC-H&M	English for Effective Communication	2	2	3	50	50	100	3
USS101	UC-H&M	Industry Specific Communication	3	0	3	50	50	100	3
TOTAL			**18**	**8**	**22**	**300**	**300**	**600**	**22**

***These are the minimum contact hrs. allocated. The contact hrs. may be increased by the department as per the requirement of the subject.**

A. Definition of Credit:

1 Hr. Lecture (T) per week	1 credit
2 Hours Practical /Lab (P) per week	1 credit

B. Range of credits –

A range of credits from 150 to 160 for a student to be eligible to get Under Graduate degree in Engineering. A student will be eligible to get Under Graduate degree with Honours or additional Minor Engineering, if he/she completes an additional 20 credits. These could be acquired through MOOCs.

C. Structure of Undergraduate Engineering program:

Credit Distribution	
Under Graduate degree in Engineering	Credits
Foundation Core Courses	
Engineering Foundation (20 credits)	84
Science Basket (20 credits)	
Projects and Internships (18 credits)	
Humanities (20 credits)	
NGCR - Non-graded Core Requirement (6 credits)	
Discipline Core Courses	43
Discipline/ Specialization Elective Courses	24
Open Elective Courses	9
Total Credits	160

We follow same guidelines as per the PTU B. Tech 1st Year Syllabus (Batch 2023 Onwards) as mentioned on the PTU Website from Page 5 to Page 13.

For Chandigarh Engineering College, Jhanjeri, An Autonomous College

Bachelor of Technology (B. Tech. 1st Year batch 2023 & Onwards)

Course Code: USC104	**Course Title :** Chemistry and Environmental Study	**TPC**	**3**	**2**	**4**
Version No.	**1.0**				
Course Pre-requisites/ Co-requisites	**None**				
Anti-requisites (if any)	**None**				
Objectives:	1. To apply the knowledge of basic chemistry in engineering and technology to understand the concepts of applied chemistry. 2. To understand the structure of different materials of daily use. 3. To understand the nanotechnology and its use in different engineering courses. 4. To analyze problems related to environment and engineering.				

CO-PO Mapping

Course Outcomes	Course Outcome Statement	PO's / PSO's
CO1	State the atomic and molecular structures and solutions of Quantum chemistry.	PO1,PO2,PO12
CO2	Apply the concepts of spectroscopic techniques to identify the compounds.	PO1,PO2,PO4,PO12
CO3	Apply concepts of water and corrosion industrial problems and solutions	PO1,PO2,PO12
CO4	Understanding structural materials and role of nanotechnology	PO1,PO2,PO3,PO9,PO12
CO5	Understanding environmental pollutants and importance of sustainable waste management.	PO1,PO2,PO3,PO6,PO7,PO8,PO9,PO12
TOTAL HOURS OF INSTRUCTIONS: 45		

Module No. 1	**Atomic and molecular structure**	**8 Hours**

Schrodinger equation. Particle in a box solution and their applications for conjugated molecules and nanoparticles. Molecular orbitals and energy level diagrams of diatomic molecules. Equations for atomic and molecular orbitals Crystal field theory and the energy level diagrams for transition metal ions (octahedral and tetrahedral environment) and their magnetic properties. Band structure of solids and the role of doping on band structures.

Module No. 2	**Spectroscopic techniques and applications**	**10 Hours**

Basic concepts of spectroscopy, Electronic spectroscopy: Principle and instrumentation, electronic transitions, Chromophores and auxochromes, band shifts, IR spectroscopy: Degree of freedom, Vibrational modes (stretching and bending vibrations), finger print and functional group region, Nuclear magnetic resonance (1 H NMR): Principle, instrumentation, chemical shift, coupling (spin-spin coupling), splitting of peaks, interpretation of 1 H NMR of simple molecules; Applications of spectroscopy.

Module No. 3	Water Chemistry and Corrosion	10 Hours

Water chemistry: Hardness of water, Degree of hardness and units of hardness, problems associated with hardwater, boiler problems (scale and sludge formation, Boiler corrosion & caustic embrittlement.) and treatments, softening of hardwater (lime soda process, ion exchange method and zeolite process),

Corrosion: Introduction to corrosion, Types of corrosion, Cause of corrosion, Corrosion prevention and control, Corrosion issues in industries,

Module No. 4	Structure material and Nano technology	9 Hours

Metal and Alloys: Introduction (Definitions and types of alloys), Properties and applications of Iron and its alloys (Stainless Steel). Aluminium and its alloys (Duralumin and Aluminium-Mg alloy). Cement: Introduction, composition, properties, classification, manufacturing process of cement (Wet method). Process of setting and hardening of cement.

Nanochemistry: Introduction, synthesis of nanomaterials (bottom-up and top-down approach), nanoscale materials, graphene, fullerenes, carbon nanotubes, Role of nanotechnology in construction materials, future prospects of nanotechnology.

Module No. 5	Environmental chemistry and sustainable development	8 Hours

Introduction of Pollution & Pollutants, Causes of Pollution, Types of Pollution – Air, Soil and Water Pollution, Types of Waste: Domestic Waste, Industrial Waste, Biomedical Waste & E-Waste, Concepts & significance of BOD, COD.

Introduction of sustainable development, importance of sustainable waste management, cleaner Production and clean production techniques.

Text Books

T1:- Chemistry-1 by Gourkrishna Dasmohapatra, Vikas Publishing House Pvt Ltd, 2020
T2:- A Textbook of Engineering Chemistry by SS Dara, 2020
T3:- Textbook of Engineering Chemistry by Dr. Rajshree Khare, 2019

References

1. Chemistry in Engineering and Technology by J C Kuriacose and J Rajaram, McGraw Hill Education (2001)
2. Spectrometric Identification Of Organic Compounds by Robert M. Silverstein Francis X. Webster David J. Kiemle, John Wiley & Sons, Inc. (2005)
3. Principles and Applications of Environmental Biotechnology for a Sustainable Future by Ram Lakhan Singh (2017)
4. Nanotechnology in Chemical Engineering by Xingzhong Xi (2019)
5. Engineering Chemistry (NPTEL Web-book), by B. L. Tembe, Kamaluddin and M. S.Krishnan. (2020)

Lab Exercises

1. Determination of surface tension and viscosity
2. Thin Layer Chromatography
3. EDTA for removal of hardness of water
4. Colligative properties using freezing point depression
5. Determination of cell constant and conductance of solutions

6. Synthesis of a polymer/drug
7. Saponification/acid value of an oil
8. Lattice structures and packing of spheres
9. Chemical oscillations- Iodine clock reaction
10. Determination of the partition coefficient of a substance between two immiscible liquids
11. Adsorption of acetic acid by charcoal
12. Determination of melting point of given organic compounds.
13. Use of the capillary viscometers to demonstrate of the isoelectric point as the pH of minimum viscosity for gelatin sols and/or coagulation of the white part of the egg.

Course Type	**Embedded Theory and Lab(ETL)**
Mode of Evaluation	**Theory** **75%** MST-1 15 MST-2 15 Assignment/Quiz 20 Final Assessment Test 50 **Laboratory** **25%**
Prepared by	Dr. Manmeet Singh
Recommended by the Board of Studies on	1st BOS, 11.09.24
Date of Approval by the Academic Council	**1st Academic Council 25-10-24**

For Chandigarh Engineering College, Jhanjeri, An Autonomous College

Bachelor of Technology (B. Tech. 1st Year batch 2023 & Onwards)

Course Code: USC102 (Common to all branches)	**Course Title : LINEAR ALGEBRA & DIFFERNTIAL EQUATIONS**	**TPC**	**4**	**0**	**4**
Version No.	**1.0**				
Course Pre-requisites/ Co-requisites	• Basic concept of Matrices & Determinant. • Basic concept of Differential Equations.				
Anti-requisites (if any)	**None**				
Objectives:	The objective of the **LINEAR ALGEBRA & DIFFERNTIAL EQUATIONS** is to familiarize the prospective engineers with techniques in multivariate integration, ordinary , partial differential equations and Linear Algebra. It aims to equip the students to deal with advanced level of mathematics and applications that would be essential for their disciplines.				

CO-PO Mapping

Course Outcomes	Course Outcome Statement	PO's / PSO's
CO1	To gain the knowledge of Ordinary differential equations and discuss its applicability to trained to visualize and conceptualize the engineering problems	PO1, PO2, PO9, PO10.
CO2	To determine the rank and inverse of matrices by elementary transformations.	PO1, PO2, PO9, PO10.
CO3	Use the knowledge to model the engineering problem mathematically using theory of matrices and linear algebra.	PO1, PO2, PO9, PO10.
CO4	Illustrate the concept of vector spaces & linear transformations of finite dimensional vector spaces.	PO1, PO2, PO9, PO10.
CO5	Learn the methods to solve Partial Differential Equations.	PO1, PO2, PO9, PO10.
TOTAL HOURS OF INSTRUCTIONS: 60		

Module No. 1	**Ordinary differential equations: First and Higher order:**	**15 Hours**

First order Exact differential equations, integrating factors, Linear first order equations, Bernoulli equation, Clairaut's equation, Higher order differential equation with constant coefficients. Method of variation of parameters, Cauchy-Euler equation; Legendre's Linear differential equation, finding

particular integrals.		
Module No. 2	**System of Linear Equations:**	**10 Hours**
Rank of a matrix, Echelon form of matrix, Homogenous and Non homogenous system of linear equations, consistency and inconsistency of system of equations, Gauss elimination method, Inverse of a matrix, Gauss-Jordon method.		
Module No. 3	**Linear Algebra**	**10 Hours**
Eigen values, eigen vectors, Cayley-Hamilton theorem, algebraic multiplicity, geometric multiplicity, similar and diagonalizable matrices.		
Module No. 4	**Vector spaces:**	**15 Hours**
Vector spaces, Subspaces, Linear independence and Linear dependence of vectors, Dimension and basis, Linear transformation, rank and nullity theorem (without proof), matrix associated with Linear Transformation,		
Module No. 5	**Partial Differential Equations:**	**10 Hours**
Formation of first order equations, solution of first order equations Lagrange's equation, Higher order Linear equations with constant coefficients.		

Text Books

1. Dr. Rajesh Kumar Narula, Engineering Mathematics-II, Sharma Publications. 2024.
2. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 40th Edition, 2020.
3. N.P.Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2021.

References

1. Maurice D. Weir, Joel Hass, Christopher Heil, "Thomas' Calculus" 14th edition, Pearson Education, 2018.

2. R.K. Jain and S.R.K. Iyengar, "Advanced Engineering Mathematics" Narosa Publications, 2022.

3. B. V. Ramana, "Higher Engineering Mathematics", Tata McGraw Hill,2017.

4. R. Garg, "Mathematics – I", Khanna Book Publishing Co. (P) Ltd. https://ekumbh.aicte-india.org/userugbook.php, 2021.

Course Type	**THEORY**
Mode of Evaluation	**Theory 100%** **Exam-I 15** **Exam-II 15** **Assignment/ Quiz 20** **Final Assessment Test 50**
Prepared by	Ms. Deepika Gakhar
Recommended by the Board of Studies on	1st BOS, 11.09.24
Date of Approval by the Academic Council	**1st Academic Council 25-10-24**

For Chandigarh Engineering College, Jhanjeri, An Autonomous College

Bachelor of Technology (B. Tech. 1st Year batch 2023 & Onwards)

Course Code: UCS101	**Course Title** Introduction to Programming	**TPC**	3	2	4
Version No.	**1.0**				
Course Pre-requisites/ Co-requisites	**None**				
Anti-requisites (if any)	**None**				
Objectives:	1. To understand the concepts of structured and object-oriented, paradigms and develop skills by using these paradigms in C and C++. 2. To choose the right data representation formats based on the requirements of the problem. 3. To learn writing a computer program to solve specified problems. 4. Use the comparisons and limitations of the various programming constructs and choose the right one for the task in hand.				

CO-PO Mapping

Course Outcomes	Course Outcome Statement	PO's / PSO's
CO1	Understand the structured programming language fundamentals.	PO1, PO2, PO3, PO5/ PSO1, PSO2
CO2	Implement programs using arrays and functions.	PO1, PO2, PO3, PO5/ PSO1, PSO2
CO3	Develop applications using pointers	PO1, PO2, PO3, PO5/ PSO1, PSO2
CO4	Identify uses of structure and Union in the programming tasks.	PO1, PO2, PO3, PO5/ PSO1, PSO2
CO5	Differentiate structure programming and object oriented programming, basics concepts of OOP.	PO1, PO2, PO3, PO5/ PSO1, PSO2
TOTAL HOURS OF INSTRUCTIONS: 45		

Module No. 1	**Introduction to C Programming**	**10 Hours**

Introduction to components of computer system, Types of Computer, Introduction to Programming, Algorithm and Flowchart, Overview of C language, Basic structure, Data concepts in C: Constants, Variables, Expressions, Errors, Operators, Data Types And Statements: Declarations, Input-Output Statements, Compound statements, Selection Statements. Conditions, Operators and its precedence, Branching and Looping statements.

Module No. 2	**Arrays and Functions**	**8 Hours**

Arrays: declaration, initialization, accessing elements- Array manipulation. Functions: The prototype declaration, Function definition, Function call: Passing arguments to a function, by value, by reference. Scope of variable names. Recursive function calls.

Module No. 3	**Pointers and Memory Management in C**	**9 Hours**

Understanding pointers and memory addresses- Pointer arithmetic- Dynamic memory allocation: malloc(), calloc(), realloc(), free()- Pointer to functions- Pointer and arrays relationship.

Module No. 4	**Structure and Union**	**8 Hours**

Structures in C: Structure Definition: Creating user-defined data types using structures, defining members, and accessing structure elements. Operations on structures.

Union Concept: Understanding unions, memory allocation, and accessing union members.

Module No. 5	Introduction to C++ and Object-Oriented Programming	10 Hours

Object-Oriented Programming Concepts: Introduction, Comparison between procedural programming paradigm and object-oriented programming paradigm, Implementation of a class, Operations on objects, Relationship among objects, specifying a class, creating class objects, methods, Constructors, copy constructor, Access specifiers. Overloading Methods – Objects as Parameters- Returning Objects- Friend function–Static, Nested and Inner Classes. Inheritance: Basics– Types of Inheritance -Method Overriding and Polymorphism. Function Template and class template.

Text Books

1. Herbert Schildt, "C: The Complete Reference", McGraw-Hill Education, Fourth edition,2017.
2. Herbert Schildt, "C++: The Complete Reference", McGraw-Hill Education, Fourth edition,2017.

References

1. C: How to program, H. M. Deitel, P. J. Deitel, 9th edition, Pearson Education, 2022.
2. YashwanthKanetkar, Let Us C:17 th Edition, BPB publication, 2020.
3. E.Balagurusamy , Object Oriented Programming with C++, 8th Edition, 2020
4. C++ Programming Language, 4e Paperback – 31 May 2022.
5. Object Oriented Programming with C++ | 8th Edition, E.Balagurusamy Paperback – 24 September 2020

Lab Exercises

1. Write a C Program using I/O statements and expressions.
2. Write a C Program using decision-making constructs.
3. Write a C Program using Arrays.
4. Write a C Program using Functions.
5. Write a C Program using pointers.
6. Write a C Program using Structure.
7. Write a C Program using Union.
8. Write a C++ Program to define a class, define instance methods for setting and Retrieving values of instance variables and instantiate its object
9. Write a C++ Program to define a class, define instance methods and overload them and use them for dynamic method invocation
10. Write a C++ Program to implement inheritance and demonstrate use of method overriding.
11. Write a C++ Program to implement multilevel inheritance by applying various access controls to its data members and methods.
12. Write a C++ program to demonstrate use polymorphism.

Course Type	**Embedded Theory and Lab(ETL)**
Mode of Evaluation	**Theory 75%** **Examination-1 15** **Examination-2 15** **Assignment/ Quiz 20** **Final Assessment Test 50** **Laboratory 25%**
Prepared by	**Ms. Neha Dhiman**
Recommended by the Board of Studies on	1st BOS, 11.09.24
Date of Approval by the Academic Council	**1st Academic Council 25-10-24**

For Chandigarh Engineering College, Jhanjeri, An Autonomous College

Bachelor of Technology (B. Tech. 1st Year batch 2023 & Onwards)

Course Code: UHM102	**Course Title : English for Effective Communication**	**TPC**	**2**	**2**	**3**
Version No.	**1.0**				
Course Pre-requisites/ Co-requisites	**UHM101**				
Anti-requisites (if any)	**None**				
Objectives:	1. Learn to communicate cohesively in writing and speaking by understanding different types of communication, improving grammar, and writing professional documents. 2. Learn to plan and deliver speeches, use different speaking styles, and practice negotiation and public speaking skills through hands-on activities.				

CO-PO Mapping

Course Outcomes	Course Outcome Statement	PO's / PSO's
CO1	**Differentiate between verbal and non-verbal communication and assess the impact of barriers.**	PO(8,9,10&12), PSO(1)
CO2	**Use advanced grammar and techniques to write clear and cohesive texts.**	PO(8,9,10&12), PSO(1)
CO3	**Apply effective writing steps to produce concise engineering documents.**	PO(8,9,10&12), PSO(1)
CO4	**Create professional emails and business letters with proper tone and structure.**	PO(8,9,10&12), PSO(1)
CO5	**Analyze literary works to explain themes of resilience and leadership and their relevance.**	PO(8,9,10&12), PSO(1)
TOTAL HOURS OF INSTRUCTIONS: 30		

Module No. 1	**Communication Forms and Barriers**	**7 Hours**

1. Listening Barriers: Examine factors that affect effective listening.
2. Interpersonal Communication: Understand one-on-one and small group interactions.
3. Mass and Media Communication: Study communication through media channels.
4. Verbal and Non-Verbal Communication: Explore both spoken and body language, and their barriers.
5. Physical and Psychological Barriers: Identify obstacles like environmental distractions and mental blocks

Module No. 2	**Mechanics of Writing and Grammar Review**	**7 Hours**

1. Enhancing Text Cohesion: Using Cohesive Devices Effectively
2. Advanced Sentence Structures: Compound-Complex structures
3. Misplaced Modifiers: Remove ambiguity
4. Idioms, Phrases, and Figures of Speech in Professional Writing
5. Homonyms, Homophones, and Homographs: Avoiding Confusion
6. One-Word Substitutions for Conciseness and Precision

Module No. 3	Precision in Engineering Writing	4 Hours

1. The art of condensation & Paraphrasing
2. Seven steps of writing effective Precise

Module No. 4	Professional Writing for the Workplace	7 Hours

1. Write Professional Emails: Tone of professional emails.
2. Meeting Minutes: summarizing key points and decisions.
3. Improve Note-Taking and Note-Making: meetings or lectures reading or research notes
4. Write Effective Letters: Inquiry Letters, Complaint Letters, Order Letters, Response Letters & Cover Letter

Module No. 5	Literary Perspectives on Resilience and Leadership	5 Hours

Understanding tone and learning to utilize it in writing business documents

Text Books

1. "The Harvard Business Review Guide to Better Business Writing" by Bryan A. Garner (2022) - Harvard Business Review Press.
2. "Advanced English Grammar: A Linguistic Approach" by Ilse Depraetere (2021) - Bloomsbury Academic.
3. "English Idioms in Use: Advanced" by Michael McCarthy and Felicity O'Dell (2021) - Cambridge University Press.
4. "Technical Writing for Engineers & Scientists" by Leo Finkelstein (2020) - McGraw-Hill Education.
5. "Business Writing: What Works, What Won't" by Wilma Davidson (2020) - St. Martin's Griffin.

References

1. "Media and Communication" by Pieter J. Fourie (2022) Publisher: Routledge
2. "Engineering Writing by Design: Creating Formal Documents of Lasting Value" by Edward J. Rothwell and Michael J. Cloud (2021) Publisher: Wiley
3. "Write to Influence!: Personnel Appraisals, Resumes, Emails, and More" by Carla D. Bass (2021) Publisher: Routledge
4. "The Elements of Style: Grammar Workbook" by William Strunk Jr. & Richard De A'Morelli (2020) Publisher: Penguin Publishing Group

Lab Exercises

1. **Speech Planning and Delivery**
   1. Topic Selection: How to choose and refine a speech topic.
   2. Research and Organization: Techniques for researching and structuring content.
   3. Rehearsal and Delivery: Tips for practicing and delivering a speech effectively.

2. **Different Styles of Speaking**
   1. Informative vs. Persuasive Speeches: Differences and techniques for each.
   2. Adaptation to Audience: How to tailor speeches to different audiences.
   3. Judging Criteria: Evaluation criteria for speaking styles

3. **Persuasive Techniques**
   1. Rhetorical Devices: Use of ethos, pathos, and logos.
   2. Practical Exercises: Implement techniques in sample speeches or exercises.
   3. Analysis: Review effective use of these techniques in famous speeches or presentations.

4. **The Art of Negotiation**
    1. Role-Play Exercises: practice real-life negotiation scenarios.
    2. Techniques: Focus on persuasive language
    3. Judging Criteria: Evaluation criteria for negotiation skills

5. **Debates**
    1. Debate Formats: learning different formats
    2. Roles: Define specific roles (e.g., speaker, rebuttal, and cross-examiner).
    3. Judging Criteria: Evaluation criteria for debate performance.

6. **Public Speaking Skills**
    1. Preparation: Strategies for researching and organizing a technical topic.
    2. Presentation: Focus on delivery, visual aids, and handling questions.
    3. Judging Criteria: Evaluation criteria for Public Speaking

Course Type	**Embedded Theory and Lab(ETL)**
Mode of Evaluation	**Theory** **75%** Exam 1 15 Exam 2 15 Assignment / Quiz 20 Final Assessment Test 50 **Laboratory** **25%**
Prepared by	Ms. Sonia Verma
Recommended by the Board of Studies on	1st BOS, 11.09.24
Date of Approval by the Academic Council	**1st Academic Council 25-10-24**

For Chandigarh Engineering College, Jhanjeri, An Autonomous College

Bachelor of Technology (B. Tech. 1st Year batch 2023 & Onwards

Course Code: USC103	**Course Title : Modern Physics**	**TPC**	**3**	**2**	**4**
Version No.	**1.0**				
Course Pre-requisites/ Co-requisites	**None**				
Anti-requisites (if any)	**None**				
Objectives:	The goal of the course is to cultivate a scientific mindset and analytical skills in engineering graduates by exploring physical concepts and their applications in engineering and technology. Understanding fundamental physical principles will equip graduates to approach engineering challenges logically, particularly those arising from rapidly advancing technologies.				

Course Outcomes

Course Outcomes	Course Outcome Statement
CO1	Understand the properties of solid and X-ray and use of X- rays in solid.
CO2	Understand the working, properties and application of semiconductor.
CO3	Acquire knowledge about the Magnetic material, superconductor, and Optical Fibre.
CO4	Illustrate the concept of Electromagnetic waves and nanomaterials.
CO5	Understand the concept for quantum mechanics. Also explain the concept of Laser system.

Detailed Syllabus:

Module No.-1	**Elements of crystallography and X- Rays**	**6 Hours**
Unit cell, Basis, Space lattice, Crystal Systems, Miller Indices of Planes and directions, bonding in solids, origin of bands in solids (Qualitative idea), Metals, semiconductors & insulators; Continuous & Characteristic X - Rays, X - Ray Diffraction & Bragg's law in Crystals, Bragg's spectrometer.		
Module No.-2	**Semiconductor Materials**	**6 Hours**
Intrinsic and extrinsic semiconductors, p-type, and n-type semiconductors; Fermi level in semiconductors; Current conduction in semiconductors, I-Vcharacteristics of p-n junction diode, Some special p-n diodes: Zener diode, Tunnel diode and Light emitting diode.		
Module No.-3	**Magnetic Materials, Superconductivity and Fibre Optics**	**10 Hours**
Basic ideas of Dia, Para, Ferro & Ferromagnetic materials, Ferrites, Hysteresis loop. **Superconductivity**, Superconductors as ideal diamagnetic materials, Signatures of Superconducting state, Meissner Effect, Type I & Type II superconductors, London Equations. **Fibre Optics** Introduction, Acceptance Angle, Numerical Aperture, Normalized frequency, Modes of propagation, material dispersion & pulse broadening in optical fibres, Applications of optical fibres		
Module No. 4	**EM waves & Dielectrics and Nanomaterials**	**12 Hours**
Physical significance of Gradient, Divergence & Curl, Dielectric polarization, Displacement current, Maxwell's Equations, electromagnetic wave propagation in free space and isotropic dielectric medium, Poynting vector. **Nanomaterials:-** Nanoscale, Classifications of nanomaterials (3D, 2D, 1D and 0D), electron confinement,		

Nanocomposites, Carbon nanotubes (CNTs), Properties of nanomaterials, synthesis of nanomaterials, ball milling and sol-gel techniques Applications of nanomaterials.

Module No. 5	**Quantum Theory and Lasers**	**11 Hours**

Need and origin of quantum concept, Wave - particle duality, Matter waves, Group & Phase velocities, Uncertainty Principle; Schrodinger wave equations (time independent & dependent); Application to particle in a box.

Lasers : Concepts of laser, Spontaneous & Stimulated emissions, Einstein's Coefficients, Population Inversion, Pumping Mechanisms, Components of a laser System, Three & four level laser systems; Ruby, He -Ne, and semiconductor Lasers.

Text Books

1. A Textbook Of Engineering Physics by M N Avadhanulu, P G Kshirsagar , TVS Arun Murthy, S Chand Publisher,2020
2. Engineering Physics Paperback by Sujay Kumar Bhattacharya , McGraw Hill, 2019.

References

1) SOLID STATE PHYSICS , 10TH EDITION by S.O. Pillai , New Age International Publisher, 2022
2) Introduction to Electrodynamics, Griffiths; DJ, Prentice Hall. 1 January 2020
3) Materials Science &Engg., Raghvan V., Prentice Hall of India. 1 January 2015
4) Lasers- Fundamentals and Applications Paperback – 1, Ajoy Ghatak K.Thyagarajan, Laxmi Pulisher, 2019.

Lab Exercises

1. To find out the frequency of AC mains using electric vibrator.
2. To find out the dielectric constant of a dielectric substance.
3. To study the characteristic of different p-n junction diode.
4. To find out the intensity response of a LED.
5. To analyze the suitability of a given Zener diode as voltage regulator.
6. To determine energy band gap of Semiconductor.
7. To study the magnetic field of a circular coil carrying current.
8. To study B-H curve using CRO.
9. To study the divergence of a laser beam.
10. To determine the resistivity of semiconductors by Four probe Method.
11. To determine numerical aperture, attenuation & propagation losses in optical fibers.

Course Type	**Embedded Theory and Lab(ETL)**	
Mode of Evaluation	**Theory**	**75%**
	Assignment/Quiz 20	
	Exam-1 15	
	Exam-2 15	
	Final Assessment Test 50	
	Laboratory	**25%**
Prepared by	Mr. Ashish Kumar	
Recommended by the Board of Studies on	1st BOS, 11.09.24	
Date of Approval by the Academic Council	**1st Academic Council 25-10-24**	

For Chandigarh Engineering College, Jhanjeri, An Autonomous College

Bachelor of Technology (B. Tech. 1st Year batch 2023 & Onwards)

Course Code: UEC101	**Course Title : Basic Electrical and Electronics Engineering**	**TPC**	**3**	**2**	**4**
Version No.	**1.0**				
Course Pre-requisites/ Co-requisites	**None**				
Anti-requisites (if any)	**None**				
Objectives:	1. To understand the basic concepts of electrical circuits. 2. To understand and analysis of AC & DC circuits. 3. To understand the working and construction of Transformer, DC & AC machines. 4. To understand electrical installation, cables and wires. 5. To understand transducers.				

Course Outcomes

Course Outcomes	Course Outcome Statement
CO1	Outline the basic concept of DC and AC Electrical circuits
CO2	Apply the fundamental principles on problems of DC & AC electrical circuits.
CO3	Explain the working of transformer and constructional details of DC machines and Induction Motors.
CO4	Illustrate the different electrical components, wiring and earthing for electrical installations.
CO5	Outline the basic concept of transducer.

Detailed Syllabus:

Module No. 1	**DC Circuits**	**10 Hours**

Basic introduction of Electrical circuit elements (R, L and C), voltage and current sources, Kirchoff's current and voltage laws. Superposition, Thevenin's and Norton's Theorems.

Module No. 2	**AC Circuits**	**10 Hours**

Representation of sinusoidal waveforms, peak and rms values, phasor representation, real power, reactive power, apparent power, power factor. Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC combinations (series and parallel), resonance. Voltage and current relations in star and delta connections.

Module No. 3	**Electrical Machines**	**10 Hours**

BH Curve characteristics, ideal and practical transformer, equivalent circuit, losses in transformers, regulation, and efficiency. Auto-transformer. Generation of rotating magnetic fields, Construction and working of a three-phase induction motor, Significance of torque-slip characteristic. Loss components and efficiency. Single-phase induction motor. Construction, working, torque-speed characteristic of single phase and 3-phase induction mototr, Construction and working of dc motor. Construction and working of synchronous generators.

Module No. 4	**Electrical Installations**	**10 Hours**

Components of LT Switchgear: Switch Fuse Unit (SFU), Miniature Circuit Breaker (MCB), Earth Leakage Circuit Breaker (ELCB), MCCB, Types of Wires and Cables, Earthing. Types of Batteries, Important Characteristics for Batteries. Elementary calculations for energy consumption.

Module No. 5	**Transducers**	**5 Hours**

Introduction, working and application of LVDT, Introduction and application of Digital Multimeter.

Text Books

1. S.K Sahdev, "Basic Electrical Engineering", Khanna Publishing House, August,2021.
2. J. B. Gupta, "Basic Electrical Engineering", S.K. Kataria & Sons, 17th Edition 2023.
3. D. P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, 2020.
4. S.K. Bhattacharya, "Basic Electrical Engineering", Pearson Publications, June, 2019.
5. A.K Sawhney, "A Course in ELECTRICAL AND ELECTRONIC MEASUREMENTS
6. AND INSTRUMENTATION" Shree Hari Publications, 1 January 2021

References

1. T.K. Nagsarkar and M.S. Sukhija, "Basic Electrical Engineering", Oxford University Press, 2017.

2. Chakrabarti A., Nath S. and Chanda K. C., Basic Electrical Engineering, Tata McGraw-Hill, 2021.

3. D. C. Kulshreshtha, "Basic Electrical Engineering", Tata McGraw Hill, 2019.

Lab Exercises

1. To verify Ohm's Law and its limitations.
2. To verify Kirchhoff's Laws.
3. To measure the resistance and inductance of a coil by ammeter-voltmeter Method
4. To verify series and parallel resonance in AC circuits.
5. To measure the minimum operating voltage, current drawn, power consumed, and the power factor of a fluorescent tube light, Bulb, Single phase induction motor,
6. To start and reverse the direction of rotation of a three phase Induction motor.
7. To start and reverse the direction of rotation of a DC motor.
8. Study of Cut section of DC shunt motor.
9. Study of Cut section of three phase induction motor
10. To measure power and power factor in a single- phase AC circuit.
11. To perform open- and short circuit tests on a single- phase transformer and calculate its efficiency.
12. Study of Digital Multimeter.
13. To observe the B-H loop on CRO.

Course Type	**Embedded Theory and Lab(ETL)**
Mode of Evaluation	**Theory** **75%** EXAM-1 15 EXAM-2 15 Assignment/ Quiz/Class Test 20 Final Assessment Test 50 **Laboratory** **25%**
Prepared by	**Dr. Jatinder Kaur**
Recommended by the Board of Studies on	**1st BoS 16-09-2024**
Date of Approval by the Academic Council	**1st Academic Council 25-10-24**

For Chandigarh Engineering College, Jhanjeri, An Autonomous College

Bachelor of Technology (B. Tech. 1st Year batch 2023 & Onwards)

Course Code: UCS102	**Course Title:** Problem Solving using Python	**TPC**	**3**	**2**	**4**
Version No.	**1.0**				
Course Pre-requisites/ Co-requisites	**None**				
Anti-requisites (if any).	**None**				
Objectives:	1. To understand why Python is a useful scripting language for developers. 2. To learn how to design and write programs in Python 3. To understand basic data structures, branching and looping constructs. 4. To understand user defined functions and file handling, 5. To learn type conversions and String Operations.				

CO-PO Mapping

Course Outcomes	Course Outcome Statement	PO's / PEO's
CO1	Develop solutions through algorithms and flowcharts	PO1, PO2, PO3, PO4, PO5
CO2	Implement simple programs using expressions and statements	PO1, PO2, PO3, PO5
CO3	Apply the concepts of looping statements and regular expressions to solve complex problems	PO1, PO2, PO3, PO4, PO5, PO6
CO4	Analyse the concepts of data types and data structures to deploy solutions for real time applications	PO1, PO2, PO3, PO4, PO5, PO6
CO5	Decide the and modules based on the application domain	PO1, PO2, PO3, PO4, PO5, PO6
CO6	Create applications based on theuser defined functions, file processing and string concepts	PO1, PO2, PO3, PO4, PO5, PO6
	TOTAL HOURS OF INSTRUCTIONS: 45	

Module No. 1	**Introduction to Problem Solving**	**8 Hours**

Problem Solving definition and steps, developing an algorithm, flowcharts and pseudocode, Introduction to Python, Interactive and script mode, Indentation, Comments, Tokens in Python – Variables, Keywords, Literals, Data types, Expressions, Input and Print functions.

Module No. 2	**Operators and Branching**	**6 Hours**

Operators and its precedence, Arithmetic Operators, Comparison (Relational) Operators, Assignment Operators, Logical Operators, Bitwise Operators, Membership Operators, Identity Operators, Branching Statements-if; if else, nested if; nested if else, elif

Module No. 3	Loops and Regular Expressions	7 Hours

Creating Loops with while and for, Different versions of Loops, Nested Loops, Loop Control Statements, Loop Modification with break, continue and pass, Regular Expressions.

Module No. 4	Basic Data Structures	12 Hours

Introduction to Different Numeric Types, Type Conversion, Mathematical Functions, Random Numbers. Creating and Accessing Strings, Operations on Strings, Indexing, Slicing, String Manipulations, Pre-defined functions on Strings.
Creating, Accessing and Manipulating Lists, Sets, Tuples and Dictionaries, Understanding the differences among them, Applications of the Data Structures. Using Branching and Control loops with Data structures, Matrix Operations using Numpy.

Module No. 5	Functions , Strings & Files	12 Hours

Pre-defined functions, User defined functions, formal and actual parameters, return statement, Using Branching, Looping and Data structures in Functions, Recursion, Internal workflow of Recursion, Modules.
File I/O-Opening and Closing files, Different modes, File attributes, Read, Write Operations, File Positions. Renaming and Deleting Files, various directory handling functions.

Text Books

1. Kenneth Lambert, "Fundamentals of Python: First Programs", Cengage Learning, 2019
2. Martin C Brown, "The Complete Reference with Python", McGrawHill, 2018.

References

1. John Zelle, Python Programming: An introduction to Computer Science, Franklin Associates, Third Edition, 2016.
2. Mark Lutz, "Learning Python", Fifth edition, O'Reilly, 2013.

List of Laboratory Experiments

Week 1:

1. Write a Python program to display the current date and time.
2. Write a Python program to get the Python version you are using
3. Write a Python program that accepts an integer (n) and computes the value of n+nn+nnn
4. Write a Python program to read and print various types of variables.
5. Write a Python program to print the calendar of a given month and year.

Week 2:

1. Python Program to Find the Square Root
2. Python Program to Calculate the Area and Perimeter of Triangle and Circle.
3. Python Program to Solve Quadratic Equation
4. Python Program to Swap Two Variables
5. Python Program to Convert Kilometres to Miles
6. Python Program to Convert Celsius To Fahrenheit

Week 3:

1. Python program to find whether the given number is Even or Odd
2. Write a Python program to get the difference between a given number and 17, if the number is greater than 17 return double the absolute difference
3. Write a Python program to test whether a number is within 100 of 1000 or 2000.
4. Write a Python program to calculate the sum of three given numbers, if the values are equal then return three times of their sum
5. Python Program to Find the Factorial of a Number
6. Python Program to print maximum of 3 numbers
7. Write a python program to find whether a given year is leap or not.

Week 4:

1. Write a program which will find all such numbers which are divisible by 7 but are not a multiple of 5, between 2000 and 3200 (both included).
    a. The numbers obtained should be printed in a comma-separated sequence on a single line. Consider use range(#begin, #end) method
2. Write a python program to check whether a number is divisible by 5 and 11 or not.
3. Write a python program to check whether a character is alphabet or not.
4. Write a python program to input any character and check whether it is alphabet, digit or special character.
5. Write a python program to check whether a character is uppercase or lowercase alphabet.
6. Write a python program to input week number and print week day.
7. Write a python program to count total number of notes in given amount

Week 5:

1. Write a Python program to print all natural numbers from 1 to n. - using while loop
2. Write a Python program to find sum of all odd numbers between 1 to n.
3. Write a Python program to count number of digits in a number.
4. Write a Python program to find first and last digit of a number.
5. Write a Python program to calculate sum of digits of a number.
6. Write a Python program to enter a number and print its reverse.

Week 6:

1. Write a Python program to check whether a number is palindrome or not.
2. Write a Python program to find frequency of each digit in a given integer.
3. Write a Python program to print all ASCII character with their values.
4. Write a Python program to find all factors of a number.
5. Write a Python program to calculate factorial of a number.
6. Write a Python program to print all Prime numbers between 1 to n.
7. Write a Python program to check whether a number is Armstrong number or Strong or Prime Number or Perfect number or magic number or not
8. Write a Python program to print Fibonacci series up to n terms.

Week 7:

1. Write a Python Program to Find the Largest Number in a List
2. Write a Python Program to Find the Second Largest Number in a List
3. Write a Python Program to Put Even and Odd elements in a List into Two Different Lists
4. Write a Python Program to Merge Two Lists and Sort it
5. Write a Python Program to Sort the List According to the Second Element in Sublist
6. Write a Python Program to Find the Second Largest Number in a List Using Bubble Sort
7. Write a Python Program to Sort a List According to the Length of the Elements
8. Write a Python Program to Find the Union of two Lists
9. Write a Python Program to Find the Intersection of Two Lists
10. Python Program to print all odd indexed elements of a list

Week 8:

1. Write a Python program to get the 4th element and 4th element from last of a tuple
2. Write a Python program to find the repeated items of a tuple.
3. Write a Python program to check whether an element exists within a tuple
4. Write a Python program to unzip a list of tuples into individual lists.
5. Write a Python program to replace last value of tuples in a list. Sample list: [(10, 20, 40), (40, 50, 60), (70, 80, 90)] Expected Output: [(10, 20, 100), (40, 50, 100), (70, 80, 100)]
6. Write a Python program to remove an empty tuple(s) from a list of tuples. Sample data: [(), (), ('',), ('a', 'b'), ('a', 'b', 'c'), ('d')] Expected output: [('',), ('a', 'b'), ('a', 'b', 'c'), 'd']
7. Write a Python program to convert a list of tuples into a dictionary.
8. Write a Python program to find the highest 3 values of corresponding keys in a dictionary.

Week 9:

1. Write a Python function that prints out the first n rows of Pascal's triangle.
2. Write a Python function to create and print a list where the values are square of numbers between 1 and 30 (both included).
3. Write a Python program to detect the number of local variables declared in a function
4. Write a Python program that invoke a given function after specific milliseconds.
5. Write a Python program to get the sum of a non-negative integer

Week 10:

1. Write a Python program to calculate the harmonic sum of n-1
2. Write a Python program to calculate the sum of the positive integers of n+(n-2)+(n- 4)... (until n-x =< 0)
3. Write a Python program to find the greatest common divisor (gcd) of two

integers using Recursion

4. Implement any sorting algorithm using Recursion.

Week 11:

1. Write a Python Program to Replace all Occurrences of 'a' with 'b' in a String. If 'a' is not present, then print appropriate message.
2. Write a Python Program to Remove the nth Index Character from a Non-Empty String
3. Write a Python Program to Detect if Two Strings are Anagrams
4. Write a Python Program to Form a New String where the First Character and the Last Character have been Exchanged.

Week 12:

1. Write a Python program to get the last part of a string before a specified character
2. Write a Python program to count the occurrences of each word in a given sentence.
3. Write a Python function to insert a string in the middle of a string.
4. Write a Python function to get a string made of its first three characters of a specified string. If the length of the string is less than 3 then return the original string.
5. Write a Python program to add a prefix text to all of the lines in a string
6. Write a Python program to convert a given string into a list of words.

A few Programming exercises for Competitive Coding (optional) :

1. Remove Duplicate Char from String
2. Hailstone Sequence
3. Secure Conversation by Encryption and Decryption
4. Special Elements in Matrix
5. Next Greater No with the Same set of Digits
6. Smallest Subarray with Sum Greater than Given Number
7. Group Anagrams
8. Find Duplicates in Array in O(n)
9. Find Two Unique Numbers from Array in O(n)
10. Number Patterns & Finding Smallest Number
11. Minimum Distance for Truck to Deliver Order [Amazon]
12. Generate Balanced Parentheses

Course Type	**Embedded Theory and Lab (ETL)**
Mode of Evaluation	**Theory** **75%** Examination-1 15 Examination-2 15 Assignment/ Quiz 20 Final Assessment Test 50 **Laboratory** **25%**
Prepared by	Ms. Neha Dhiman
Recommended by the Board of Studies on	**1st BoS 11-09-2024**
Date of Approval by the Academic Council	**1st Academic Council 25-10-24**

For Chandigarh Engineering College, Jhanjeri, An Autonomous College

Bachelor of Technology (B. Tech. 1st Year batch 2023 & Onwards)

Course Code: UVC202	**Course Title** Indian Constitution	**TPC**	**2**	**0**	**2**
Version No.	**1.0**				
Course Pre-requisites/ Co-requisites	**None**				
Anti-requisites (if any)	**None**				
Objectives:	The Constitution of India is the supreme law of India. Parliament of India can not make any law which violates the Fundamental Rights enumerated under the Part III of the Constitution. The Parliament of India has been empowered to amend the Constitution under Article 368, however, it cannot use this power to change the "basic structure" of the constitution, which has been ruled and explained by the Supreme Court of India in its historical judgments. The Constitution of India reflects the idea of "Constitutionalism" – a modern and progressive concept historically developed by the thinkers of "liberalism" – an ideology which has been recognized as one of the most popular political ideology and result of historical struggles against arbitrary use of sovereign power by state. The historic revolutions in France, England, America and particularly European Renaissance and Reformation movement have resulted into progressive legal reforms in the form of "constitutionalism" in many countries. The Constitution of India was made by borrowing models and principles from many countries including United Kingdom and America.				
Module No. 1					
Meaning of the constitution law and constitutionalism Historical perspective of the Constitution of India Salient features and characteristics of the Constitution of India Scheme of the fundamental rights The scheme of the Fundamental Duties and its legal status The Directive Principles of State Policy – Its importance and implementation Federal structure and distribution of legislative and financial powers between the Union and thn States Parliamentary Form of Government in India – The constitution powers and status of the President of India Amendment of the Constitutional Powers and Procedure The historical perspectives of the constitutional amendments in India Emergency Provisions : National Emergency, President Rule, Financial Emergency Local Self Government – Constitutional Scheme in India Scheme of the Fundamental Right to Equality Scheme of the Fundamental Right to certain Freedom under Article 19 Scope of the Right to Life and Personal Liberty under Article 21					

For Chandigarh Engineering College, Jhanjeri, An Autonomous College

Bachelor of Technology (B. Tech. 1st Year batch 2023 & Onwards)

Course Code: USS101	**Course Title:** Industry Specific Communication	**LTPC**	3	0	0	3
Version No.	1.0					
Course Pre-requisites/ Co-requisites	None					
Anti-Requisites (if any)	None					
Objectives:	• To understand the fundamental concepts of effective communication and develop skills in English grammar and soft skills. • To choose appropriate communication techniques and strategies based on the requirements of specific professional scenarios. • To learn how to construct clear and impactful written and verbal communication for academic and professional settings. • To evaluate various communication methods, understand their applications and limitations, and use the most effective approach to address real-world challenges.					

CO-PO Mapping

Course Outcomes	Course Outcome Statement	PO's / PSO's
CO1	Demonstrate a strong grasp of English grammar, enabling error-free communication in both written and verbal formats.	(PO8, PO9, PO10 & PO12)
CO2	Develop the ability to articulate thoughts clearly and confidently in diverse professional and social contexts.	(PO8, PO9, PO10 & PO12)
CO3	Create impactful resumes, cover letters, and emails that meet industry standards and convey professionalism.	(PO8, PO9, PO10 & PO12)
CO4	Apply soft skills such as active listening, teamwork, and conflict resolution to build strong professional relationships.	(PO8, PO9, PO10 & PO12)
CO5	Exhibit polished communication and presentation skills, ensuring readiness for interviews, group discussions, and workplace interactions.	(PO8, PO9, PO10 & PO12)

Module No. 1	**Introduction to Communication**	**9 Hours**

Introduction to Soft Skills Essentials: Communication, Collaboration & More, Getting to Know You: Self-Introduction Mastery and Introducing Me: Practice Your Story , The Art of Communication: Verbal Ability Basics, Word Power: Building Your Vocabulary

Module No. 2	**Speaking Skills, Reading and Understanding**	**9 Hours**

Unspoken Impact: Elevating Your Body Language, Discover You: The Journey of Self-Awareness and Self-Discovery: Understanding Who You Are , Word Fix: Mastering Commonly Confused & Misspelled Words, Sentence Symphony: Understanding Sentence Types

Module No. 3	**Building Confidence through Technical Communication**	**9 Hours**

Acting As You: Building Confidence with Role Plays and Exploring Different Versions of Yourself, Unlock Your Potential: Exploring the Holland Code, Beyond Boundaries: The Art of Creative Writing, The Great Exchange: Thoughtful Debate/Discussion.		
Module No. 4	**Communication Essentials for Professionals**	**9 Hours**
Picture Perfect: Building Descriptive Skills, Quick Talk: The JAM Session Challenge, Grammar & Usage: The Cornerstones of Clear Expression, Spot the Mistakes: Correct the Errors, Say It Right: Mastering Common Mispronunciations		
Module No. 5	**Building Industry-Ready Soft Skills**	**9 Hours**
Sharpen Your Edge: Soft Skills Q&A Session, Active Listening and Effective Speaking, Role Play Ensemble: Strengthening Team Skills, Word Wise: Verbal Ability Practice Test		

Text Books

1. Carnegie, Dale. The Art of Public Speaking: Seventh Edition Prabhat Prakashan Pvt. Ltd, 2020
2. Murphy, Raymond. Essential English Grammar with Answers: Second Edition, Cambridge University Press, 2024

References

1. Wren, P.C., and Martin, H. High School English Grammar and Composition Book (Regular Edition). New Delhi, S. Chand Publishing, 2023.
2. Carnegie, Dale. How to Win Friends and Influence People. New York, Simon and Schuster, 2024.

Mode of Evaluation	**Theory**	**100%**
	Examination-1	15
	Examination-2	15
	Assignment/ Quiz	20
	Final Assessment Test	50
Prepared by	**Ms. Akshdeep Kaur & Ms. Aakriti Mahajan**	
Recommended by the Board of Studies on	**1st BoS 11-09-2024**	
Date of Approval by the Academic Council	**1st Academic Council 25-10-24**	

Study Scheme & Syllabus of

Bachelor of Technology

(1st/2nd Semester)

Batch 2024 & Onwards

(For Chandigarh Engineering College, Jhanjeri, An Autonomous College)

By

Department of Academics & Approved by BoS & Academic Council

IK Gujral Punjab Technical University
Chandigarh Engineering College, Jhanjeri, An Autonomous College
Bachelor of Technology (B. Tech 1st year batch 2024 & onwards)

Bachelors of Technology 2nd Semester
It is an Under Graduate (UG) Programme of 4 years duration (8 semesters)
Eligibility for Admission: As per AICTE norms.
Scheme followed by the following Branches:

- ✓ B. Tech ECE

Second Semester **Contact Hours: 29**

Course Code	Type of Course	Course Title	Hours per Week			Marks Distribution		Total Marks	Credits
			T	P	C	Internal	External		
USC103	UC-Sci	Modern Physics	3	2	4	50	50	100	4
USC102	UC-Sci	Linear Algebra and Differential Equations	4	0	4	50	50	100	4
UEC101	UC-Engg	Basic Electrical and Electronics Engineering	3	2	4	50	50	100	4
UCS102	UC-Engg	Problem Solving using Python	3	2	4	50	50	100	4
UHM102	UC-H&M	English for Effective Communication	2	2	3	50	50	100	3
USS101	UC-H&M	Industry Specific Communication	3	0	3	50	50	100	3
TOTAL			**18**	**8**	**22**	**300**	**300**	**600**	**22**

***These are the minimum contact hrs. allocated. The contact hrs. may be increased by the department as per the requirement of the subject.**

B. Definition of Credit:

1 Hr. Lecture (T) per week	1 credit
2 Hours Practical /Lab (P) per week	1 credit

B. Range of credits –

A range of credits from 150 to 160 for a student to be eligible to get Under Graduate degree in Engineering. A student will be eligible to get Under Graduate degree with Honours or additional Minor Engineering, if he/she completes an additional 20 credits. These could be acquired through MOOCs.

C. Structure of Undergraduate Engineering program:

Credit Distribution	
Under Graduate degree in Engineering	Credits
Foundation Core Courses	
Engineering Foundation (20 credits)	84
Science Basket (20 credits)	
Projects and Internships (18 credits)	
Humanities (20 credits)	
NGCR - Non-graded Core Requirement (6 credits)	
Discipline Core Courses	43
Discipline/ Specialization Elective Courses	24
Open Elective Courses	9
Total Credits	160

We follow same guidelines as per the PTU B. Tech 1st Year Syllabus (Batch 2023 Onwards) as mentioned on the PTU Website from Page 5 to Page 13.

For Chandigarh Engineering College, Jhanjeri, An Autonomous College

Bachelor of Technology (B. Tech. 1st Year batch 2023 & Onwards)

Course Code: USC102 (Common to all branches)	**Course Title : LINEAR ALGEBRA & DIFFERNTIAL EQUATIONS**	**TPC**	**4**	**0**	**4**
Version No.	**1.0**				
Course Pre-requisites/ Co-requisites	• Basic concept of Matrices & Determinant. • Basic concept of Differential Equations.				
Anti-requisites (if any)	**None**				
Objectives:	The objective of the **LINEAR ALGEBRA & DIFFERNTIAL EQUATIONS** is to familiarize the prospective engineers with techniques in multivariate integration, ordinary , partial differential equations and Linear Algebra. It aims to equip the students to deal with advanced level of mathematics and applications that would be essential for their disciplines.				

CO-PO Mapping

Course Outcomes	Course Outcome Statement	PO's / PSO's
CO1	To gain the knowledge of Ordinary differential equations and discuss its applicability to trained to visualize and conceptualize the engineering problems	PO1, PO2, PO9, PO10.
CO2	To determine the rank and inverse of matrices by elementary transformations.	PO1, PO2, PO9, PO10.
CO3	Use the knowledge to model the engineering problem mathematically using theory of matrices and linear algebra.	PO1, PO2, PO9, PO10.
CO4	Illustrate the concept of vector spaces & linear transformations of finite dimensional vector spaces.	PO1, PO2, PO9, PO10.
CO5	Learn the methods to solve Partial Differential Equations.	PO1, PO2, PO9, PO10.
TOTAL HOURS OF INSTRUCTIONS: 60		

Module No. 1	**Ordinary differential equations: First and Higher order:**	**15 Hours**

First order Exact differential equations, integrating factors, Linear first order equations, Bernoulli equation, Clairaut's equation, Higher order differential equation with constant coefficients. Method of variation of parameters, Cauchy-Euler equation; Legendre's Linear differential equation, finding

particular integrals.		
Module No. 2	**System of Linear Equations:**	**10 Hours**
Rank of a matrix, Echelon form of matrix, Homogenous and Non homogenous system of linear equations, consistency and inconsistency of system of equations, Gauss elimination method, Inverse of a matrix, Gauss-Jordon method.		
Module No. 3	**Linear Algebra**	**10 Hours**
Eigen values, eigen vectors, Cayley-Hamilton theorem, algebraic multiplicity, geometric multiplicity, similar and diagonalizable matrices.		
Module No. 4	**Vector spaces:**	**15 Hours**
Vector spaces, Subspaces, Linear independence and Linear dependence of vectors, Dimension and basis, Linear transformation, rank and nullity theorem (without proof), matrix associated with Linear Transformation,		
Module No. 5	**Partial Differential Equations:**	**10 Hours**
Formation of first order equations, solution of first order equations Lagrange's equation, Higher order Linear equations with constant coefficients.		

Text Books

4. Dr. Rajesh Kumar Narula, Engineering Mathematics-II, Sharma Publications. 2024.
5. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 40th Edition, 2020.
6. N.P.Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2021.

References

1. Maurice D. Weir, Joel Hass, Christopher Heil, "Thomas' Calculus" 14th edition, Pearson Education, 2018.

2. R.K. Jain and S.R.K. Iyengar, "Advanced Engineering Mathematics" Narosa Publications, 2022.

3. B. V. Ramana, "Higher Engineering Mathematics", Tata McGraw Hill,2017.

4. R. Garg, "Mathematics – I", Khanna Book Publishing Co. (P) Ltd. https://ekumbh.aicte-india.org/userugbook.php, 2021.

Course Type	**THEORY**
Mode of Evaluation	**Theory 100%** **Exam-I 15** **Exam-II 15** **Assignment/ Quiz 20** **Final Assessment Test 50**
Prepared by	Ms. Deepika Gakhar
Recommended by the Board of Studies on	1st BOS, 11.09.24
Date of Approval by the Academic Council	**1st Academic Council 25-10-24**

For Chandigarh Engineering College, Jhanjeri, An Autonomous College

Bachelor of Technology (B. Tech. 1st Year batch 2023 & Onwards)

Course Code: UHM102	**Course Title : English for Effective Communication**	**TPC**	**2**	**2**	**3**
Version No.	**1.0**				
Course Pre-requisites/ Co-requisites	**UHM101**				
Anti-requisites (if any)	**None**				
Objectives:	3. Learn to communicate cohesively in writing and speaking by understanding different types of communication, improving grammar, and writing professional documents. 4. Learn to plan and deliver speeches, use different speaking styles, and practice negotiation and public speaking skills through hands-on activities.				

CO-PO Mapping

Course Outcomes	Course Outcome Statement	PO's / PSO's
CO1	**Differentiate between verbal and non-verbal communication and assess the impact of barriers.**	PO(8,9,10&12), PSO(1)
CO2	**Use advanced grammar and techniques to write clear and cohesive texts.**	PO(8,9,10&12), PSO(1)
CO3	**Apply effective writing steps to produce concise engineering documents.**	PO(8,9,10&12), PSO(1)
CO4	**Create professional emails and business letters with proper tone and structure.**	PO(8,9,10&12), PSO(1)
CO5	**Analyze literary works to explain themes of resilience and leadership and their relevance.**	PO(8,9,10&12), PSO(1)
TOTAL HOURS OF INSTRUCTIONS: 30		

Module No. 1	**Communication Forms and Barriers**	**7 Hours**

6. Listening Barriers: Examine factors that affect effective listening.
7. Interpersonal Communication: Understand one-on-one and small group interactions.
8. Mass and Media Communication: Study communication through media channels.
9. Verbal and Non-Verbal Communication: Explore both spoken and body language, and their barriers.
10. Physical and Psychological Barriers: Identify obstacles like environmental distractions and mental blocks

Module No. 2	**Mechanics of Writing and Grammar Review**	**7 Hours**

7. Enhancing Text Cohesion: Using Cohesive Devices Effectively
8. Advanced Sentence Structures: Compound-Complex structures
9. Misplaced Modifiers: Remove ambiguity
10. Idioms, Phrases, and Figures of Speech in Professional Writing
11. Homonyms, Homophones, and Homographs: Avoiding Confusion
12. One-Word Substitutions for Conciseness and Precision

Module No. 3	Precision in Engineering Writing	4 Hours

3. The art of condensation & Paraphrasing
4. Seven steps of writing effective Precise

Module No. 4	Professional Writing for the Workplace	7 Hours

5. Write Professional Emails: Tone of professional emails.
6. Meeting Minutes: summarizing key points and decisions.
7. Improve Note-Taking and Note-Making: meetings or lectures reading or research notes
8. Write Effective Letters: Inquiry Letters, Complaint Letters, Order Letters, Response Letters & Cover Letter

Module No. 5	Literary Perspectives on Resilience and Leadership	5 Hours

Understanding tone and learning to utilize it in writing business documents

Text Books

6. "The Harvard Business Review Guide to Better Business Writing" by Bryan A. Garner (2022) - Harvard Business Review Press.
7. "Advanced English Grammar: A Linguistic Approach" by Ilse Depraetere (2021) - Bloomsbury Academic.
8. "English Idioms in Use: Advanced" by Michael McCarthy and Felicity O'Dell (2021) - Cambridge University Press.
9. "Technical Writing for Engineers & Scientists" by Leo Finkelstein (2020) - McGraw-Hill Education.
10. "Business Writing: What Works, What Won't" by Wilma Davidson (2020) - St. Martin's Griffin.

References

5. "Media and Communication" by Pieter J. Fourie (2022) Publisher: Routledge
6. "Engineering Writing by Design: Creating Formal Documents of Lasting Value" by Edward J. Rothwell and Michael J. Cloud (2021) Publisher: Wiley
7. "Write to Influence!: Personnel Appraisals, Resumes, Emails, and More" by Carla D. Bass (2021) Publisher: Routledge
8. "The Elements of Style: Grammar Workbook" by William Strunk Jr. & Richard De A'Morelli (2020) Publisher: Penguin Publishing Group

Lab Exercises

7. **Speech Planning and Delivery**
   4. Topic Selection: How to choose and refine a speech topic.
   5. Research and Organization: Techniques for researching and structuring content.
   6. Rehearsal and Delivery: Tips for practicing and delivering a speech effectively.

8. **Different Styles of Speaking**
   4. Informative vs. Persuasive Speeches: Differences and techniques for each.
   5. Adaptation to Audience: How to tailor speeches to different audiences.
   6. Judging Criteria: Evaluation criteria for speaking styles

9. **Persuasive Techniques**
   4. Rhetorical Devices: Use of ethos, pathos, and logos.
   5. Practical Exercises: Implement techniques in sample speeches or exercises.
   6. Analysis: Review effective use of these techniques in famous speeches or presentations.

10. The Art of Negotiation

4. Role-Play Exercises: practice real-life negotiation scenarios.
5. Techniques: Focus on persuasive language
6. Judging Criteria: Evaluation criteria for negotiation skills

11. Debates

4. Debate Formats: learning different formats
5. Roles: Define specific roles (e.g., speaker, rebuttal, and cross-examiner).
6. Judging Criteria: Evaluation criteria for debate performance.

12. Public Speaking Skills

4. Preparation: Strategies for researching and organizing a technical topic.
5. Presentation: Focus on delivery, visual aids, and handling questions.
6. Judging Criteria: Evaluation criteria for Public Speaking

Course Type	**Embedded Theory and Lab(ETL)**
Mode of Evaluation	**Theory** **75%** Exam 1 15 Exam 2 15 Assignment / Quiz 20 Final Assessment Test 50 **Laboratory** **25%**
Prepared by	Ms. Sonia Verma
Recommended by the Board of Studies on	1st BOS, 11.09.24
Date of Approval by the Academic Council	**1st Academic Council 25-10-24**

For Chandigarh Engineering College, Jhanjeri, An Autonomous College

Bachelor of Technology (B. Tech. 1st Year batch 2023 & Onwards

Course Code: USC103	**Course Title : Modern Physics**	**TPC**	**3**	**2**	**4**
Version No.	**1.0**				
Course Pre-requisites/ Co-requisites	**None**				
Anti-requisites (if any)	**None**				
Objectives:	The goal of the course is to cultivate a scientific mindset and analytical skills in engineering graduates by exploring physical concepts and their applications in engineering and technology. Understanding fundamental physical principles will equip graduates to approach engineering challenges logically, particularly those arising from rapidly advancing technologies.				

Course Outcomes

Course Outcomes	Course Outcome Statement
CO1	Understand the properties of solid and X-ray and use of X- rays in solid.
CO2	Understand the working, properties and application of semiconductor.
CO3	Acquire knowledge about the Magnetic material, superconductor, and Optical Fibre.
CO4	Illustrate the concept of Electromagnetic waves and nanomaterials.
CO5	Understand the concept for quantum mechanics. Also explain the concept of Laser system.

Detailed Syllabus:

Module No.-1	**Elements of crystallography and X- Rays**	**6 Hours**
Unit cell, Basis, Space lattice, Crystal Systems, Miller Indices of Planes and directions, bonding in solids, origin of bands in solids (Qualitative idea), Metals, semiconductors & insulators; Continuous & Characteristic X - Rays, X - Ray Diffraction & Bragg's law in Crystals, Bragg's spectrometer.		
Module No.-2	**Semiconductor Materials**	**6 Hours**
Intrinsic and extrinsic semiconductors, p-type, and n-type semiconductors; Fermi level in semiconductors; Current conduction in semiconductors, I-Vcharacteristics of p-n junction diode, Some special p-n diodes: Zener diode, Tunnel diode and Light emitting diode.		
Module No.-3	**Magnetic Materials, Superconductivity and Fibre Optics**	**10 Hours**
Basic ideas of Dia, Para, Ferro & Ferromagnetic materials, Ferrites, Hysteresis loop. **Superconductivity**, Superconductors as ideal diamagnetic materials, Signatures of Superconducting state, Meissner Effect, Type I & Type II superconductors, London Equations. **Fibre Optics** Introduction, Acceptance Angle, Numerical Aperture, Normalized frequency, Modes of propagation, material dispersion & pulse broadening in optical fibres, Applications of optical fibres		
Module No. 4	**EM waves & Dielectrics and Nanomaterials**	**12 Hours**
Physical significance of Gradient, Divergence & Curl, Dielectric polarization, Displacement current, Maxwell's Equations, electromagnetic wave propagation in free space and isotropic dielectric medium, Poynting vector. **Nanomaterials:-** Nanoscale, Classifications of nanomaterials (3D, 2D, 1D and 0D), electron confinement,		

Nanocomposites, Carbon nanotubes (CNTs), Properties of nanomaterials, synthesis of nanomaterials, ball milling and sol-gel techniques Applications of nanomaterials.

Module No. 5	**Quantum Theory and Lasers**	**11 Hours**

Need and origin of quantum concept, Wave - particle duality, Matter waves, Group & Phase velocities, Uncertainty Principle; Schrodinger wave equations (time independent & dependent); Application to particle in a box.

Lasers : Concepts of laser, Spontaneous & Stimulated emissions, Einstein's Coefficients, Population Inversion, Pumping Mechanisms, Components of a laser System, Three & four level laser systems; Ruby, He -Ne, and semiconductor Lasers.

Text Books

1. A Textbook Of Engineering Physics by M N Avadhanulu, P G Kshirsagar , TVS Arun Murthy, S Chand Publisher,2020
2. Engineering Physics Paperback by Sujay Kumar Bhattacharya , McGraw Hill, 2019.

References

5) SOLID STATE PHYSICS , 10TH EDITION by S.O. Pillai , New Age International Publisher, 2022
6) Introduction to Electrodynamics, Griffiths; DJ, Prentice Hall. 1 January 2020
7) Materials Science &Engg., Raghvan V., Prentice Hall of India. 1 January 2015
8) Lasers- Fundamentals and Applications Paperback – 1, Ajoy Ghatak K.Thyagarajan, Laxmi Pulisher, 2019.

Lab Exercises

12. To find out the frequency of AC mains using electric vibrator.
13. To find out the dielectric constant of a dielectric substance.
14. To study the characteristic of different p-n junction diode.
15. To find out the intensity response of a LED.
16. To analyze the suitability of a given Zener diode as voltage regulator.
17. To determine energy band gap of Semiconductor.
18. To study the magnetic field of a circular coil carrying current.
19. To study B-H curve using CRO.
20. To study the divergence of a laser beam.
21. To determine the resistivity of semiconductors by Four probe Method.
22. To determine numerical aperture, attenuation & propagation losses in optical fibers.

Course Type	**Embedded Theory and Lab(ETL)**	
Mode of Evaluation	**Theory**	**75%**
	Assignment/Quiz 20	
	Exam-1 15	
	Exam-2 15	
	Final Assessment Test 50	
	Laboratory	**25%**
Prepared by	Mr. Ashish Kumar	
Recommended by the Board of Studies on	1st BOS, 11.09.24	
Date of Approval by the Academic Council	**1st Academic Council 25-10-24**	

For Chandigarh Engineering College, Jhanjeri, An Autonomous College

Bachelor of Technology (B. Tech. 1st Year batch 2023 & Onwards)

Course Code: UEC101	**Course Title : Basic Electrical and Electronics Engineering**	**TPC**	**3**	**2**	**4**
Version No.	**1.0**				
Course Pre-requisites/ Co-requisites	**None**				
Anti-requisites (if any)	**None**				
Objectives:	6. To understand the basic concepts of electrical circuits. 7. To understand and analysis of AC & DC circuits. 8. To understand the working and construction of Transformer, DC & AC machines. 9. To understand electrical installation, cables and wires. 10. To understand transducers.				

Course Outcomes

Course Outcomes	Course Outcome Statement
CO1	Outline the basic concept of DC and AC Electrical circuits
CO2	Apply the fundamental principles on problems of DC & AC electrical circuits.
CO3	Explain the working of transformer and constructional details of DC machines and Induction Motors.
CO4	Illustrate the different electrical components, wiring and earthing for electrical installations.
CO5	Outline the basic concept of transducer.

Detailed Syllabus:

Module No. 1	**DC Circuits**	**10 Hours**
Basic introduction of Electrical circuit elements (R, L and C), voltage and current sources, Kirchoff's current and voltage laws. Superposition, Thevenin's and Norton's Theorems.		
Module No. 2	**AC Circuits**	**10 Hours**
Representation of sinusoidal waveforms, peak and rms values, phasor representation, real power, reactive power, apparent power, power factor. Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC combinations (series and parallel), resonance. Voltage and current relations in star and delta connections.		
Module No. 3	**Electrical Machines**	**10 Hours**
BH Curve characteristics, ideal and practical transformer, equivalent circuit, losses in transformers, regulation, and efficiency. Auto-transformer. Generation of rotating magnetic fields, Construction and working of a three-phase induction motor, Significance of torque-slip characteristic. Loss components and efficiency. Single-phase induction motor. Construction, working, torque-speed characteristic of single phase and 3-phase induction mototr, Construction and working of dc motor. Construction and working of synchronous generators.		
Module No. 4	**Electrical Installations**	**10 Hours**
Components of LT Switchgear: Switch Fuse Unit (SFU), Miniature Circuit Breaker (MCB), Earth Leakage Circuit Breaker (ELCB), MCCB, Types of Wires and Cables, Earthing. Types of Batteries, Important Characteristics for Batteries. Elementary calculations for energy consumption.		
Module No. 5	**Transducers**	**5 Hours**

Introduction, working and application of LVDT, Introduction and application of Digital Multimeter.

Text Books

7. S.K Sahdev, "Basic Electrical Engineering", Khanna Publishing House, August,2021.
8. J. B. Gupta, "Basic Electrical Engineering", S.K. Kataria & Sons, 17th Edition 2023.
9. D. P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, 2020.
10. S.K. Bhattacharya, "Basic Electrical Engineering", Pearson Publications, June, 2019.
11. A.K Sawhney, "A Course in ELECTRICAL AND ELECTRONIC MEASUREMENTS
12. AND INSTRUMENTATION" Shree Hari Publications, 1 January 2021

References

4. T.K. Nagsarkar and M.S. Sukhija, "Basic Electrical Engineering", Oxford University Press, 2017.
5. Chakrabarti A., Nath S. and Chanda K. C., Basic Electrical Engineering, Tata McGraw-Hill, 2021.
6. D. C. Kulshreshtha, "Basic Electrical Engineering", Tata McGraw Hill, 2019.

Lab Exercises

14. To verify Ohm's Law and its limitations.
15. To verify Kirchhoff's Laws.
16. To measure the resistance and inductance of a coil by ammeter-voltmeter Method
17. To verify series and parallel resonance in AC circuits.
18. To measure the minimum operating voltage, current drawn, power consumed, and the power factor of a fluorescent tube light, Bulb, Single phase induction motor,
19. To start and reverse the direction of rotation of a three phase Induction motor.
20. To start and reverse the direction of rotation of a DC motor.
21. Study of Cut section of DC shunt motor.
22. Study of Cut section of three phase induction motor
23. To measure power and power factor in a single- phase AC circuit.
24. To perform open- and short circuit tests on a single- phase transformer and calculate its efficiency.
25. Study of Digital Multimeter.
26. To observe the B-H loop on CRO.

Course Type	**Embedded Theory and Lab(ETL)**
Mode of Evaluation	**Theory** **75%** EXAM-1 15 EXAM-2 15 Assignment/ Quiz/Class Test 20 Final Assessment Test 50 **Laboratory** **25%**
Prepared by	**Dr. Jatinder Kaur**
Recommended by the Board of Studies on	**1st BoS 16-09-2024**
Date of Approval by the Academic Council	**1st Academic Council 25-10-24**

For Chandigarh Engineering College, Jhanjeri, An Autonomous College

Bachelor of Technology (B. Tech. 1st Year batch 2023 & Onwards)

Course Code: UCS102	**Course Title:** Problem Solving using Python	**TPC**	**3**	**2**	**4**
Version No.	**1.0**				
Course Pre-requisites/ Co-requisites	**None**				
Anti-requisites (if any).	**None**				
Objectives:	6. To understand why Python is a useful scripting language for developers. 7. To learn how to design and write programs in Python 8. To understand basic data structures, branching and looping constructs. 9. To understand user defined functions and file handling, 10. To learn type conversions and String Operations.				

CO-PO Mapping

Course Outcomes	Course Outcome Statement	PO's / PEO's
CO1	Develop solutions through algorithms and flowcharts	PO1, PO2, PO3, PO4, PO5
CO2	Implement simple programs using expressions and statements	PO1, PO2, PO3, PO5
CO3	Apply the concepts of looping statements and regular expressions to solve complex problems	PO1, PO2, PO3, PO4, PO5, PO6
CO4	Analyse the concepts of data types and data structures to deploy solutions for real time applications	PO1, PO2, PO3, PO4, PO5, PO6
CO5	Decide the and modules based on the application domain	PO1, PO2, PO3, PO4, PO5, PO6
CO6	Create applications based on theuser defined functions, file processing and string concepts	PO1, PO2, PO3, PO4, PO5, PO6
	TOTAL HOURS OF INSTRUCTIONS: 45	

Module No. 1	**Introduction to Problem Solving**	**8 Hours**

Problem Solving definition and steps, developing an algorithm, flowcharts and pseudocode, Introduction to Python, Interactive and script mode, Indentation, Comments, Tokens in Python – Variables, Keywords, Literals, Data types, Expressions, Input and Print functions.

Module No. 2	**Operators and Branching**	**6 Hours**

Operators and its precedence, Arithmetic Operators, Comparison (Relational) Operators, Assignment Operators, Logical Operators, Bitwise Operators, Membership Operators, Identity Operators, Branching Statements-if; if else, nested if; nested if else, elif

Module No. 3	Loops and Regular Expressions	7 Hours

Creating Loops with while and for, Different versions of Loops, Nested Loops, Loop Control Statements, Loop Modification with break, continue and pass, Regular Expressions.

Module No. 4	Basic Data Structures	12 Hours

Introduction to Different Numeric Types, Type Conversion, Mathematical Functions, Random Numbers. Creating and Accessing Strings, Operations on Strings, Indexing, Slicing, String Manipulations, Pre-defined functions on Strings.
Creating, Accessing and Manipulating Lists, Sets, Tuples and Dictionaries, Understanding the differences among them, Applications of the Data Structures. Using Branching and Control loops with Data structures, Matrix Operations using Numpy.

Module No. 5	Functions , Strings & Files	12 Hours

Pre-defined functions, User defined functions, formal and actual parameters, return statement, Using Branching, Looping and Data structures in Functions, Recursion, Internal workflow of Recursion, Modules.
File I/O-Opening and Closing files, Different modes, File attributes, Read, Write Operations, File Positions. Renaming and Deleting Files, various directory handling functions.

Text Books

3. Kenneth Lambert, "Fundamentals of Python: First Programs", Cengage Learning, 2019
4. Martin C Brown, "The Complete Reference with Python", McGrawHill, 2018.

References

3. John Zelle, Python Programming: An introduction to Computer Science, Franklin Associates, Third Edition, 2016.
4. Mark Lutz, "Learning Python", Fifth edition, O'Reilly, 2013.

List of Laboratory Experiments

Week 1:

6. Write a Python program to display the current date and time.
7. Write a Python program to get the Python version you are using
8. Write a Python program that accepts an integer (n) and computes the value of n+nn+nnn
9. Write a Python program to read and print various types of variables.
10. Write a Python program to print the calendar of a given month and year.

Week 2:

7. Python Program to Find the Square Root
8. Python Program to Calculate the Area and Perimeter of Triangle and Circle.
9. Python Program to Solve Quadratic Equation
10. Python Program to Swap Two Variables
11. Python Program to Convert Kilometres to Miles
12. Python Program to Convert Celsius To Fahrenheit

Week 3:

8. Python program to find whether the given number is Even or Odd
9. Write a Python program to get the difference between a given number and 17, if the number is greater than 17 return double the absolute difference
10. Write a Python program to test whether a number is within 100 of 1000 or 2000.
11. Write a Python program to calculate the sum of three given numbers, if the values are equal then return three times of their sum
12. Python Program to Find the Factorial of a Number
13. Python Program to print maximum of 3 numbers
14. Write a python program to find whether a given year is leap or not.

Week 4:

8. Write a program which will find all such numbers which are divisible by 7 but are not a multiple of 5, between 2000 and 3200 (both included).
    a. The numbers obtained should be printed in a comma-separated sequence on a single line. Consider use range(#begin, #end) method
9. Write a python program to check whether a number is divisible by 5 and 11 or not.
10. Write a python program to check whether a character is alphabet or not.
11. Write a python program to input any character and check whether it is alphabet, digit or special character.
12. Write a python program to check whether a character is uppercase or lowercase alphabet.
13. Write a python program to input week number and print week day.
14. Write a python program to count total number of notes in given amount

Week 5:

7. Write a Python program to print all natural numbers from 1 to n. - using while loop
8. Write a Python program to find sum of all odd numbers between 1 to n.
9. Write a Python program to count number of digits in a number.
10. Write a Python program to find first and last digit of a number.
11. Write a Python program to calculate sum of digits of a number.
12. Write a Python program to enter a number and print its reverse.

Week 6:

9. Write a Python program to check whether a number is palindrome or not.
10. Write a Python program to find frequency of each digit in a given integer.
11. Write a Python program to print all ASCII character with their values.
12. Write a Python program to find all factors of a number.
13. Write a Python program to calculate factorial of a number.
14. Write a Python program to print all Prime numbers between 1 to n.
15. Write a Python program to check whether a number is Armstrong number or Strong or Prime Number or Perfect number or magic number or not
16. Write a Python program to print Fibonacci series up to n terms.

Week 7:

1. Write a Python Program to Find the Largest Number in a List
2. Write a Python Program to Find the Second Largest Number in a List
3. Write a Python Program to Put Even and Odd elements in a List into Two Different Lists
4. Write a Python Program to Merge Two Lists and Sort it
5. Write a Python Program to Sort the List According to the Second Element in Sublist
6. Write a Python Program to Find the Second Largest Number in a List Using Bubble Sort
7. Write a Python Program to Sort a List According to the Length of the Elements
8. Write a Python Program to Find the Union of two Lists
9. Write a Python Program to Find the Intersection of Two Lists
10. Python Program to print all odd indexed elements of a list

Week 8:

1. Write a Python program to get the 4th element and 4th element from last of a tuple
2. Write a Python program to find the repeated items of a tuple.
3. Write a Python program to check whether an element exists within a tuple
4. Write a Python program to unzip a list of tuples into individual lists.
5. Write a Python program to replace last value of tuples in a list. Sample list: [(10, 20, 40), (40, 50, 60), (70, 80, 90)] Expected Output: [(10, 20, 100), (40, 50, 100), (70, 80, 100)]
6. Write a Python program to remove an empty tuple(s) from a list of tuples. Sample data: [(), (), ('',), ('a', 'b'), ('a', 'b', 'c'), ('d')] Expected output: [('',), ('a', 'b'), ('a', 'b', 'c'), 'd']
7. Write a Python program to convert a list of tuples into a dictionary.
8. Write a Python program to find the highest 3 values of corresponding keys in a dictionary.

Week 9:

6. Write a Python function that prints out the first n rows of Pascal's triangle.
7. Write a Python function to create and print a list where the values are square of numbers between 1 and 30 (both included).
8. Write a Python program to detect the number of local variables declared in a function
9. Write a Python program that invoke a given function after specific milliseconds.
10. Write a Python program to get the sum of a non-negative integer

Week 10:

5. Write a Python program to calculate the harmonic sum of n-1
6. Write a Python program to calculate the sum of the positive integers of n+(n-2)+(n- 4)... (until n-x =< 0)
7. Write a Python program to find the greatest common divisor (gcd) of two

integers using Recursion

8. Implement any sorting algorithm using Recursion.

Week 11:

5. Write a Python Program to Replace all Occurrences of 'a' with 'b' in a String. If 'a' is not present, then print appropriate message.
6. Write a Python Program to Remove the nth Index Character from a Non-Empty String
7. Write a Python Program to Detect if Two Strings are Anagrams
8. Write a Python Program to Form a New String where the First Character and the Last Character have been Exchanged.

Week 12:

7. Write a Python program to get the last part of a string before a specified character
8. Write a Python program to count the occurrences of each word in a given sentence.
9. Write a Python function to insert a string in the middle of a string.
10. Write a Python function to get a string made of its first three characters of a specified string. If the length of the string is less than 3 then return the original string.
11. Write a Python program to add a prefix text to all of the lines in a string
12. Write a Python program to convert a given string into a list of words.

A few Programming exercises for Competitive Coding (optional) :

13. Remove Duplicate Char from String
14. Hailstone Sequence
15. Secure Conversation by Encryption and Decryption
16. Special Elements in Matrix
17. Next Greater No with the Same set of Digits
18. Smallest Subarray with Sum Greater than Given Number
19. Group Anagrams
20. Find Duplicates in Array in O(n)
21. Find Two Unique Numbers from Array in O(n)
22. Number Patterns & Finding Smallest Number
23. Minimum Distance for Truck to Deliver Order [Amazon]
24. Generate Balanced Parentheses

Course Type	**Embedded Theory and Lab (ETL)**
Mode of Evaluation	**Theory** **75%** Examination-1 15 Examination-2 15 Assignment/ Quiz 20 Final Assessment Test 50 **Laboratory** **25%**
Prepared by	Ms. Neha Dhiman
Recommended by the Board of Studies on	**1st BoS 11-09-2024**
Date of Approval by the Academic Council	**1st Academic Council 25-10-24**

For Chandigarh Engineering College, Jhanjeri, An Autonomous College

Bachelor of Technology (B. Tech. 1st Year batch 2023 & Onwards)

Course Code: USS101	**Course Title: Industry Specific Communication**	**LTPC**	**3**	**0**	**0**	**3**
Version No.	**1.0**					
Course Pre-requisites/ Co-requisites	**None**					
Anti-Requisites (if any)	**None**					
Objectives:	• To understand the fundamental concepts of effective communication and develop skills in English grammar and soft skills. • To choose appropriate communication techniques and strategies based on the requirements of specific professional scenarios. • To learn how to construct clear and impactful written and verbal communication for academic and professional settings. • To evaluate various communication methods, understand their applications and limitations, and use the most effective approach to address real-world challenges.					

CO-PO Mapping

Course Outcomes	Course Outcome Statement	PO's / PSO's
CO1	Demonstrate a strong grasp of English grammar, enabling error-free communication in both written and verbal formats.	(PO8, PO9, PO10 & PO12)
CO2	Develop the ability to articulate thoughts clearly and confidently in diverse professional and social contexts.	(PO8, PO9, PO10 & PO12)
CO3	Create impactful resumes, cover letters, and emails that meet industry standards and convey professionalism.	(PO8, PO9, PO10 & PO12)
CO4	Apply soft skills such as active listening, teamwork, and conflict resolution to build strong professional relationships.	(PO8, PO9, PO10 & PO12)
CO5	Exhibit polished communication and presentation skills, ensuring readiness for interviews, group discussions, and workplace interactions.	(PO8, PO9, PO10 & PO12)

Module No. 1	**Introduction to Communication**	**9 Hours**

Introduction to Soft Skills Essentials: Communication, Collaboration & More, Getting to Know You: Self-Introduction Mastery and Introducing Me: Practice Your Story , The Art of Communication: Verbal Ability Basics, Word Power: Building Your Vocabulary

Module No. 2	**Speaking Skills, Reading and Understanding**	**9 Hours**

Unspoken Impact: Elevating Your Body Language, Discover You: The Journey of Self-Awareness and Self-Discovery: Understanding Who You Are , Word Fix: Mastering Commonly Confused & Misspelled Words, Sentence Symphony: Understanding Sentence Types

Module No. 3	**Building Confidence through Technical Communication**	**9 Hours**

Acting As You: Building Confidence with Role Plays and Exploring Different Versions of Yourself, Unlock Your Potential: Exploring the Holland Code, Beyond Boundaries: The Art of Creative Writing, The Great Exchange: Thoughtful Debate/Discussion.		
Module No. 4	**Communication Essentials for Professionals**	**9 Hours**
Picture Perfect: Building Descriptive Skills, Quick Talk: The JAM Session Challenge, Grammar & Usage: The Cornerstones of Clear Expression, Spot the Mistakes: Correct the Errors, Say It Right: Mastering Common Mispronunciations		
Module No. 5	**Building Industry-Ready Soft Skills**	**9 Hours**
Sharpen Your Edge: Soft Skills Q&A Session, Active Listening and Effective Speaking, Role Play Ensemble: Strengthening Team Skills, Word Wise: Verbal Ability Practice Test		

Text Books

3. Carnegie, Dale. The Art of Public Speaking: Seventh Edition Prabhat Prakashan Pvt. Ltd, 2020
4. Murphy, Raymond. Essential English Grammar with Answers: Second Edition, Cambridge University Press, 2024

References

3. Wren, P.C., and Martin, H. High School English Grammar and Composition Book (Regular Edition). New Delhi, S. Chand Publishing, 2023.
4. Carnegie, Dale. How to Win Friends and Influence People. New York, Simon and Schuster, 2024.

Mode of Evaluation	**Theory**	**100%**
	Examination-1	15
	Examination-2	15
	Assignment/ Quiz	20
	Final Assessment Test	50
Prepared by	**Ms. Akshdeep Kaur & Ms. Aakriti Mahajan**	
Recommended by the Board of Studies on	**1st BoS 11-09-2024**	
Date of Approval by the Academic Council	**1st Academic Council 25-10-24**	

Study Scheme & Syllabus of

Bachelor of Technology

(1st/2nd Semester)

Batch 2024 & Onwards

(For Chandigarh Engineering College, Jhanjeri, An Autonomous College)

By

Department of Academics & Approved by BoS & Academic Council

IK Gujral Punjab Technical University
Chandigarh Engineering College, Jhanjeri, An Autonomous College
Bachelor of Technology (B. Tech 1st year batch 2024 & onwards)

Bachelors of Technology 2nd Semester
It is an Under Graduate (UG) Programme of 4 years duration (8 semesters)
Eligibility for Admission: As per AICTE norms.
Scheme followed by the following Branches:

- ✓ B. Tech ME

Second Semester **Contact Hours: 29**

Course Code	Type of Course	Course Title	Hours per Week			Marks Distribution		Total Marks	Credits
			T	P	C	Internal	External		
USC103	UC-Sci	Modern Physics	3	2	4	50	50	100	4
USC102	UC-Sci	Linear Algebra and Differential Equations	4	0	4	50	50	100	4
UEC101	UC-Engg	Basic Electrical and Electronics Engineering	3	2	4	50	50	100	4
UME102	UC-Engg	Engineering Graphics Design	1	4	3	50	50	100	3
UCS102	UC-Engg	Problem Solving using Python	3	2	4	50	50	100	4
UHM102	UC-H&M	English for Effective Communication	2	2	3	50	50	100	3
USS101	UC-H&M	Industry Specific Communication	3	0	3	50	50	100	3
TOTAL			**19**	**12**	**25**	**350**	**350**	**700**	**25**

***These are the minimum contact hrs. allocated. The contact hrs. may be increased by the department as per the requirement of the subject.**

C. Definition of Credit:

1 Hr. Lecture (T) per week	1 credit
2 Hours Practical /Lab (P) per week	1 credit

B. Range of credits –

A range of credits from 150 to 160 for a student to be eligible to get Under Graduate degree in Engineering. A student will be eligible to get Under Graduate degree with Honours or additional Minor Engineering, if he/she completes an additional 20 credits. These could be acquired through MOOCs.

C. Structure of Undergraduate Engineering program:

Credit Distribution	
Under Graduate degree in Engineering	Credits
Foundation Core Courses	
Engineering Foundation (20 credits)	84
Science Basket (20 credits)	
Projects and Internships (18 credits)	
Humanities (20 credits)	
NGCR - Non-graded Core Requirement (6 credits)	
Discipline Core Courses	43
Discipline/ Specialization Elective Courses	24
Open Elective Courses	9
Total Credits	160

We follow same guidelines as per the PTU B. Tech 1st Year Syllabus (Batch 2023 Onwards) as mentioned on the PTU Website from Page 5 to Page 13.

For Chandigarh Engineering College, Jhanjeri, An Autonomous College

Bachelor of Technology (B. Tech. 1st Year batch 2023 & Onwards)

Course Code: USC102 (Common to all branches)	**Course Title : LINEAR ALGEBRA & DIFFERNTIAL EQUATIONS**	**TPC**	**4**	**0**	**4**
Version No.	**1.0**				
Course Pre-requisites/ Co-requisites	• Basic concept of Matrices & Determinant. • Basic concept of Differential Equations.				
Anti-requisites (if any)	**None**				
Objectives:	The objective of the **LINEAR ALGEBRA & DIFFERNTIAL EQUATIONS** is to familiarize the prospective engineers with techniques in multivariate integration, ordinary , partial differential equations and Linear Algebra. It aims to equip the students to deal with advanced level of mathematics and applications that would be essential for their disciplines.				

CO-PO Mapping

Course Outcomes	Course Outcome Statement	PO's / PSO's
CO1	To gain the knowledge of Ordinary differential equations and discuss its applicability to trained to visualize and conceptualize the engineering problems	PO1, PO2, PO9, PO10.
CO2	To determine the rank and inverse of matrices by elementary transformations.	PO1, PO2, PO9, PO10.
CO3	Use the knowledge to model the engineering problem mathematically using theory of matrices and linear algebra.	PO1, PO2, PO9, PO10.
CO4	Illustrate the concept of vector spaces & linear transformations of finite dimensional vector spaces.	PO1, PO2, PO9, PO10.
CO5	Learn the methods to solve Partial Differential Equations.	PO1, PO2, PO9, PO10.
TOTAL HOURS OF INSTRUCTIONS: 60		

Module No. 1	**Ordinary differential equations: First and Higher order:**	**15 Hours**

First order Exact differential equations, integrating factors, Linear first order equations, Bernoulli equation, Clairaut's equation, Higher order differential equation with constant coefficients. Method of variation of parameters, Cauchy-Euler equation; Legendre's Linear differential equation, finding

particular integrals.		
Module No. 2	**System of Linear Equations:**	**10 Hours**
Rank of a matrix, Echelon form of matrix, Homogenous and Non homogenous system of linear equations, consistency and inconsistency of system of equations, Gauss elimination method, Inverse of a matrix, Gauss-Jordon method.		
Module No. 3	**Linear Algebra**	**10 Hours**
Eigen values, eigen vectors, Cayley-Hamilton theorem, algebraic multiplicity, geometric multiplicity, similar and diagonalizable matrices.		
Module No. 4	**Vector spaces:**	**15 Hours**
Vector spaces, Subspaces, Linear independence and Linear dependence of vectors, Dimension and basis, Linear transformation, rank and nullity theorem (without proof), matrix associated with Linear Transformation,		
Module No. 5	**Partial Differential Equations:**	**10 Hours**
Formation of first order equations, solution of first order equations Lagrange's equation, Higher order Linear equations with constant coefficients.		

Text Books

7. Dr. Rajesh Kumar Narula, Engineering Mathematics-II, Sharma Publications. 2024.
8. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 40th Edition, 2020.
9. N.P.Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2021.

References

1. Maurice D. Weir, Joel Hass, Christopher Heil, "Thomas' Calculus" 14th edition, Pearson Education, 2018.

2. R.K. Jain and S.R.K. Iyengar, "Advanced Engineering Mathematics" Narosa Publications, 2022.

3. B. V. Ramana, "Higher Engineering Mathematics", Tata McGraw Hill,2017.

4. R. Garg, "Mathematics – I", Khanna Book Publishing Co. (P) Ltd. https://ekumbh.aicte-india.org/userugbook.php, 2021.

Course Type	**THEORY**
Mode of Evaluation	**Theory 100%** **Exam-I 15** **Exam-II 15** **Assignment/ Quiz 20** **Final Assessment Test 50**
Prepared by	Ms. Deepika Gakhar
Recommended by the Board of Studies on	1st BOS, 11.09.24
Date of Approval by the Academic Council	**1st Academic Council 25-10-24**

For Chandigarh Engineering College, Jhanjeri, An Autonomous College

Bachelor of Technology (B. Tech. 1st Year batch 2023 & Onwards)

Course Code: UHM102	**Course Title : English for Effective Communication**	**TPC**	**2**	**2**	**3**
Version No.	**1.0**				
Course Pre-requisites/ Co-requisites	**UHM101**				
Anti-requisites (if any)	**None**				
Objectives:	5. Learn to communicate cohesively in writing and speaking by understanding different types of communication, improving grammar, and writing professional documents. 6. Learn to plan and deliver speeches, use different speaking styles, and practice negotiation and public speaking skills through hands-on activities.				

CO-PO Mapping

Course Outcomes	Course Outcome Statement	PO's / PSO's
CO1	**Differentiate between verbal and non-verbal communication and assess the impact of barriers.**	PO(8,9,10&12), PSO(1)
CO2	**Use advanced grammar and techniques to write clear and cohesive texts.**	PO(8,9,10&12), PSO(1)
CO3	**Apply effective writing steps to produce concise engineering documents.**	PO(8,9,10&12), PSO(1)
CO4	**Create professional emails and business letters with proper tone and structure.**	PO(8,9,10&12), PSO(1)
CO5	**Analyze literary works to explain themes of resilience and leadership and their relevance.**	PO(8,9,10&12), PSO(1)
TOTAL HOURS OF INSTRUCTIONS: 30		

Module No. 1	**Communication Forms and Barriers**	**7 Hours**

11. Listening Barriers: Examine factors that affect effective listening.
12. Interpersonal Communication: Understand one-on-one and small group interactions.
13. Mass and Media Communication: Study communication through media channels.
14. Verbal and Non-Verbal Communication: Explore both spoken and body language, and their barriers.
15. Physical and Psychological Barriers: Identify obstacles like environmental distractions and mental blocks

Module No. 2	**Mechanics of Writing and Grammar Review**	**7 Hours**

13. Enhancing Text Cohesion: Using Cohesive Devices Effectively
14. Advanced Sentence Structures: Compound-Complex structures
15. Misplaced Modifiers: Remove ambiguity
16. Idioms, Phrases, and Figures of Speech in Professional Writing
17. Homonyms, Homophones, and Homographs: Avoiding Confusion
18. One-Word Substitutions for Conciseness and Precision

Module No. 3	Precision in Engineering Writing	4 Hours
5. The art of condensation & Paraphrasing 6. Seven steps of writing effective Precise		
Module No. 4	**Professional Writing for the Workplace**	**7 Hours**
9. Write Professional Emails: Tone of professional emails. 10. Meeting Minutes: summarizing key points and decisions. 11. Improve Note-Taking and Note-Making: meetings or lectures reading or research notes 12. Write Effective Letters: Inquiry Letters, Complaint Letters, Order Letters, Response Letters & Cover Letter		
Module No. 5	**Literary Perspectives on Resilience and Leadership**	**5 Hours**
Understanding tone and learning to utilize it in writing business documents		

Text Books

11. "The Harvard Business Review Guide to Better Business Writing" by Bryan A. Garner (2022) - Harvard Business Review Press.
12. "Advanced English Grammar: A Linguistic Approach" by Ilse Depraetere (2021) - Bloomsbury Academic.
13. "English Idioms in Use: Advanced" by Michael McCarthy and Felicity O'Dell (2021) - Cambridge University Press.
14. "Technical Writing for Engineers & Scientists" by Leo Finkelstein (2020) - McGraw-Hill Education.
15. "Business Writing: What Works, What Won't" by Wilma Davidson (2020) - St. Martin's Griffin.

References

9. "Media and Communication" by Pieter J. Fourie (2022) Publisher: Routledge
10. "Engineering Writing by Design: Creating Formal Documents of Lasting Value" by Edward J. Rothwell and Michael J. Cloud (2021) Publisher: Wiley
11. "Write to Influence!: Personnel Appraisals, Resumes, Emails, and More" by Carla D. Bass (2021) Publisher: Routledge
12. "The Elements of Style: Grammar Workbook" by William Strunk Jr. & Richard De A'Morelli (2020) Publisher: Penguin Publishing Group

Lab Exercises

13. **Speech Planning and Delivery**
    7. Topic Selection: How to choose and refine a speech topic.
    8. Research and Organization: Techniques for researching and structuring content.
    9. Rehearsal and Delivery: Tips for practicing and delivering a speech effectively.

14. **Different Styles of Speaking**
    7. Informative vs. Persuasive Speeches: Differences and techniques for each.
    8. Adaptation to Audience: How to tailor speeches to different audiences.
    9. Judging Criteria: Evaluation criteria for speaking styles

15. **Persuasive Techniques**
    7. Rhetorical Devices: Use of ethos, pathos, and logos.
    8. Practical Exercises: Implement techniques in sample speeches or exercises.
    9. Analysis: Review effective use of these techniques in famous speeches or presentations.

16. The Art of Negotiation

7. Role-Play Exercises: practice real-life negotiation scenarios.
8. Techniques: Focus on persuasive language
9. Judging Criteria: Evaluation criteria for negotiation skills

17. Debates

7. Debate Formats: learning different formats
8. Roles: Define specific roles (e.g., speaker, rebuttal, and cross-examiner).
9. Judging Criteria: Evaluation criteria for debate performance.

18. Public Speaking Skills

7. Preparation: Strategies for researching and organizing a technical topic.
8. Presentation: Focus on delivery, visual aids, and handling questions.
9. Judging Criteria: Evaluation criteria for Public Speaking

Course Type	**Embedded Theory and Lab(ETL)**
Mode of Evaluation	**Theory** **75%** Exam 1 15 Exam 2 15 Assignment / Quiz 20 Final Assessment Test 50 **Laboratory** **25%**
Prepared by	Ms. Sonia Verma
Recommended by the Board of Studies on	1st BOS, 11.09.24
Date of Approval by the Academic Council	**1st Academic Council 25-10-24**

For Chandigarh Engineering College, Jhanjeri, An Autonomous College

Bachelor of Technology (B. Tech. 1st Year batch 2023 & Onwards

Course Code: USC103	**Course Title : Modern Physics**	**TPC**	**3**	**2**	**4**
Version No.	**1.0**				
Course Pre-requisites/ Co-requisites	**None**				
Anti-requisites (if any)	**None**				
Objectives:	The goal of the course is to cultivate a scientific mindset and analytical skills in engineering graduates by exploring physical concepts and their applications in engineering and technology. Understanding fundamental physical principles will equip graduates to approach engineering challenges logically, particularly those arising from rapidly advancing technologies.				

Course Outcomes

Course Outcomes	Course Outcome Statement
CO1	Understand the properties of solid and X-ray and use of X- rays in solid.
CO2	Understand the working, properties and application of semiconductor.
CO3	Acquire knowledge about the Magnetic material, superconductor, and Optical Fibre.
CO4	Illustrate the concept of Electromagnetic waves and nanomaterials.
CO5	Understand the concept for quantum mechanics. Also explain the concept of Laser system.

Detailed Syllabus:

Module No.-1	**Elements of crystallography and X- Rays**	**6 Hours**
Unit cell, Basis, Space lattice, Crystal Systems, Miller Indices of Planes and directions, bonding in solids, origin of bands in solids (Qualitative idea), Metals, semiconductors & insulators; Continuous & Characteristic X - Rays, X - Ray Diffraction & Bragg's law in Crystals, Bragg's spectrometer.		
Module No.-2	**Semiconductor Materials**	**6 Hours**
Intrinsic and extrinsic semiconductors, p-type, and n-type semiconductors; Fermi level in semiconductors; Current conduction in semiconductors, I-Vcharacteristics of p-n junction diode, Some special p-n diodes: Zener diode, Tunnel diode and Light emitting diode.		
Module No.-3	**Magnetic Materials, Superconductivity and Fibre Optics**	**10 Hours**
Basic ideas of Dia, Para, Ferro & Ferromagnetic materials, Ferrites, Hysteresis loop. **Superconductivity**, Superconductors as ideal diamagnetic materials, Signatures of Superconducting state, Meissner Effect, Type I & Type II superconductors, London Equations. **Fibre Optics** Introduction, Acceptance Angle, Numerical Aperture, Normalized frequency, Modes of propagation, material dispersion & pulse broadening in optical fibres, Applications of optical fibres		
Module No. 4	**EM waves & Dielectrics and Nanomaterials**	**12 Hours**
Physical significance of Gradient, Divergence & Curl, Dielectric polarization, Displacement current, Maxwell's Equations, electromagnetic wave propagation in free space and isotropic dielectric medium, Poynting vector. **Nanomaterials:-** Nanoscale, Classifications of nanomaterials (3D, 2D, 1D and 0D), electron confinement,		

Nanocomposites, Carbon nanotubes (CNTs), Properties of nanomaterials, synthesis of nanomaterials, ball milling and sol-gel techniques Applications of nanomaterials.

Module No. 5	**Quantum Theory and Lasers**	**11 Hours**

Need and origin of quantum concept, Wave - particle duality, Matter waves, Group & Phase velocities, Uncertainty Principle; Schrodinger wave equations (time independent & dependent); Application to particle in a box.

Lasers : Concepts of laser, Spontaneous & Stimulated emissions, Einstein's Coefficients, Population Inversion, Pumping Mechanisms, Components of a laser System, Three & four level laser systems; Ruby, He -Ne, and semiconductor Lasers.

Text Books

1. A Textbook Of Engineering Physics by M N Avadhanulu, P G Kshirsagar , TVS Arun Murthy, S Chand Publisher,2020
2. Engineering Physics Paperback by Sujay Kumar Bhattacharya , McGraw Hill, 2019.

References

9) SOLID STATE PHYSICS , 10TH EDITION by S.O. Pillai , New Age International Publisher, 2022
10) Introduction to Electrodynamics, Griffiths; DJ, Prentice Hall. 1 January 2020
11) Materials Science &Engg., Raghvan V., Prentice Hall of India. 1 January 2015
12) Lasers- Fundamentals and Applications Paperback – 1, Ajoy Ghatak K.Thyagarajan, Laxmi Pulisher, 2019.

Lab Exercises

23. To find out the frequency of AC mains using electric vibrator.
24. To find out the dielectric constant of a dielectric substance.
25. To study the characteristic of different p-n junction diode.
26. To find out the intensity response of a LED.
27. To analyze the suitability of a given Zener diode as voltage regulator.
28. To determine energy band gap of Semiconductor.
29. To study the magnetic field of a circular coil carrying current.
30. To study B-H curve using CRO.
31. To study the divergence of a laser beam.
32. To determine the resistivity of semiconductors by Four probe Method.
33. To determine numerical aperture, attenuation & propagation losses in optical fibers.

Course Type	**Embedded Theory and Lab(ETL)**	
Mode of Evaluation	**Theory**	**75%**
	Assignment/Quiz 20	
	Exam-1 15	
	Exam-2 15	
	Final Assessment Test 50	
	Laboratory	**25%**
Prepared by	Mr. Ashish Kumar	
Recommended by the Board of Studies on	1st BOS, 11.09.24	
Date of Approval by the Academic Council	**1st Academic Council 25-10-24**	

For Chandigarh Engineering College, Jhanjeri, An Autonomous College

Bachelor of Technology (B. Tech. 1st Year batch 2023 & Onwards)

Course Code: UEC101	**Course Title : Basic Electrical and Electronics Engineering**	**TPC**	**3**	**2**	**4**
Version No.	**1.0**				
Course Pre-requisites/ Co-requisites	**None**				
Anti-requisites (if any)	**None**				
Objectives:	11. To understand the basic concepts of electrical circuits. 12. To understand and analysis of AC & DC circuits. 13. To understand the working and construction of Transformer, DC & AC machines. 14. To understand electrical installation, cables and wires. 15. To understand transducers.				

Course Outcomes

Course Outcomes	Course Outcome Statement
CO1	Outline the basic concept of DC and AC Electrical circuits
CO2	Apply the fundamental principles on problems of DC & AC electrical circuits.
CO3	Explain the working of transformer and constructional details of DC machines and Induction Motors.
CO4	Illustrate the different electrical components, wiring and earthing for electrical installations.
CO5	Outline the basic concept of transducer.

Detailed Syllabus:

Module No. 1	**DC Circuits**	**10 Hours**
Basic introduction of Electrical circuit elements (R, L and C), voltage and current sources, Kirchoff's current and voltage laws. Superposition, Thevenin's and Norton's Theorems.		
Module No. 2	**AC Circuits**	**10 Hours**
Representation of sinusoidal waveforms, peak and rms values, phasor representation, real power, reactive power, apparent power, power factor. Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC combinations (series and parallel), resonance. Voltage and current relations in star and delta connections.		
Module No. 3	**Electrical Machines**	**10 Hours**
BH Curve characteristics, ideal and practical transformer, equivalent circuit, losses in transformers, regulation, and efficiency. Auto-transformer. Generation of rotating magnetic fields, Construction and working of a three-phase induction motor, Significance of torque-slip characteristic. Loss components and efficiency. Single-phase induction motor. Construction, working, torque-speed characteristic of single phase and 3-phase induction mototr, Construction and working of dc motor. Construction and working of synchronous generators.		
Module No. 4	**Electrical Installations**	**10 Hours**
Components of LT Switchgear: Switch Fuse Unit (SFU), Miniature Circuit Breaker (MCB), Earth Leakage Circuit Breaker (ELCB), MCCB, Types of Wires and Cables, Earthing. Types of Batteries, Important Characteristics for Batteries. Elementary calculations for energy consumption.		
Module No. 5	**Transducers**	**5 Hours**

Introduction, working and application of LVDT, Introduction and application of Digital Multimeter.

Text Books

13. S.K Sahdev, "Basic Electrical Engineering", Khanna Publishing House, August,2021.
14. J. B. Gupta, "Basic Electrical Engineering", S.K. Kataria & Sons, 17th Edition 2023.
15. D. P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, 2020.
16. S.K. Bhattacharya, "Basic Electrical Engineering", Pearson Publications, June, 2019.
17. A.K Sawhney, "A Course in ELECTRICAL AND ELECTRONIC MEASUREMENTS
18. AND INSTRUMENTATION" Shree Hari Publications, 1 January 2021

References

7. T.K. Nagsarkar and M.S. Sukhija, "Basic Electrical Engineering", Oxford University Press, 2017.
8. Chakrabarti A., Nath S. and Chanda K. C., Basic Electrical Engineering, Tata McGraw-Hill, 2021.
9. D. C. Kulshreshtha, "Basic Electrical Engineering", Tata McGraw Hill, 2019.

Lab Exercises

27. To verify Ohm's Law and its limitations.
28. To verify Kirchhoff's Laws.
29. To measure the resistance and inductance of a coil by ammeter-voltmeter Method
30. To verify series and parallel resonance in AC circuits.
31. To measure the minimum operating voltage, current drawn, power consumed, and the power factor of a fluorescent tube light, Bulb, Single phase induction motor,
32. To start and reverse the direction of rotation of a three phase Induction motor.
33. To start and reverse the direction of rotation of a DC motor.
34. Study of Cut section of DC shunt motor.
35. Study of Cut section of three phase induction motor
36. To measure power and power factor in a single- phase AC circuit.
37. To perform open- and short circuit tests on a single- phase transformer and calculate its efficiency.
38. Study of Digital Multimeter.
39. To observe the B-H loop on CRO.

Course Type	**Embedded Theory and Lab(ETL)**
Mode of Evaluation	**Theory** **75%** EXAM-1 15 EXAM-2 15 Assignment/ Quiz/Class Test 20 Final Assessment Test 50 **Laboratory** **25%**
Prepared by	**Dr. Jatinder Kaur**
Recommended by the Board of Studies on	**1st BoS 16-09-2024**
Date of Approval by the Academic Council	**1st Academic Council 25-10-24**

For Chandigarh Engineering College, Jhanjeri, An Autonomous College

Bachelor of Technology (B. Tech. 1st Year batch 2023 & Onwards)

Course Code: UCS102	**Course Title:** Problem Solving using Python	**TPC**	**3**	**2**	**4**
Version No.	**1.0**				
Course Pre-requisites/ Co-requisites	**None**				
Anti-requisites (if any).	**None**				
Objectives:	11. To understand why Python is a useful scripting language for developers. 12. To learn how to design and write programs in Python 13. To understand basic data structures, branching and looping constructs. 14. To understand user defined functions and file handling, 15. To learn type conversions and String Operations.				

CO-PO Mapping

Course Outcomes	Course Outcome Statement	PO's / PEO's
CO1	Develop solutions through algorithms and flowcharts	PO1, PO2, PO3, PO4, PO5
CO2	Implement simple programs using expressions and statements	PO1, PO2, PO3, PO5
CO3	Apply the concepts of looping statements and regular expressions to solve complex problems	PO1, PO2, PO3, PO4, PO5, PO6
CO4	Analyse the concepts of data types and data structures to deploy solutions for real time applications	PO1, PO2, PO3, PO4, PO5, PO6
CO5	Decide the and modules based on the application domain	PO1, PO2, PO3, PO4, PO5, PO6
CO6	Create applications based on theuser defined functions, file processing and string concepts	PO1, PO2, PO3, PO4, PO5, PO6
		TOTAL HOURS OF INSTRUCTIONS: 45

Module No. 1	**Introduction to Problem Solving**	**8 Hours**

Problem Solving definition and steps, developing an algorithm, flowcharts and pseudocode, Introduction to Python, Interactive and script mode, Indentation, Comments, Tokens in Python – Variables, Keywords, Literals, Data types, Expressions, Input and Print functions.

Module No. 2	**Operators and Branching**	**6 Hours**

Operators and its precedence, Arithmetic Operators, Comparison (Relational) Operators, Assignment Operators, Logical Operators, Bitwise Operators, Membership Operators, Identity Operators, Branching Statements-if; if else, nested if; nested if else, elif

Module No. 3	Loops and Regular Expressions	7 Hours

Creating Loops with while and for, Different versions of Loops, Nested Loops, Loop Control Statements, Loop Modification with break, continue and pass, Regular Expressions.

Module No. 4	Basic Data Structures	12 Hours

Introduction to Different Numeric Types, Type Conversion, Mathematical Functions, Random Numbers. Creating and Accessing Strings, Operations on Strings, Indexing, Slicing, String Manipulations, Pre-defined functions on Strings.
Creating, Accessing and Manipulating Lists, Sets, Tuples and Dictionaries, Understanding the differences among them, Applications of the Data Structures. Using Branching and Control loops with Data structures, Matrix Operations using Numpy.

Module No. 5	Functions , Strings & Files	12 Hours

Pre-defined functions, User defined functions, formal and actual parameters, return statement, Using Branching, Looping and Data structures in Functions, Recursion, Internal workflow of Recursion, Modules.
File I/O-Opening and Closing files, Different modes, File attributes, Read, Write Operations, File Positions. Renaming and Deleting Files, various directory handling functions.

Text Books

5. Kenneth Lambert, "Fundamentals of Python: First Programs", Cengage Learning, 2019
6. Martin C Brown, "The Complete Reference with Python", McGrawHill, 2018.

References

5. John Zelle, Python Programming: An introduction to Computer Science, Franklin Associates, Third Edition, 2016.
6. Mark Lutz, "Learning Python", Fifth edition, O'Reilly, 2013.

List of Laboratory Experiments

Week 1:

11. Write a Python program to display the current date and time.
12. Write a Python program to get the Python version you are using
13. Write a Python program that accepts an integer (n) and computes the value of n+nn+nnn
14. Write a Python program to read and print various types of variables.
15. Write a Python program to print the calendar of a given month and year.

Week 2:

13. Python Program to Find the Square Root
14. Python Program to Calculate the Area and Perimeter of Triangle and Circle.
15. Python Program to Solve Quadratic Equation
16. Python Program to Swap Two Variables
17. Python Program to Convert Kilometres to Miles
18. Python Program to Convert Celsius To Fahrenheit

Week 3:

15. Python program to find whether the given number is Even or Odd
16. Write a Python program to get the difference between a given number and 17, if the number is greater than 17 return double the absolute difference
17. Write a Python program to test whether a number is within 100 of 1000 or 2000.
18. Write a Python program to calculate the sum of three given numbers, if the values are equal then return three times of their sum
19. Python Program to Find the Factorial of a Number
20. Python Program to print maximum of 3 numbers
21. Write a python program to find whether a given year is leap or not.

Week 4:

15. Write a program which will find all such numbers which are divisible by 7 but are not a multiple of 5, between 2000 and 3200 (both included).
    a. The numbers obtained should be printed in a comma-separated sequence on a single line. Consider use range(#begin, #end) method
16. Write a python program to check whether a number is divisible by 5 and 11 or not.
17. Write a python program to check whether a character is alphabet or not.
18. Write a python program to input any character and check whether it is alphabet, digit or special character.
19. Write a python program to check whether a character is uppercase or lowercase alphabet.
20. Write a python program to input week number and print week day.
21. Write a python program to count total number of notes in given amount

Week 5:

13. Write a Python program to print all natural numbers from 1 to n. - using while loop
14. Write a Python program to find sum of all odd numbers between 1 to n.
15. Write a Python program to count number of digits in a number.
16. Write a Python program to find first and last digit of a number.
17. Write a Python program to calculate sum of digits of a number.
18. Write a Python program to enter a number and print its reverse.

Week 6:

17. Write a Python program to check whether a number is palindrome or not.
18. Write a Python program to find frequency of each digit in a given integer.
19. Write a Python program to print all ASCII character with their values.
20. Write a Python program to find all factors of a number.
21. Write a Python program to calculate factorial of a number.
22. Write a Python program to print all Prime numbers between 1 to n.
23. Write a Python program to check whether a number is Armstrong number or Strong or Prime Number or Perfect number or magic number or not
24. Write a Python program to print Fibonacci series up to n terms.

Week 7:

1. Write a Python Program to Find the Largest Number in a List
2. Write a Python Program to Find the Second Largest Number in a List
3. Write a Python Program to Put Even and Odd elements in a List into Two Different Lists
4. Write a Python Program to Merge Two Lists and Sort it
5. Write a Python Program to Sort the List According to the Second Element in Sublist
6. Write a Python Program to Find the Second Largest Number in a List Using Bubble Sort
7. Write a Python Program to Sort a List According to the Length of the Elements
8. Write a Python Program to Find the Union of two Lists
9. Write a Python Program to Find the Intersection of Two Lists
10. Python Program to print all odd indexed elements of a list

Week 8:

1. Write a Python program to get the 4th element and 4th element from last of a tuple
2. Write a Python program to find the repeated items of a tuple.
3. Write a Python program to check whether an element exists within a tuple
4. Write a Python program to unzip a list of tuples into individual lists.
5. Write a Python program to replace last value of tuples in a list. Sample list: [(10, 20, 40), (40, 50, 60), (70, 80, 90)] Expected Output: [(10, 20, 100), (40, 50, 100), (70, 80, 100)]
6. Write a Python program to remove an empty tuple(s) from a list of tuples. Sample data: [(), (), ('',), ('a', 'b'), ('a', 'b', 'c'), ('d')] Expected output: [('',), ('a', 'b'), ('a', 'b', 'c'), 'd']
7. Write a Python program to convert a list of tuples into a dictionary.
8. Write a Python program to find the highest 3 values of corresponding keys in a dictionary.

Week 9:

11. Write a Python function that prints out the first n rows of Pascal's triangle.
12. Write a Python function to create and print a list where the values are square of numbers between 1 and 30 (both included).
13. Write a Python program to detect the number of local variables declared in a function
14. Write a Python program that invoke a given function after specific milliseconds.
15. Write a Python program to get the sum of a non-negative integer

Week 10:

9. Write a Python program to calculate the harmonic sum of n-1
10. Write a Python program to calculate the sum of the positive integers of n+(n-2)+(n- 4)... (until n-x =< 0)
11. Write a Python program to find the greatest common divisor (gcd) of two

integers using Recursion

12. Implement any sorting algorithm using Recursion.

Week 11:

9. Write a Python Program to Replace all Occurrences of 'a' with 'b' in a String. If 'a' is not present, then print appropriate message.
10. Write a Python Program to Remove the nth Index Character from a Non-Empty String
11. Write a Python Program to Detect if Two Strings are Anagrams
12. Write a Python Program to Form a New String where the First Character and the Last Character have been Exchanged.

Week 12:

13. Write a Python program to get the last part of a string before a specified character
14. Write a Python program to count the occurrences of each word in a given sentence.
15. Write a Python function to insert a string in the middle of a string.
16. Write a Python function to get a string made of its first three characters of a specified string. If the length of the string is less than 3 then return the original string.
17. Write a Python program to add a prefix text to all of the lines in a string
18. Write a Python program to convert a given string into a list of words.

A few Programming exercises for Competitive Coding (optional) :

25. Remove Duplicate Char from String
26. Hailstone Sequence
27. Secure Conversation by Encryption and Decryption
28. Special Elements in Matrix
29. Next Greater No with the Same set of Digits
30. Smallest Subarray with Sum Greater than Given Number
31. Group Anagrams
32. Find Duplicates in Array in O(n)
33. Find Two Unique Numbers from Array in O(n)
34. Number Patterns & Finding Smallest Number
35. Minimum Distance for Truck to Deliver Order [Amazon]
36. Generate Balanced Parentheses

Course Type	**Embedded Theory and Lab (ETL)**
Mode of Evaluation	**Theory** **75%** Examination-1 15 Examination-2 15 Assignment/ Quiz 20 Final Assessment Test 50 **Laboratory** **25%**
Prepared by	Ms. Neha Dhiman
Recommended by the Board of Studies on	**1st BoS 11-09-2024**
Date of Approval by the Academic Council	**1st Academic Council 25-10-24**

For Chandigarh Engineering College, Jhanjeri, An Autonomous College

Bachelor of Technology (B. Tech. 1st Year batch 2023 & Onwards)

Course Code: UME102	**Course Title:** Engineering Graphics Design	**TPC**	**1**	**4**	**3**
Version No.	**1.0**				
Course Pre-requisites/ Co-requisites	**None**				
Anti-requisites (if any)	**None**				
Objectives:	5. To understand the basic principles of engineering drawing 6. To have the knowledge of generating the pictorial views 7. To understand the development of surfaces 8. Use CAD tools for making drawings of machine components and assemblies. 9. To have the knowledge of interpretation of dimensions of different quadrant projections.				

Course Outcomes

Course Outcomes	Course Outcome Statement
CO1	Understand the basic principles and elements of engineering drawings
CO2	To use drawing tools and software to create engineering drawings.
CO3	Analyze the accuracy and clarity of engineering drawings.
CO4	Evaluate different design solutions based on engineering drawings.
CO5	Design and create three-dimensional engineering drawings

Detailed Syllabus:

Module No. 1	**INTRODUCTION TO ENGINEERING DRAWING**	**3 Hours**

Drawing Instruments: their Standard and uses – symbols and conventions in drawing practice –. Types of lines and their uses, Drawing Sheets: sizes and layout, Grades of pencils used. Dimensioning: definition, types and methods of dimensioning, geometrical construction, concept of scales in drawing, types of scales, construction of plane and diagonal scales.

Module No. 2	**THEORY OF PROJECTIONS**	**4 Hours**

Relevance of projection, Types of projections, Principles of orthographic projections in reference to quadrants – conventions – first and third angle projections, illustration through simple problems of projection; Projections of points in quadrants. Projections and trace of a line with different possible orientations in a quadrant. Methods to find true length and inclination of a line with principal planes.

Module No. 3	**PROJECTIONS OF PLANES AND SOLIDS**	**5 Hours**

Concept of plane and lamina, Projections of a lamina when; parallel to any reference plane, perpendicular to any reference plane, inclined to reference plane. Traces of planes, Definition of solid, types of solids – conventions- different possible orientations of solid in a quadrant. Projections of solid when; axis parallel to reference plane, perpendicular to reference plane, inclined to one and parallel to other reference plane.

Module No. 4	ISOMETRIC PROJECTIONS	2 Hours
Principles of Isometric Projections-Isometric Scale- Isometric Views or drawing- Conventions. Isometric drawing / projections of solids such as cube, prisms, pyramids, cylinder, and cone.		
Module No. 5	**PRACTICE USING COMPUTER AIDED DRAFTING (CAD) TOOLS**	**2 Hours**
Hands on training on any CAD software to strengthen the understanding of the engineering drawing.		

Text Books

1. Engineering Drawing Unknown Binding –2023 edition by N D Bhatt
2. Engineering Drawing + Auto CAD by K. Venugopal and V. Prabhu Raja- 1 January 2022
3. Engineering Graphics and Drafting By PS Gill by PS Gill | 1 January 2020

References

1. 1. Engineering Drawing |3rd Edition by Basant Agrawal and C M Agrawal-1 August 2020.
2. 2. A Textbook of Engineering Drawing by Dr. R K Dhawan- 2020
3. 3. Engineering Drawing through Problems by S. K. Sinha- 18 July 2024

Lab Exercises

Week 1: Conventional Representation of different types of lines and materials

Practical Tasks: Preparing a Sheet 1

1. Different types of lines used in engineering drawing
2. Representation of different materials
3. Free hand single stroke vertical letters in 7:4

Computer Graphic Lab

1. **Aim:** To understand and Learn AUTO-CAD interface.
2. **Lab Outcome:** Students will be able to locate various commands and AUTO-CAD controls and can customize and Reset User Interface

Week 2: Construction of plane scale.

Practical Tasks: Preparing a Sheet 2

1. A plain scale is a line divided into equal units that is used to measure distances.
2. Plain scales are used in engineering graphics and can be used for reducing or enlarging dimensions.
3. Plain scales can include formulas for calculating the scale ratio and length of the scale.

Computer Graphic Lab

1. **Aim:** To draw a given sketch in AUTO-CAD with Dimensioning and Proper Location.
2. **Command Learned:** Line, ORTHO, OSNAP, DYN, Dimensioning, Circle, Move, and Trim

Week 3: Construction of diagonal scale.

Practical Tasks: Preparing a Sheet 3

1. A diagonal scale is a tool used in engineering to measure lengths with greater accuracy.

2. It's based on the principle of similar triangles and is used to represent three consecutive units, such as meters, centimeters, and millimeters.
3. Diagonal scales can measure up to second decimal places, which is more accurate than a plain scale.

Computer Graphic Lab

1. **Aim:** To draw a given sketch in AUTO-CAD with Dimensioning and Proper Location
2. **Command Learned:** Trim, Champher, Slot, Editing Dimensions Text and Precision etc.

Week 4: Projection of point in different quadrants in Horizontal and vertical plane

Practical Tasks: Preparing a Sheet 4

1. The position of a point in an engineering drawing is defined by its distance from the three principle planes: the vertical plane (VP), horizontal plane (HP), and profile plane (PP).

Computer Graphic Lab

1. **Aim:** To draw a given sketch in AUTO-CAD with Dimensioning and Proper Location
2. **Command Learned:** Trim, Fillet, Editing Dimensions Text and Precision etc.

Week 5: Projection of line in different quadrants in Horizontal and vertical plane

Practical Tasks: Preparing a Sheet 5

1. A line can be in any of the four quadrants in space.
2. A line can be perpendicular to one plane and parallel to the other, or parallel to both planes, or inclined to one plane and parallel to the other.
3. Projection of a line parallel to a reference plane
4. Projection of a line onto a plane
5. The projection of a straight line is obtained by joining the top and front views of the line's endpoints.

Computer Graphic Lab

1. **Aim:** To draw a given sketch in AUTO-CAD with Dimensioning and Proper Location
2. **Command Learned:** TTR, Circular Array, Explode, Line type and Dimensioning etc.

Week 5: Find the true length and inclination in Projection of line in different quadrants

Practical Tasks: Preparing a Sheet 6

1. In the context of line projection, true length refers to the actual length of a line, which is not foreshortened by the viewing type. Here are some things to know about true length.

Computer Graphic Lab

1. **Aim:** To draw a given sketch in AUTO-CAD with Dimensioning and Proper Location
2. **Command Learned:** TTR, Circular Array, Explode, Line type and Dimensioning etc.

Week 7: Projection of Plane in different quadrants

Practical Tasks: Preparing a Sheet 7

1. A projection plane is an imaginary flat surface that's used to project an image of a 3D object onto a 2D view. The projection is created by connecting the points where the lines of sight from the object pierce the projection plane.
2. Concept of plane and lamina, Projections of a lamina when; parallel to any reference plane, perpendicular to any reference plane, inclined to reference plane.

Computer Graphic Lab

1. **Aim:** To draw a given sketch in AUTO-CAD with Dimensioning and Proper Location and Layers
2. **Command Learned:** Layers used in floor plan, freeze, lock, layer settings

Week 8: Inclination of the plane with horizontal and vertical plane.

Practical Tasks: Preparing a Sheet 8

1. A projection plane is an imaginary flat surface that's used to project an image of a 3D object onto a 2D view. The projection is created by connecting the points where the lines of sight from the object pierce the projection plane.
2. Concept of plane and lamina, Projections of a lamina when; parallel to any reference plane, perpendicular to any reference plane, inclined to reference plane.

Computer Graphic Lab

1. **Aim:** To draw a given sketch in AUTO-CAD with Dimensioning and Proper Location and Layers
2. **Command Learned:** Layers used in floor plan, freeze, lock, layer settings

Week 9: Projection of Solid in different quadrants.

Practical Tasks: Preparing a Sheet 9

1. The different types of solids include polyhedra like cubes and pyramids, and solids of revolution like cones and cylinders.
2. The projection process involves assuming the solid's position and drawing the front and top views in three steps.
3. The projection of solids also covers inclined positions and problems involving various solids.

Computer Graphic Lab

1. **Aim:** Part Modelling Using Sweep Command
2. **Command Learned:** Circle CR,TTR, rotate 3d, Sweep, Region, Extrude, press pull, Slot, Move, and Trim

Week 10: Inclination of the solid with horizontal and vertical plane.

Practical Tasks: Preparing a Sheet 10

1. The projection process involves assuming the solid's position and drawing the front and top views in three steps.
2. The projection of solids also covers inclined positions and problems involving various solids.

Computer Graphic Lab

1. **Aim:** Part Modelling Using Multiview Drawing
2. **Command Learned:** Solids and Solid Editing Commands

Week 11: Principles of Isometric Projections-Isometric Scale- Isometric Views or drawing- Conventions.

Practical Tasks: Preparing a Sheet 11

1. Isometric projection is a method for representing three-dimensional objects in two dimensions. It is used in technical and engineering drawings, and is also known as isometric drawing

Computer Graphic Lab

1. **Aim:** Part Modelling
2. **Command Learned:** Solids and Solid Editing Commands

Week 12: Isometric drawing / projections of solids such as cube, prisms, pyramids, cylinder, and cone.

Practical Tasks: Preparing a Sheet 12

1. Isometric projection is a method for representing three-dimensional objects in two dimensions. It is used in technical and engineering drawings, and is also known as isometric drawing

Computer Graphic Lab

1. **Aim:** Part Modelling
2. **Command Learned:** Solids and Solid Editing Commands

Mode of Evaluation	**Internal**		**75%**
	Assignment/ Quiz	20	
	Exam-1	15	
	Exam-2	15	
	Final Assessment Test	50	
	Laboratory		**25%**
Prepared by	**Dr. Mandeep**		
Recommended by the Board of Studies on	**1st BoS 12-09-24**		
Date of Approval by the Academic Council	**1st Academic Council 25-10-24**		

For Chandigarh Engineering College, Jhanjeri, An Autonomous College

Bachelor of Technology (B. Tech. 1st Year batch 2023 & Onwards)

Course Code: USS101	**Course Title: Industry Specific Communication**	**LTPC**	**3**	**0**	**0**	**3**
Version No.	**1.0**					
Course Pre-requisites/ Co-requisites	**None**					
Anti-Requisites (if any)	**None**					
Objectives:	• To understand the fundamental concepts of effective communication and develop skills in English grammar and soft skills. • To choose appropriate communication techniques and strategies based on the requirements of specific professional scenarios. • To learn how to construct clear and impactful written and verbal communication for academic and professional settings. • To evaluate various communication methods, understand their applications and limitations, and use the most effective approach to address real-world challenges.					

CO-PO Mapping

Course Outcomes	Course Outcome Statement	PO's / PSO's
CO1	Demonstrate a strong grasp of English grammar, enabling error-free communication in both written and verbal formats.	(PO8, PO9, PO10 & PO12)
CO2	Develop the ability to articulate thoughts clearly and confidently in diverse professional and social contexts.	(PO8, PO9, PO10 & PO12)
CO3	Create impactful resumes, cover letters, and emails that meet industry standards and convey professionalism.	(PO8, PO9, PO10 & PO12)
CO4	Apply soft skills such as active listening, teamwork, and conflict resolution to build strong professional relationships.	(PO8, PO9, PO10 & PO12)
CO5	Exhibit polished communication and presentation skills, ensuring readiness for interviews, group discussions, and workplace interactions.	(PO8, PO9, PO10 & PO12)

Module No. 1	**Introduction to Communication**	**9 Hours**
Introduction to Soft Skills Essentials: Communication, Collaboration & More, Getting to Know You: Self-Introduction Mastery and Introducing Me: Practice Your Story , The Art of Communication: Verbal Ability Basics, Word Power: Building Your Vocabulary		

Module No. 2	**Speaking Skills, Reading and Understanding**	**9 Hours**
Unspoken Impact: Elevating Your Body Language, Discover You: The Journey of Self-Awareness and Self-Discovery: Understanding Who You Are , Word Fix: Mastering Commonly Confused & Misspelled Words, Sentence Symphony: Understanding Sentence Types		

Module No. 3	**Building Confidence through Technical Communication**	**9 Hours**

Acting As You: Building Confidence with Role Plays and Exploring Different Versions of Yourself, Unlock Your Potential: Exploring the Holland Code, Beyond Boundaries: The Art of Creative Writing, The Great Exchange: Thoughtful Debate/Discussion.		
Module No. 4	**Communication Essentials for Professionals**	**9 Hours**
Picture Perfect: Building Descriptive Skills, Quick Talk: The JAM Session Challenge, Grammar & Usage: The Cornerstones of Clear Expression, Spot the Mistakes: Correct the Errors, Say It Right: Mastering Common Mispronunciations		
Module No. 5	**Building Industry-Ready Soft Skills**	**9 Hours**
Sharpen Your Edge: Soft Skills Q&A Session, Active Listening and Effective Speaking, Role Play Ensemble: Strengthening Team Skills, Word Wise: Verbal Ability Practice Test		

Text Books

5. Carnegie, Dale. The Art of Public Speaking: Seventh Edition Prabhat Prakashan Pvt. Ltd, 2020
6. Murphy, Raymond. Essential English Grammar with Answers: Second Edition, Cambridge University Press, 2024

References

5. Wren, P.C., and Martin, H. High School English Grammar and Composition Book (Regular Edition). New Delhi, S. Chand Publishing, 2023.
6. Carnegie, Dale. How to Win Friends and Influence People. New York, Simon and Schuster, 2024.

Mode of Evaluation	**Theory**	**100%**
	Examination-1	15
	Examination-2	15
	Assignment/ Quiz	20
	Final Assessment Test	50
Prepared by	**Ms. Akshdeep Kaur & Ms. Aakriti Mahajan**	
Recommended by the Board of Studies on	**1st BoS 11-09-2024**	
Date of Approval by the Academic Council	**1st Academic Council 25-10-24**	

Study Scheme & Syllabus of

Bachelor of Technology

(1st/2nd Semester)

Batch 2024 & Onwards

(For Chandigarh Engineering College, Jhanjeri, An Autonomous College)

By

Department of Academics & Approved by BoS & Academic Council

IK Gujral Punjab Technical University
Chandigarh Engineering College, Jhanjeri, An Autonomous College
Bachelor of Technology (B. Tech 1st year batch 2024 & onwards)

Bachelors of Technology 2nd Semester
It is an Under Graduate (UG) Programme of 4 years duration (8 semesters)
Eligibility for Admission: As per AICTE norms.
Scheme followed by the following Branches:

- ✓ B. Tech CE

Second Semester **Contact Hours: 29**

Course Code	Type of Course	Course Title	Hours per Week			Marks Distribution		Total Marks	Credits
			T	P	C	Internal	External		
USC103	UC-Sci	Modern Physics	3	2	4	50	50	100	4
USC102	UC-Sci	Linear Algebra and Differential Equations	4	0	4	50	50	100	4
UEC101	UC-Engg	Basic Electrical and Electronics Engineering	3	2	4	50	50	100	4
UME102	UC-Engg	Engineering Graphics Design	1	4	3	50	50	100	3
UCS102	UC-Engg	Problem Solving using Python	3	2	4	50	50	100	4
UHM102	UC-H&M	English for Effective Communication	2	2	3	50	50	100	3
USS101	UC-H&M	Industry Specific Communication	3	0	3	50	50	100	3
TOTAL			**19**	**12**	**25**	**350**	**350**	**700**	**25**

***These are the minimum contact hrs. allocated. The contact hrs. may be increased by the department as per the requirement of the subject.**

D. Definition of Credit:

1 Hr. Lecture (T) per week	1 credit
2 Hours Practical /Lab (P) per week	1 credit

B. Range of credits –

A range of credits from 150 to 160 for a student to be eligible to get Under Graduate degree in Engineering. A student will be eligible to get Under Graduate degree with Honours or additional Minor Engineering, if he/she completes an additional 20 credits. These could be acquired through MOOCs.

C. Structure of Undergraduate Engineering program:

Credit Distribution	
Under Graduate degree in Engineering	Credits
Foundation Core Courses	
Engineering Foundation (20 credits)	84
Science Basket (20 credits)	
Projects and Internships (18 credits)	
Humanities (20 credits)	
NGCR - Non-graded Core Requirement (6 credits)	
Discipline Core Courses	43
Discipline/ Specialization Elective Courses	24
Open Elective Courses	9
Total Credits	160

We follow same guidelines as per the PTU B. Tech 1st Year Syllabus (Batch 2023 Onwards) as mentioned on the PTU Website from Page 5 to Page 13.

For Chandigarh Engineering College, Jhanjeri, An Autonomous College

Bachelor of Technology (B. Tech. 1st Year batch 2023 & Onwards)

Course Code: USC102 (Common to all branches)	**Course Title : LINEAR ALGEBRA & DIFFERNTIAL EQUATIONS**	**TPC**	**4**	**0**	**4**
Version No.	**1.0**				
Course Pre-requisites/ Co-requisites	• Basic concept of Matrices & Determinant. • Basic concept of Differential Equations.				
Anti-requisites (if any)	**None**				
Objectives:	The objective of the **LINEAR ALGEBRA & DIFFERNTIAL EQUATIONS** is to familiarize the prospective engineers with techniques in multivariate integration, ordinary , partial differential equations and Linear Algebra. It aims to equip the students to deal with advanced level of mathematics and applications that would be essential for their disciplines.				

CO-PO Mapping

Course Outcomes	Course Outcome Statement	PO's / PSO's
CO1	To gain the knowledge of Ordinary differential equations and discuss its applicability to trained to visualize and conceptualize the engineering problems	PO1, PO2, PO9, PO10.
CO2	To determine the rank and inverse of matrices by elementary transformations.	PO1, PO2, PO9, PO10.
CO3	Use the knowledge to model the engineering problem mathematically using theory of matrices and linear algebra.	PO1, PO2, PO9, PO10.
CO4	Illustrate the concept of vector spaces & linear transformations of finite dimensional vector spaces.	PO1, PO2, PO9, PO10.
CO5	Learn the methods to solve Partial Differential Equations.	PO1, PO2, PO9, PO10.
TOTAL HOURS OF INSTRUCTIONS: 60		

Module No. 1	**Ordinary differential equations: First and Higher order:**	**15 Hours**

First order Exact differential equations, integrating factors, Linear first order equations, Bernoulli equation, Clairaut's equation, Higher order differential equation with constant coefficients. Method of variation of parameters, Cauchy-Euler equation; Legendre's Linear differential equation, finding

particular integrals.		
Module No. 2	**System of Linear Equations:**	**10 Hours**
Rank of a matrix, Echelon form of matrix, Homogenous and Non homogenous system of linear equations, consistency and inconsistency of system of equations, Gauss elimination method, Inverse of a matrix, Gauss-Jordon method.		
Module No. 3	**Linear Algebra**	**10 Hours**
Eigen values, eigen vectors, Cayley-Hamilton theorem, algebraic multiplicity, geometric multiplicity, similar and diagonalizable matrices.		
Module No. 4	**Vector spaces:**	**15 Hours**
Vector spaces, Subspaces, Linear independence and Linear dependence of vectors, Dimension and basis, Linear transformation, rank and nullity theorem (without proof), matrix associated with Linear Transformation,		
Module No. 5	**Partial Differential Equations:**	**10 Hours**
Formation of first order equations, solution of first order equations Lagrange's equation, Higher order Linear equations with constant coefficients.		

Text Books

10. Dr. Rajesh Kumar Narula, Engineering Mathematics-II, Sharma Publications. 2024.
11. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 40th Edition, 2020.
12. N.P.Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2021.

References

1. Maurice D. Weir, Joel Hass, Christopher Heil, "Thomas' Calculus" 14th edition, Pearson Education, 2018.

2. R.K. Jain and S.R.K. Iyengar, "Advanced Engineering Mathematics" Narosa Publications, 2022.

3. B. V. Ramana, "Higher Engineering Mathematics", Tata McGraw Hill,2017.

4. R. Garg, "Mathematics – I", Khanna Book Publishing Co. (P) Ltd. https://ekumbh.aicte-india.org/userugbook.php, 2021.

Course Type	**THEORY**
Mode of Evaluation	**Theory 100%** **Exam-I 15** **Exam-II 15** **Assignment/ Quiz 20** **Final Assessment Test 50**
Prepared by	Ms. Deepika Gakhar
Recommended by the Board of Studies on	1st BOS, 11.09.24
Date of Approval by the Academic Council	**1st Academic Council 25-10-24**

For Chandigarh Engineering College, Jhanjeri, An Autonomous College

Bachelor of Technology (B. Tech. 1st Year batch 2023 & Onwards)

Course Code: UHM102	**Course Title : English for Effective Communication**	**TPC**	**2**	**2**	**3**
Version No.	**1.0**				
Course Pre-requisites/ Co-requisites	**UHM101**				
Anti-requisites (if any)	**None**				
Objectives:	7. Learn to communicate cohesively in writing and speaking by understanding different types of communication, improving grammar, and writing professional documents. 8. Learn to plan and deliver speeches, use different speaking styles, and practice negotiation and public speaking skills through hands-on activities.				

CO-PO Mapping

Course Outcomes	Course Outcome Statement	PO's / PSO's
CO1	**Differentiate between verbal and non-verbal communication and assess the impact of barriers.**	PO(8,9,10&12), PSO(1)
CO2	**Use advanced grammar and techniques to write clear and cohesive texts.**	PO(8,9,10&12), PSO(1)
CO3	**Apply effective writing steps to produce concise engineering documents.**	PO(8,9,10&12), PSO(1)
CO4	**Create professional emails and business letters with proper tone and structure.**	PO(8,9,10&12), PSO(1)
CO5	**Analyze literary works to explain themes of resilience and leadership and their relevance.**	PO(8,9,10&12), PSO(1)
TOTAL HOURS OF INSTRUCTIONS: 30		

Module No. 1	**Communication Forms and Barriers**	**7 Hours**

16. Listening Barriers: Examine factors that affect effective listening.
17. Interpersonal Communication: Understand one-on-one and small group interactions.
18. Mass and Media Communication: Study communication through media channels.
19. Verbal and Non-Verbal Communication: Explore both spoken and body language, and their barriers.
20. Physical and Psychological Barriers: Identify obstacles like environmental distractions and mental blocks

Module No. 2	**Mechanics of Writing and Grammar Review**	**7 Hours**

19. Enhancing Text Cohesion: Using Cohesive Devices Effectively
20. Advanced Sentence Structures: Compound-Complex structures
21. Misplaced Modifiers: Remove ambiguity
22. Idioms, Phrases, and Figures of Speech in Professional Writing
23. Homonyms, Homophones, and Homographs: Avoiding Confusion
24. One-Word Substitutions for Conciseness and Precision

Module No. 3	Precision in Engineering Writing	4 Hours
7. The art of condensation & Paraphrasing 8. Seven steps of writing effective Precise		
Module No. 4	**Professional Writing for the Workplace**	**7 Hours**
13. Write Professional Emails: Tone of professional emails. 14. Meeting Minutes: summarizing key points and decisions. 15. Improve Note-Taking and Note-Making: meetings or lectures reading or research notes 16. Write Effective Letters: Inquiry Letters, Complaint Letters, Order Letters, Response Letters & Cover Letter		
Module No. 5	**Literary Perspectives on Resilience and Leadership**	**5 Hours**
Understanding tone and learning to utilize it in writing business documents		

Text Books

16. "The Harvard Business Review Guide to Better Business Writing" by Bryan A. Garner (2022) - Harvard Business Review Press.
17. "Advanced English Grammar: A Linguistic Approach" by Ilse Depraetere (2021) - Bloomsbury Academic.
18. "English Idioms in Use: Advanced" by Michael McCarthy and Felicity O'Dell (2021) - Cambridge University Press.
19. "Technical Writing for Engineers & Scientists" by Leo Finkelstein (2020) - McGraw-Hill Education.
20. "Business Writing: What Works, What Won't" by Wilma Davidson (2020) - St. Martin's Griffin.

References

13. "Media and Communication" by Pieter J. Fourie (2022) Publisher: Routledge
14. "Engineering Writing by Design: Creating Formal Documents of Lasting Value" by Edward J. Rothwell and Michael J. Cloud (2021) Publisher: Wiley
15. "Write to Influence!: Personnel Appraisals, Resumes, Emails, and More" by Carla D. Bass (2021) Publisher: Routledge
16. "The Elements of Style: Grammar Workbook" by William Strunk Jr. & Richard De A'Morelli (2020) Publisher: Penguin Publishing Group

Lab Exercises

19. **Speech Planning and Delivery**
    10. Topic Selection: How to choose and refine a speech topic.
    11. Research and Organization: Techniques for researching and structuring content.
    12. Rehearsal and Delivery: Tips for practicing and delivering a speech effectively.

20. **Different Styles of Speaking**
    10. Informative vs. Persuasive Speeches: Differences and techniques for each.
    11. Adaptation to Audience: How to tailor speeches to different audiences.
    12. Judging Criteria: Evaluation criteria for speaking styles

21. **Persuasive Techniques**
    10. Rhetorical Devices: Use of ethos, pathos, and logos.
    11. Practical Exercises: Implement techniques in sample speeches or exercises.
    12. Analysis: Review effective use of these techniques in famous speeches or presentations.

22. The Art of Negotiation

10. Role-Play Exercises: practice real-life negotiation scenarios.
11. Techniques: Focus on persuasive language
12. Judging Criteria: Evaluation criteria for negotiation skills

23. Debates

10. Debate Formats: learning different formats
11. Roles: Define specific roles (e.g., speaker, rebuttal, and cross-examiner).
12. Judging Criteria: Evaluation criteria for debate performance.

24. Public Speaking Skills

10. Preparation: Strategies for researching and organizing a technical topic.
11. Presentation: Focus on delivery, visual aids, and handling questions.
12. Judging Criteria: Evaluation criteria for Public Speaking

Course Type	**Embedded Theory and Lab(ETL)**
Mode of Evaluation	**Theory** **75%** Exam 1 15 Exam 2 15 Assignment / Quiz 20 Final Assessment Test 50 **Laboratory** **25%**
Prepared by	Ms. Sonia Verma
Recommended by the Board of Studies on	1st BOS, 11.09.24
Date of Approval by the Academic Council	**1st Academic Council 25-10-24**

For Chandigarh Engineering College, Jhanjeri, An Autonomous College

Bachelor of Technology (B. Tech. 1st Year batch 2023 & Onwards

Course Code: USC103	**Course Title : Modern Physics**	**TPC**	**3**	**2**	**4**
Version No.	**1.0**				
Course Pre-requisites/ Co-requisites	**None**				
Anti-requisites (if any)	**None**				
Objectives:	The goal of the course is to cultivate a scientific mindset and analytical skills in engineering graduates by exploring physical concepts and their applications in engineering and technology. Understanding fundamental physical principles will equip graduates to approach engineering challenges logically, particularly those arising from rapidly advancing technologies.				

Course Outcomes

Course Outcomes	Course Outcome Statement
CO1	Understand the properties of solid and X-ray and use of X- rays in solid.
CO2	Understand the working, properties and application of semiconductor.
CO3	Acquire knowledge about the Magnetic material, superconductor, and Optical Fibre.
CO4	Illustrate the concept of Electromagnetic waves and nanomaterials.
CO5	Understand the concept for quantum mechanics. Also explain the concept of Laser system.

Detailed Syllabus:

Module No.-1	**Elements of crystallography and X- Rays**	**6 Hours**
Unit cell, Basis, Space lattice, Crystal Systems, Miller Indices of Planes and directions, bonding in solids, origin of bands in solids (Qualitative idea), Metals, semiconductors & insulators; Continuous & Characteristic X - Rays, X - Ray Diffraction & Bragg's law in Crystals, Bragg's spectrometer.		
Module No.-2	**Semiconductor Materials**	**6 Hours**
Intrinsic and extrinsic semiconductors, p-type, and n-type semiconductors; Fermi level in semiconductors; Current conduction in semiconductors, I-Vcharacteristics of p-n junction diode, Some special p-n diodes: Zener diode, Tunnel diode and Light emitting diode.		
Module No.-3	**Magnetic Materials, Superconductivity and Fibre Optics**	**10 Hours**
Basic ideas of Dia, Para, Ferro & Ferromagnetic materials, Ferrites, Hysteresis loop. **Superconductivity**, Superconductors as ideal diamagnetic materials, Signatures of Superconducting state, Meissner Effect, Type I & Type II superconductors, London Equations. **Fibre Optics** Introduction, Acceptance Angle, Numerical Aperture, Normalized frequency, Modes of propagation, material dispersion & pulse broadening in optical fibres, Applications of optical fibres		
Module No. 4	**EM waves & Dielectrics and Nanomaterials**	**12 Hours**
Physical significance of Gradient, Divergence & Curl, Dielectric polarization, Displacement current, Maxwell's Equations, electromagnetic wave propagation in free space and isotropic dielectric medium, Poynting vector. **Nanomaterials:-** Nanoscale, Classifications of nanomaterials (3D, 2D, 1D and 0D), electron confinement,		

Nanocomposites, Carbon nanotubes (CNTs), Properties of nanomaterials, synthesis of nanomaterials, ball milling and sol-gel techniques Applications of nanomaterials.

Module No. 5	**Quantum Theory and Lasers**	**11 Hours**

Need and origin of quantum concept, Wave - particle duality, Matter waves, Group & Phase velocities, Uncertainty Principle; Schrodinger wave equations (time independent & dependent); Application to particle in a box.

Lasers : Concepts of laser, Spontaneous & Stimulated emissions, Einstein's Coefficients, Population Inversion, Pumping Mechanisms, Components of a laser System, Three & four level laser systems; Ruby, He -Ne, and semiconductor Lasers.

Text Books

1. A Textbook Of Engineering Physics by M N Avadhanulu, P G Kshirsagar , TVS Arun Murthy, S Chand Publisher,2020
2. Engineering Physics Paperback by Sujay Kumar Bhattacharya , McGraw Hill, 2019.

References

13) SOLID STATE PHYSICS , 10TH EDITION by S.O. Pillai , New Age International Publisher, 2022

14) Introduction to Electrodynamics, Griffiths; DJ, Prentice Hall. 1 January 2020

15) Materials Science &Engg., Raghvan V., Prentice Hall of India. 1 January 2015

16) Lasers- Fundamentals and Applications Paperback – 1, Ajoy Ghatak K.Thyagarajan, Laxmi Pulisher, 2019.

Lab Exercises

34. To find out the frequency of AC mains using electric vibrator.
35. To find out the dielectric constant of a dielectric substance.
36. To study the characteristic of different p-n junction diode.
37. To find out the intensity response of a LED.
38. To analyze the suitability of a given Zener diode as voltage regulator.
39. To determine energy band gap of Semiconductor.
40. To study the magnetic field of a circular coil carrying current.
41. To study B-H curve using CRO.
42. To study the divergence of a laser beam.
43. To determine the resistivity of semiconductors by Four probe Method.
44. To determine numerical aperture, attenuation & propagation losses in optical fibers.

Course Type	**Embedded Theory and Lab(ETL)**	
Mode of Evaluation	**Theory**	**75%**
	Assignment/Quiz 20	
	Exam-1 15	
	Exam-2 15	
	Final Assessment Test 50	
	Laboratory	**25%**
Prepared by	Mr. Ashish Kumar	
Recommended by the Board of Studies on	1st BOS, 11.09.24	
Date of Approval by the Academic Council	**1st Academic Council 25-10-24**	

For Chandigarh Engineering College, Jhanjeri, An Autonomous College

Bachelor of Technology (B. Tech. 1st Year batch 2023 & Onwards)

Course Code: UEC101	**Course Title : Basic Electrical and Electronics Engineering**	**TPC**	**3**	**2**	**4**
Version No.	**1.0**				
Course Pre-requisites/ Co-requisites	**None**				
Anti-requisites (if any)	**None**				
Objectives:	16. To understand the basic concepts of electrical circuits. 17. To understand and analysis of AC & DC circuits. 18. To understand the working and construction of Transformer, DC & AC machines. 19. To understand electrical installation, cables and wires. 20. To understand transducers.				

Course Outcomes

Course Outcomes	Course Outcome Statement
CO1	Outline the basic concept of DC and AC Electrical circuits
CO2	Apply the fundamental principles on problems of DC & AC electrical circuits.
CO3	Explain the working of transformer and constructional details of DC machines and Induction Motors.
CO4	Illustrate the different electrical components, wiring and earthing for electrical installations.
CO5	Outline the basic concept of transducer.

Detailed Syllabus:

Module No. 1	**DC Circuits**	**10 Hours**
Basic introduction of Electrical circuit elements (R, L and C), voltage and current sources, Kirchoff's current and voltage laws. Superposition, Thevenin's and Norton's Theorems.		
Module No. 2	**AC Circuits**	**10 Hours**
Representation of sinusoidal waveforms, peak and rms values, phasor representation, real power, reactive power, apparent power, power factor. Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC combinations (series and parallel), resonance. Voltage and current relations in star and delta connections.		
Module No. 3	**Electrical Machines**	**10 Hours**
BH Curve characteristics, ideal and practical transformer, equivalent circuit, losses in transformers, regulation, and efficiency. Auto-transformer. Generation of rotating magnetic fields, Construction and working of a three-phase induction motor, Significance of torque-slip characteristic. Loss components and efficiency. Single-phase induction motor. Construction, working, torque-speed characteristic of single phase and 3-phase induction mototr, Construction and working of dc motor. Construction and working of synchronous generators.		
Module No. 4	**Electrical Installations**	**10 Hours**
Components of LT Switchgear: Switch Fuse Unit (SFU), Miniature Circuit Breaker (MCB), Earth Leakage Circuit Breaker (ELCB), MCCB, Types of Wires and Cables, Earthing. Types of Batteries, Important Characteristics for Batteries. Elementary calculations for energy consumption.		
Module No. 5	**Transducers**	**5 Hours**

Introduction, working and application of LVDT, Introduction and application of Digital Multimeter.

Text Books

19. S.K Sahdev, "Basic Electrical Engineering", Khanna Publishing House, August,2021.

20. J. B. Gupta, "Basic Electrical Engineering", S.K. Kataria & Sons, 17th Edition 2023.

21. D. P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, 2020.

22. S.K. Bhattacharya, "Basic Electrical Engineering", Pearson Publications, June, 2019.

23. A.K Sawhney, "A Course in ELECTRICAL AND ELECTRONIC MEASUREMENTS

24. AND INSTRUMENTATION" Shree Hari Publications, 1 January 2021

References

10. T.K. Nagsarkar and M.S. Sukhija, "Basic Electrical Engineering", Oxford University Press, 2017.

11. Chakrabarti A., Nath S. and Chanda K. C., Basic Electrical Engineering, Tata McGraw-Hill, 2021.

12. D. C. Kulshreshtha, "Basic Electrical Engineering", Tata McGraw Hill, 2019.

Lab Exercises

40. To verify Ohm's Law and its limitations.

41. To verify Kirchhoff's Laws.

42. To measure the resistance and inductance of a coil by ammeter-voltmeter Method

43. To verify series and parallel resonance in AC circuits.

44. To measure the minimum operating voltage, current drawn, power consumed, and the power factor of a fluorescent tube light, Bulb, Single phase induction motor,

45. To start and reverse the direction of rotation of a three phase Induction motor.

46. To start and reverse the direction of rotation of a DC motor.

47. Study of Cut section of DC shunt motor.

48. Study of Cut section of three phase induction motor

49. To measure power and power factor in a single- phase AC circuit.

50. To perform open- and short circuit tests on a single- phase transformer and calculate its efficiency.

51. Study of Digital Multimeter.

52. To observe the B-H loop on CRO.

Course Type	**Embedded Theory and Lab(ETL)**
Mode of Evaluation	**Theory** **75%** EXAM-1 15 EXAM-2 15 Assignment/ Quiz/Class Test 20 Final Assessment Test 50 **Laboratory** **25%**
Prepared by	**Dr. Jatinder Kaur**
Recommended by the Board of Studies on	**1st BoS 16-09-2024**
Date of Approval by the Academic Council	**1st Academic Council 25-10-24**

For Chandigarh Engineering College, Jhanjeri, An Autonomous College

Bachelor of Technology (B. Tech. 1st Year batch 2023 & Onwards)

Course Code: UCS102	**Course Title:** Problem Solving using Python	**TPC**	**3**	**2**	**4**
Version No.	**1.0**				
Course Pre-requisites/ Co-requisites	**None**				
Anti-requisites (if any).	**None**				
Objectives:	16. To understand why Python is a useful scripting language for developers. 17. To learn how to design and write programs in Python 18. To understand basic data structures, branching and looping constructs. 19. To understand user defined functions and file handling, 20. To learn type conversions and String Operations.				

CO-PO Mapping

Course Outcomes	Course Outcome Statement	PO's / PEO's
CO1	Develop solutions through algorithms and flowcharts	PO1, PO2, PO3, PO4, PO5
CO2	Implement simple programs using expressions and statements	PO1, PO2, PO3, PO5
CO3	Apply the concepts of looping statements and regular expressions to solve complex problems	PO1, PO2, PO3, PO4, PO5, PO6
CO4	Analyse the concepts of data types and data structures to deploy solutions for real time applications	PO1, PO2, PO3, PO4, PO5, PO6
CO5	Decide the and modules based on the application domain	PO1, PO2, PO3, PO4, PO5, PO6
CO6	Create applications based on theuser defined functions, file processing and string concepts	PO1, PO2, PO3, PO4, PO5, PO6
		TOTAL HOURS OF INSTRUCTIONS: 45

Module No. 1	**Introduction to Problem Solving**	**8 Hours**

Problem Solving definition and steps, developing an algorithm, flowcharts and pseudocode, Introduction to Python, Interactive and script mode, Indentation, Comments, Tokens in Python – Variables, Keywords, Literals, Data types, Expressions, Input and Print functions.

Module No. 2	**Operators and Branching**	**6 Hours**

Operators and its precedence, Arithmetic Operators, Comparison (Relational) Operators, Assignment Operators, Logical Operators, Bitwise Operators, Membership Operators, Identity Operators, Branching Statements-if; if else, nested if; nested if else, elif

Module No. 3	Loops and Regular Expressions	7 Hours

Creating Loops with while and for, Different versions of Loops, Nested Loops, Loop Control Statements, Loop Modification with break, continue and pass, Regular Expressions.

Module No. 4	Basic Data Structures	12 Hours

Introduction to Different Numeric Types, Type Conversion, Mathematical Functions, Random Numbers. Creating and Accessing Strings, Operations on Strings, Indexing, Slicing, String Manipulations, Pre-defined functions on Strings.
Creating, Accessing and Manipulating Lists, Sets, Tuples and Dictionaries, Understanding the differences among them, Applications of the Data Structures. Using Branching and Control loops with Data structures, Matrix Operations using Numpy.

Module No. 5	Functions , Strings & Files	12 Hours

Pre-defined functions, User defined functions, formal and actual parameters, return statement, Using Branching, Looping and Data structures in Functions, Recursion, Internal workflow of Recursion, Modules.
File I/O-Opening and Closing files, Different modes, File attributes, Read, Write Operations, File Positions. Renaming and Deleting Files, various directory handling functions.

Text Books

7. Kenneth Lambert, "Fundamentals of Python: First Programs", Cengage Learning, 2019
8. Martin C Brown, "The Complete Reference with Python", McGrawHill, 2018.

References

7. John Zelle, Python Programming: An introduction to Computer Science, Franklin Associates, Third Edition, 2016.
8. Mark Lutz, "Learning Python", Fifth edition, O'Reilly, 2013.

List of Laboratory Experiments

Week 1:

16. Write a Python program to display the current date and time.
17. Write a Python program to get the Python version you are using
18. Write a Python program that accepts an integer (n) and computes the value of n+nn+nnn
19. Write a Python program to read and print various types of variables.
20. Write a Python program to print the calendar of a given month and year.

Week 2:

19. Python Program to Find the Square Root
20. Python Program to Calculate the Area and Perimeter of Triangle and Circle.
21. Python Program to Solve Quadratic Equation
22. Python Program to Swap Two Variables
23. Python Program to Convert Kilometres to Miles
24. Python Program to Convert Celsius To Fahrenheit

Week 3:

22. Python program to find whether the given number is Even or Odd
23. Write a Python program to get the difference between a given number and 17, if the number is greater than 17 return double the absolute difference
24. Write a Python program to test whether a number is within 100 of 1000 or 2000.
25. Write a Python program to calculate the sum of three given numbers, if the values are equal then return three times of their sum
26. Python Program to Find the Factorial of a Number
27. Python Program to print maximum of 3 numbers
28. Write a python program to find whether a given year is leap or not.

Week 4:

22. Write a program which will find all such numbers which are divisible by 7 but are not a multiple of 5, between 2000 and 3200 (both included).
    a. The numbers obtained should be printed in a comma-separated sequence on a single line. Consider use range(#begin, #end) method
23. Write a python program to check whether a number is divisible by 5 and 11 or not.
24. Write a python program to check whether a character is alphabet or not.
25. Write a python program to input any character and check whether it is alphabet, digit or special character.
26. Write a python program to check whether a character is uppercase or lowercase alphabet.
27. Write a python program to input week number and print week day.
28. Write a python program to count total number of notes in given amount

Week 5:

19. Write a Python program to print all natural numbers from 1 to n. - using while loop
20. Write a Python program to find sum of all odd numbers between 1 to n.
21. Write a Python program to count number of digits in a number.
22. Write a Python program to find first and last digit of a number.
23. Write a Python program to calculate sum of digits of a number.
24. Write a Python program to enter a number and print its reverse.

Week 6:

25. Write a Python program to check whether a number is palindrome or not.
26. Write a Python program to find frequency of each digit in a given integer.
27. Write a Python program to print all ASCII character with their values.
28. Write a Python program to find all factors of a number.
29. Write a Python program to calculate factorial of a number.
30. Write a Python program to print all Prime numbers between 1 to n.
31. Write a Python program to check whether a number is Armstrong number or Strong or Prime Number or Perfect number or magic number or not
32. Write a Python program to print Fibonacci series up to n terms.

Week 7:

1. Write a Python Program to Find the Largest Number in a List
2. Write a Python Program to Find the Second Largest Number in a List
3. Write a Python Program to Put Even and Odd elements in a List into Two Different Lists
4. Write a Python Program to Merge Two Lists and Sort it
5. Write a Python Program to Sort the List According to the Second Element in Sublist
6. Write a Python Program to Find the Second Largest Number in a List Using Bubble Sort
7. Write a Python Program to Sort a List According to the Length of the Elements
8. Write a Python Program to Find the Union of two Lists
9. Write a Python Program to Find the Intersection of Two Lists
10. Python Program to print all odd indexed elements of a list

Week 8:

1. Write a Python program to get the 4th element and 4th element from last of a tuple
2. Write a Python program to find the repeated items of a tuple.
3. Write a Python program to check whether an element exists within a tuple
4. Write a Python program to unzip a list of tuples into individual lists.
5. Write a Python program to replace last value of tuples in a list. Sample list: [(10, 20, 40), (40, 50, 60), (70, 80, 90)] Expected Output: [(10, 20, 100), (40, 50, 100), (70, 80, 100)]
6. Write a Python program to remove an empty tuple(s) from a list of tuples. Sample data: [(), (), ('',), ('a', 'b'), ('a', 'b', 'c'), ('d')] Expected output: [('',), ('a', 'b'), ('a', 'b', 'c'), 'd']
7. Write a Python program to convert a list of tuples into a dictionary.
8. Write a Python program to find the highest 3 values of corresponding keys in a dictionary.

Week 9:

16. Write a Python function that prints out the first n rows of Pascal's triangle.
17. Write a Python function to create and print a list where the values are square of numbers between 1 and 30 (both included).
18. Write a Python program to detect the number of local variables declared in a function
19. Write a Python program that invoke a given function after specific milliseconds.
20. Write a Python program to get the sum of a non-negative integer

Week 10:

13. Write a Python program to calculate the harmonic sum of n-1
14. Write a Python program to calculate the sum of the positive integers of n+(n-2)+(n- 4)... (until n-x =< 0)
15. Write a Python program to find the greatest common divisor (gcd) of two

integers using Recursion

16. Implement any sorting algorithm using Recursion.

Week 11:

13. Write a Python Program to Replace all Occurrences of 'a' with 'b' in a String. If 'a' is not present, then print appropriate message.
14. Write a Python Program to Remove the nth Index Character from a Non-Empty String
15. Write a Python Program to Detect if Two Strings are Anagrams
16. Write a Python Program to Form a New String where the First Character and the Last Character have been Exchanged.

Week 12:

19. Write a Python program to get the last part of a string before a specified character
20. Write a Python program to count the occurrences of each word in a given sentence.
21. Write a Python function to insert a string in the middle of a string.
22. Write a Python function to get a string made of its first three characters of a specified string. If the length of the string is less than 3 then return the original string.
23. Write a Python program to add a prefix text to all of the lines in a string
24. Write a Python program to convert a given string into a list of words.

A few Programming exercises for Competitive Coding (optional) :

37. Remove Duplicate Char from String
38. Hailstone Sequence
39. Secure Conversation by Encryption and Decryption
40. Special Elements in Matrix
41. Next Greater No with the Same set of Digits
42. Smallest Subarray with Sum Greater than Given Number
43. Group Anagrams
44. Find Duplicates in Array in O(n)
45. Find Two Unique Numbers from Array in O(n)
46. Number Patterns & Finding Smallest Number
47. Minimum Distance for Truck to Deliver Order [Amazon]
48. Generate Balanced Parentheses

Course Type	**Embedded Theory and Lab (ETL)**
Mode of Evaluation	**Theory** **75%** Examination-1 15 Examination-2 15 Assignment/ Quiz 20 Final Assessment Test 50 **Laboratory** **25%**
Prepared by	Ms. Neha Dhiman
Recommended by the Board of Studies on	**1st BoS 11-09-2024**
Date of Approval by the Academic Council	**1st Academic Council 25-10-24**

For Chandigarh Engineering College, Jhanjeri, An Autonomous College

Bachelor of Technology (B. Tech. 1st Year batch 2023 & Onwards)

Course Code: UME102	**Course Title:** Engineering Graphics Design	**TPC**	**1**	**4**	**3**
Version No.	**1.0**				
Course Pre-requisites/ Co-requisites	**None**				
Anti-requisites (if any)	**None**				
Objectives:	10. To understand the basic principles of engineering drawing 11. To have the knowledge of generating the pictorial views 12. To understand the development of surfaces 13. Use CAD tools for making drawings of machine components and assemblies. 14. To have the knowledge of interpretation of dimensions of different quadrant projections.				

Course Outcomes

Course Outcomes	Course Outcome Statement
CO1	Understand the basic principles and elements of engineering drawings
CO2	To use drawing tools and software to create engineering drawings.
CO3	Analyze the accuracy and clarity of engineering drawings.
CO4	Evaluate different design solutions based on engineering drawings.
CO5	Design and create three-dimensional engineering drawings

Detailed Syllabus:

Module No. 1	**INTRODUCTION TO ENGINEERING DRAWING**	**3 Hours**

Drawing Instruments: their Standard and uses – symbols and conventions in drawing practice –. Types of lines and their uses, Drawing Sheets: sizes and layout, Grades of pencils used. Dimensioning: definition, types and methods of dimensioning, geometrical construction, concept of scales in drawing, types of scales, construction of plane and diagonal scales.

Module No. 2	**THEORY OF PROJECTIONS**	**4 Hours**

Relevance of projection, Types of projections, Principles of orthographic projections in reference to quadrants – conventions – first and third angle projections, illustration through simple problems of projection; Projections of points in quadrants. Projections and trace of a line with different possible orientations in a quadrant. Methods to find true length and inclination of a line with principal planes.

Module No. 3	**PROJECTIONS OF PLANES AND SOLIDS**	**5 Hours**

Concept of plane and lamina, Projections of a lamina when; parallel to any reference plane, perpendicular to any reference plane, inclined to reference plane. Traces of planes, Definition of solid, types of solids – conventions- different possible orientations of solid in a quadrant. Projections of solid when; axis parallel to reference plane, perpendicular to reference plane, inclined to one and parallel to other reference plane.

Module No. 4	ISOMETRIC PROJECTIONS	2 Hours
Principles of Isometric Projections-Isometric Scale- Isometric Views or drawing- Conventions. Isometric drawing / projections of solids such as cube, prisms, pyramids, cylinder, and cone.		
Module No. 5	**PRACTICE USING COMPUTER AIDED DRAFTING (CAD) TOOLS**	**2 Hours**
Hands on training on any CAD software to strengthen the understanding of the engineering drawing.		

Text Books

4. Engineering Drawing Unknown Binding –2023 edition by N D Bhatt
5. Engineering Drawing + Auto CAD by K. Venugopal and V. Prabhu Raja- 1 January 2022
6. Engineering Graphics and Drafting By PS Gill by PS Gill | 1 January 2020

References

4. 1. Engineering Drawing |3rd Edition by Basant Agrawal and C M Agrawal-1 August 2020.
5. 2. A Textbook of Engineering Drawing by Dr. R K Dhawan- 2020
6. 3. Engineering Drawing through Problems by S. K. Sinha- 18 July 2024

Lab Exercises

Week 1: Conventional Representation of different types of lines and materials

Practical Tasks: Preparing a Sheet 1

4. Different types of lines used in engineering drawing
5. Representation of different materials
6. Free hand single stroke vertical letters in 7:4

Computer Graphic Lab

3. **Aim:** To understand and Learn AUTO-CAD interface.
4. **Lab Outcome:** Students will be able to locate various commands and AUTO-CAD controls and can customize and Reset User Interface

Week 2: Construction of plane scale.

Practical Tasks: Preparing a Sheet 2

4. A plain scale is a line divided into equal units that is used to measure distances.
5. Plain scales are used in engineering graphics and can be used for reducing or enlarging dimensions.
6. Plain scales can include formulas for calculating the scale ratio and length of the scale.

Computer Graphic Lab

3. **Aim:** To draw a given sketch in AUTO-CAD with Dimensioning and Proper Location.
4. **Command Learned:** Line, ORTHO, OSNAP, DYN, Dimensioning, Circle, Move, and Trim

Week 3: Construction of diagonal scale.

Practical Tasks: Preparing a Sheet 3

4. A diagonal scale is a tool used in engineering to measure lengths with greater accuracy.

5. It's based on the principle of similar triangles and is used to represent three consecutive units, such as meters, centimeters, and millimeters.
6. Diagonal scales can measure up to second decimal places, which is more accurate than a plain scale.

Computer Graphic Lab

3. **Aim:** To draw a given sketch in AUTO-CAD with Dimensioning and Proper Location
4. **Command Learned:** Trim, Champher, Slot, Editing Dimensions Text and Precision etc.

Week 4: Projection of point in different quadrants in Horizontal and vertical plane

Practical Tasks: Preparing a Sheet 4

2. The position of a point in an engineering drawing is defined by its distance from the three principle planes: the vertical plane (VP), horizontal plane (HP), and profile plane (PP).

Computer Graphic Lab

3. **Aim:** To draw a given sketch in AUTO-CAD with Dimensioning and Proper Location
4. **Command Learned:** Trim, Fillet, Editing Dimensions Text and Precision etc.

Week 5: Projection of line in different quadrants in Horizontal and vertical plane

Practical Tasks: Preparing a Sheet 5

6. A line can be in any of the four quadrants in space.
7. A line can be perpendicular to one plane and parallel to the other, or parallel to both planes, or inclined to one plane and parallel to the other.
8. Projection of a line parallel to a reference plane
9. Projection of a line onto a plane
10. The projection of a straight line is obtained by joining the top and front views of the line's endpoints.

Computer Graphic Lab

3. **Aim:** To draw a given sketch in AUTO-CAD with Dimensioning and Proper Location
4. **Command Learned:** TTR, Circular Array, Explode, Line type and Dimensioning etc.

Week 5: Find the true length and inclination in Projection of line in different quadrants

Practical Tasks: Preparing a Sheet 6

2. In the context of line projection, true length refers to the actual length of a line, which is not foreshortened by the viewing type. Here are some things to know about true length.

Computer Graphic Lab

3. **Aim:** To draw a given sketch in AUTO-CAD with Dimensioning and Proper Location
4. **Command Learned:** TTR, Circular Array, Explode, Line type and Dimensioning etc.

Week 7: Projection of Plane in different quadrants

Practical Tasks: Preparing a Sheet 7

3. A projection plane is an imaginary flat surface that's used to project an image of a 3D object onto a 2D view. The projection is created by connecting the points where the lines of sight from the object pierce the projection plane.
4. Concept of plane and lamina, Projections of a lamina when; parallel to any reference plane, perpendicular to any reference plane, inclined to reference plane.

Computer Graphic Lab

3. **Aim:** To draw a given sketch in AUTO-CAD with Dimensioning and Proper Location and Layers
4. **Command Learned:** Layers used in floor plan, freeze, lock, layer settings

Week 8: Inclination of the plane with horizontal and vertical plane.

Practical Tasks: Preparing a Sheet 8

3. A projection plane is an imaginary flat surface that's used to project an image of a 3D object onto a 2D view. The projection is created by connecting the points where the lines of sight from the object pierce the projection plane.
4. Concept of plane and lamina, Projections of a lamina when; parallel to any reference plane, perpendicular to any reference plane, inclined to reference plane.

Computer Graphic Lab

3. **Aim:** To draw a given sketch in AUTO-CAD with Dimensioning and Proper Location and Layers
4. **Command Learned:** Layers used in floor plan, freeze, lock, layer settings

Week 9: Projection of Solid in different quadrants.

Practical Tasks: Preparing a Sheet 9

4. The different types of solids include polyhedra like cubes and pyramids, and solids of revolution like cones and cylinders.
5. The projection process involves assuming the solid's position and drawing the front and top views in three steps.
6. The projection of solids also covers inclined positions and problems involving various solids.

Computer Graphic Lab

3. **Aim:** Part Modelling Using Sweep Command
4. **Command Learned:** Circle CR,TTR, rotate 3d, Sweep, Region, Extrude, press pull, Slot, Move, and Trim

Week 10: Inclination of the solid with horizontal and vertical plane.

Practical Tasks: Preparing a Sheet 10

3. The projection process involves assuming the solid's position and drawing the front and top views in three steps.
4. The projection of solids also covers inclined positions and problems involving various solids.

Computer Graphic Lab

3. **Aim:** Part Modelling Using Multiview Drawing
4. **Command Learned:** Solids and Solid Editing Commands

Week 11: Principles of Isometric Projections-Isometric Scale- Isometric Views or drawing- Conventions.

Practical Tasks: Preparing a Sheet 11

2. Isometric projection is a method for representing three-dimensional objects in two dimensions. It is used in technical and engineering drawings, and is also known as isometric drawing

Computer Graphic Lab

3. **Aim:** Part Modelling
4. **Command Learned:** Solids and Solid Editing Commands

Week 12: Isometric drawing / projections of solids such as cube, prisms, pyramids, cylinder, and cone.

Practical Tasks: Preparing a Sheet 12

2. Isometric projection is a method for representing three-dimensional objects in two dimensions. It is used in technical and engineering drawings, and is also known as isometric drawing

Computer Graphic Lab

3. **Aim:** Part Modelling
4. **Command Learned:** Solids and Solid Editing Commands

Mode of Evaluation	**Internal**		**75%**
	Assignment/ Quiz	20	
	Exam-1	15	
	Exam-2	15	
	Final Assessment Test	50	
	Laboratory		**25%**
Prepared by	**Dr. Mandeep**		
Recommended by the Board of Studies on	**1st BoS 12-09-24**		
Date of Approval by the Academic Council	**1st Academic Council 25-10-24**		

For Chandigarh Engineering College, Jhanjeri, An Autonomous College

Bachelor of Technology (B. Tech. 1st Year batch 2023 & Onwards)

Course Code: USS101	**Course Title: Industry Specific Communication**	**LTPC**	**3**	**0**	**0**	**3**
Version No.	**1.0**					
Course Pre-requisites/ Co-requisites	**None**					
Anti-Requisites (if any)	**None**					
Objectives:	• To understand the fundamental concepts of effective communication and develop skills in English grammar and soft skills. • To choose appropriate communication techniques and strategies based on the requirements of specific professional scenarios. • To learn how to construct clear and impactful written and verbal communication for academic and professional settings. • To evaluate various communication methods, understand their applications and limitations, and use the most effective approach to address real-world challenges.					

CO-PO Mapping

Course Outcomes	Course Outcome Statement	PO's / PSO's
CO1	Demonstrate a strong grasp of English grammar, enabling error-free communication in both written and verbal formats.	(PO8, PO9, PO10 & PO12)
CO2	Develop the ability to articulate thoughts clearly and confidently in diverse professional and social contexts.	(PO8, PO9, PO10 & PO12)
CO3	Create impactful resumes, cover letters, and emails that meet industry standards and convey professionalism.	(PO8, PO9, PO10 & PO12)
CO4	Apply soft skills such as active listening, teamwork, and conflict resolution to build strong professional relationships.	(PO8, PO9, PO10 & PO12)
CO5	Exhibit polished communication and presentation skills, ensuring readiness for interviews, group discussions, and workplace interactions.	(PO8, PO9, PO10 & PO12)

Module No. 1	**Introduction to Communication**	**9 Hours**
Introduction to Soft Skills Essentials: Communication, Collaboration & More, Getting to Know You: Self-Introduction Mastery and Introducing Me: Practice Your Story , The Art of Communication: Verbal Ability Basics, Word Power: Building Your Vocabulary		

Module No. 2	**Speaking Skills, Reading and Understanding**	**9 Hours**
Unspoken Impact: Elevating Your Body Language, Discover You: The Journey of Self-Awareness and Self-Discovery: Understanding Who You Are , Word Fix: Mastering Commonly Confused & Misspelled Words, Sentence Symphony: Understanding Sentence Types		

Module No. 3	**Building Confidence through Technical Communication**	**9 Hours**

Acting As You: Building Confidence with Role Plays and Exploring Different Versions of Yourself, Unlock Your Potential: Exploring the Holland Code, Beyond Boundaries: The Art of Creative Writing, The Great Exchange: Thoughtful Debate/Discussion.		
Module No. 4	**Communication Essentials for Professionals**	**9 Hours**
Picture Perfect: Building Descriptive Skills, Quick Talk: The JAM Session Challenge, Grammar & Usage: The Cornerstones of Clear Expression, Spot the Mistakes: Correct the Errors, Say It Right: Mastering Common Mispronunciations		
Module No. 5	**Building Industry-Ready Soft Skills**	**9 Hours**
Sharpen Your Edge: Soft Skills Q&A Session, Active Listening and Effective Speaking, Role Play Ensemble: Strengthening Team Skills, Word Wise: Verbal Ability Practice Test		

Text Books

7. Carnegie, Dale. The Art of Public Speaking: Seventh Edition Prabhat Prakashan Pvt. Ltd, 2020
8. Murphy, Raymond. Essential English Grammar with Answers: Second Edition, Cambridge University Press, 2024

References

7. Wren, P.C., and Martin, H. High School English Grammar and Composition Book (Regular Edition). New Delhi, S. Chand Publishing, 2023.
8. Carnegie, Dale. How to Win Friends and Influence People. New York, Simon and Schuster, 2024.

Mode of Evaluation	**Theory**	**100%**
	Examination-1	15
	Examination-2	15
	Assignment/ Quiz	20
	Final Assessment Test	50
Prepared by	**Ms. Akshdeep Kaur & Ms. Aakriti Mahajan**	
Recommended by the Board of Studies on	**1st BoS 11-09-2024**	
Date of Approval by the Academic Council	**1st Academic Council 25-10-24**	