**ENGLISH - II**

**COURSE OUTCOMES**

At the end of the course, the students will develop ability to

1. Understand and effectively apply the steps in the writing process.
2. Build unified, coherent and adequately developed paragraphs.
3. Adapt writing goals and styles to various audiences to achieve appropriate writing style and content.
4. Identify syntax.
5. Collect and process the information in a specific discipline and use editing and revising techniques to improve writing quality.

**UNIT I**

**Introduction to Academic Writing**

Introduction, types, features, responsive reading, reading with a purpose, critical reading and analysis, developing academic writing, academic honesty, plagiarism.

**UNIT II**

**Elements of the Essay**

Structure **-** crafting sentences, clauses and phrases, grammatical sentence types, rhetorical sentence types, writing longer sentences, punctuation, expletive constructions, Style-principles of plain style, Vocabulary-task analysis: direction words, choosing specific and concrete words, Evidence, Analysis, Sources-writing introductions and conclusions, pre-draft response, writing the draft, editing and proof reading.

**UNIT III**

**Tertiary Essay Writing**

Time management, choosing and narrowing topics, coherent and grammatically correct sentences, production of original and organized compositions, brainstorming, researching the topic, revising the plan.

**UNIT IV**

**Compare and Contrast Essay**

Setting, early thoughts develop clarity and focus, planning, significant differences; pose analytical questions, topic sentences and paragraph structures, sample essay.

**UNIT V**

**Exploratory Essay**

Value of exploratory writing, knots and questions, practicing exploratory writing, making meanings, organizing an exploratory essay, sample essay in exploratory form.

**UNIT VI**

**Argumentative Essay**

Organizing an argumentative essay, drafting a thesis statement, constructing a sentence outline, clarification strategies, metadiscourse and programmatic statements, transitional expressions, definitions, composing titles, comparing the argument essay and the exploratory essay, sample essay in argument form.

**TEXT BOOKS**

1. Matthew Parfitt.2016. “Writing in Response”, Bedford/ St.martin’s, Macmillan Education, Boston, Newyork.
2. Bailey.S. 2015.”Academic Writing: A Hand book for International students”, London and Newyork: Routledge.

**REFERENCE BOOKS**

1. Murray, N.2012.”Writing Essays in English Language and Linguistics”, Cambridge University Press.
2. Oshima ,A. & Hogue,A. 2005.”Writing Academic English”, Addison-Wesley, Newyork.
3. Craswell, G.2004.”Writing for Academic Success,” Sage Publications.
4. Jordan, R.R.1999.” Academic Writing Course”, London: Nelson/ Longman.

**MATHEMATICS - II**

**COURSE OUTCOMES**

At the end of the course the student should be able to:

1. Apply the methods of solving higher order linear differential equations to solve some real world problems.
2. Apply the Knowledge of Matrices, Eigenvalues and Eigen Vectors in problems involving Science and Engineering
3. Develop Fourier series for different types of functions.
4. Understand the notion of functions of several variables and discuss their maxima & minima.
5. Evaluate the double & triple integrals in a given region of integration by various techniques.

**UNIT I**

**Linear Differential Equations of Higher Order**

Introduction: Second-Order Linear Equations - General Solutions of Linear Equations - Homogeneous and Non homogeneous Equations with Constant Coefficients - Applications: Mass Spring Systems - Electrical Circuits.

**UNIT II**

**Functions of Several Variables**

Parametrizations of Plane Curves - Calculus with Parametric Curves - Polar Coordinates - Graphing Polar Coordinate Equations - Areas and Lengths in Polar Coordinates. - Functions of Several Variables - Limits and continuity - Partial derivatives - The Chain Rule - Tangent planes and Differentials – Taylor's Formula for Two Variables - Extreme values and saddle points – Lagrange Multipliers.

**UNIT III**

**Fourier Series**

Definition of Fourier series - Dirichlet conditions - Fourier series of functions defined in [0,2*π]* - Fourier series of Even and Odd functions - Half range Fourier sine and cosine series - Fourier series in arbitrary intervals.

**UNIT IV**

**Multiple Integrals**

Double and Iterated Integrals over Rectangles - Double Integrals over General Regions - Area by Double Integration - Double Integrals in Polar Form - Triple Integrals in Rectangular Coordinates – Triple Integrals in Cylindrical and Spherical Coordinates.

**UNIT V**

**Linear Algebra I**

Types of Matrices – Real and Complex Matrices - Rank of a Matrix - Linear Systems of Equations - Solutions of Linear Systems – Inverse of a Matrix: Gauss-Jordan method.

**UNIT VI**

**Linear Algebra II**

Symmetric, Skew-Symmetric, and Orthogonal Matrices – Eigen values, Eigen vectors – properties of Eigen values and Eigen vectors – Cayley-Hamilton theorem (without proof) – Inverse and Powers of a Matrix.

**TEXT BOOKS**

1. Thomas' Calculus: Early Transcendentals, Joel R. Hass, Davis, Christopher E. Heil, Maurice D. Weir, Pearson publications.
2. B.S.Grewal, "Higher Engineering Mathematics", Khanna publishers, Delhi.

**REFERENCES**

1. Elementary Differential Equations, C. Henry Edwards, David E. Penney, Prentice Hall.
2. Erwin kreyszig, "Advanced Engineering Mathematics", John wiley & sons, 605 Third Evenue, New York.
3. Peter V. O'Neil, "Advanced Engineering Mathematics", Cl-Engineering.

**ENGINEERING PHYSICS - II**

**COURSE OUTCOMES**

At the end of the course, the students will develop ability to

1. Understand and apply the fundamentals of quantum mechanics to microscopic particles
2. Recognize the role of defects in physical properties of crystals and analyze crystal structure using X-ray diffraction
3. Elucidate the basis for classification of dielectric and magnetic materials and their related concepts
4. Apply the knowledge acquired from basics of materials science to realize devices with better performance and smaller in size
5. Explore connections between theory and applications

**UNIT I**

**Quantum Mechanics**

Classical mechanics and its limitations, de Broglie hypothesis, Matter waves, Davisson-Germer experiment, Heisenberg’s uncertainty principle, Schrodinger time independent wave equation, Physical significance and properties of wave function, Particle in one dimensional box, Tunnelling effect (qualitative) – Applications

**UNIT II**

**Band Theory of Solids**

Introduction, Motion of electron in a periodic potential-Bloch theorem, Kronig-Penny model (qualitative)-origin of energy bands in solids, Velocity and effective mass of an electron, Classification of solids-conductors, semiconductors and insulators, Direct and indirect band gap of semiconductors

**UNIT III**

**Crystallography**

Introduction, Unit cell, Crystal systems and Bravais lattices, Crystal planes and Miller indices, Interplanar spacing of orthogonal crystal systems, Crystal defects-classification, Effect of crystal defects on physical properties, X-ray diffraction-Bragg’s law, Debye-Scherrer method, Applications of X-ray diffraction

**UNIT IV**

**Dielectric Properties**

Introduction, Polarization mechanisms-electronic, ionic, orientation and space charge polarizations (qualitative), Dielectric relaxation, Piezo-electricity-production and detection of ultrasonics by piezo-electric effect, Applications of ultrasonics, Pyro-electricity, Ferro-electricity-hysteresis, Applications of dielectric materials

**UNIT V**

**Magnetic Properties**

Introduction, Origin of magnetic moment, Classification and characteristics of magnetic materials, Domain theory of ferromagnetism-hysteresis, Soft and hard magnetic materials, Magnetostrictive effect, Applications of magnetic materials, Superconductivity-Meissner effect, Type I & II superconductors, High Tc superconductors, Applications

**UNIT VI**

**Nanomaterials**

Introduction, Surface area to volume ratio, Quantum confinement, Classification of nanomaterials (1D, 2D, 3D), Properties of nanomaterials, Types and properties of carbon nanotubes, Top-down fabrication - Ball milling method, Bottom-up fabrication - Sol-gel method, Characterization of nanomaterials: X-ray diffractometer (XRD)-Determination of particle size, Scanning Electron Microscope (SEM), Transmission Electron Microscope (TEM) and Atomic Force Microscope (AFM), Applications of various nanomaterials

**TEXT BOOKS**

1. M.N. Avadhanulu & P.G. Kshirsagar, “A Text book of Engineering Physics”, S. Chand & Company Ltd., Tenth Revised Edition – 2013.
2. P.K. Palanisamy, “Engineering Physics”, SciTech Publications, India (P) Ltd., Third Edition - 2013.

**REFERENCE BOOKS**

1. S.O. Pillai, “Solid State Physics”, New Age International (P) Ltd., Sixth Edition – 2010.
2. R.K. Gaur & S.L. Gupta, “Engineering Physics”, Dhanpat Rai Publications (P) Ltd., Eighth Edition – 2001 (Reprint – 2008).
3. A.J. Dekker, “Solid State Physics”, Mac Millan India Ltd.
4. B.S. Murthy, P. Shankar, Baldev Raj, B.B. Rath & J. Murday, “Textbook of Nanoscience and Nanotechnology”, Universities Press, First Edition – 2013.

**PROBLEM SOLVING WITH PROGRAMMING**

**COURSE OUTCOMES**

At the end of the course, the students will develop ability to

1. Analyze and implement software development tools like algorithm, pseudo codes and programming structure.
2. Modularize the problems into small modules and then convert them into modular programs
3. Apply the pointers, memory allocation techniques and use of files for dealing with variety of problems.
4. Apply C programming to solve problems related to scientific computing.
5. Develop efficient programs for real world applications.

**UNIT I**

**Pointers**

Basics of pointers, pointer to array, array of pointers, void pointer, pointer to pointer- example programs, pointer to string.

Project: Simple C project by using pointers.

**UNIT II**

**Structures**

Basics of structure in C, structure members, accessing structure members, nested structures, array of structures, pointers to structures - example programs, Unions- accessing union members- example programs.

Project: Simple C project by using structures/unions.

**UNIT III**

**Functions**

Functions: User-defined functions, categories of functions, parameter passing in functions: call by value, call by reference, recursive functions. Passing arrays to functions, Passing strings to functions, passing a structure to a function.

Project: Simple C project by using functions.

**UNIT IV**

**File Management**

Data Files, Opening and Closing a Data File, Creating a Data File, Processing a Data File, Unformatted Data Files.

**Memory Management**

Memory Management: Dynamic memory allocation and deallocation functions:- malloc , calloc, realloc and free.

Project: Simple C project by using files.

**UNIT V**

Low-Level Programming, Register Variables, Bitwise Operations, Bit Fields

**Pre-processor Directives**

Additional Features of C, Enumerations, Command Line Parameters, More About Library Functions, Macros, The C Preprocessor. Pre-processor directives: Typedef, #define, #undef, #if,#endif,#elif, #ifdef, #ifndef, #error.

**UNIT VI**

**Basic of C++ Programming:**

Introduction to C++. Differences between C and C++, C++ Program Structure, Disadvantage of Conventional Programming, data types, variables, scope and life time of variables, operators, expressions, and control statements. Arrays, Strings, Functions. Basics concepts of OOPs

**TEXT BOOKS**

1. Computer Science: A Structured Programming Approach Using C- B. A. Forouzan and R.F. Gilberg, Third Edition, Cengage Learning'
2. B.W.Kernighan Dennis M. Ritchie, The C Programming Language, PHI/Pearson Education,ISBN:0-13-110362-8

**REFERENCE BOOKS**

1. “The spirit of C: an Introduction to Modern Programming” by Henry Mulish Cooper.
2. C Programming: A Modern Approach by K.N. King .
3. Let us C by Yashwant Kanetkar. 13th edition, BPB Publications
4. Computer science a structured programming approach using C by Pradeep K.Sinha, Priti Sinha, 3rd edition, Thomson publications.

**ENGINEERING PHYSICS - II LAB**

**COURSE OUTCOMES**

At the end of the course, the students will develop ability to

1. Realize the concept of forced oscillations with the help of electrical circuits
2. Analyze as well as compare the intensity distribution in optical phenomena and their related applications
3. Draw the characteristics of electrical circuits and evaluate the dependent parameters
4. Explore and understand the applications of semiconducting devices
5. Develop skills in observation, interpretation, reasoning, predicting and questioning in order to realize new knowledge

**List of Experiments:** (Any Eight Experiments Compulsory)

1. Frequency of electrically driven tuning fork using Melde’s apparatus
2. Resonant frequency and quality factor - LCR circuit
3. Time constant of an R-C circuit (Charging and Discharging)
4. Magnetic field along the axis of current carrying coil using Stewart and Gee’s apparatus
5. Resolving power of diffraction grating
6. Radius of curvature of a plano-convex lens using Newton’s rings setup
7. Numerical aperture of an optical fiber
8. Bending losses of an optical fiber
9. Quantum states using PhET simulations
10. Planck’s constant using photocell
11. Energy gap of the material of a p-n junction diode

**TEXT BOOKS**

1. D.C. Tayal, “University Practical Physics”, Himalaya Publishing House.
2. Y.Aparna and K.Venkateswara Rao, “Laboratory Manual of Engineering Physics”, VGS Publishers.

**PROBLEM SOLVING WITH PROGRAMMING LAB**

**COURSE OUTCOMES**

At the end of the course, the students will develop ability to

1. Analyze and implement software development tools like algorithm, pseudo codes and programming structure.
2. Modularize the problems into small modules and then convert them into modular programs
3. Apply the pointers, memory allocation techniques and use of files for dealing with variety of problems.
4. Apply C programming to solve problems related to scientific computing.
5. Develop efficient programs for real world applications.

**Week 1**

1. Compute sum of the array elements using pointers !
2. Write a C program to find the sum of all elements of an array using pointers as arguments.
3. Write a C program to convert a Floating Point Number base(10) to binary number.

**Week 2**

1. Access Elements of an Array Using Pointer
2. C Program Swap Numbers in Cyclic Order Using Call by Reference
3. Find Length of the String using Pointer
4. Program to read integers into an array and reversing them using pointers

**Week 3**

1. Add Two Numbers Using Pointer !
2. Calculate Size of Pointer in C Programming
3. Difference between two float Pointers
4. Difference between two integer Pointers

**Week 4 - Structures**

1. write a C program for defining a structure of bank customer details.( account number , acc holder name, acctype, balance )
2. Write a C program to Demonstrate Elecricity Bill of One Year.
3. Write the Programs using structures and Unions

**Week 5- Structures**

1. Store Information(name, roll and marks) of a Student Using Structure
2. Add Two Distances (in inch-feet) System Using Structures
3. Add Two Complex Numbers by Passing Structure to a Function
4. Calculate Difference Between Two Time Period
5. Store Information of 10 Students Using Structure

**Week 6 - Functions**

1. Write the programs using functions
2. Display all prime numbers between two Intervals
3. Check Prime and Armstrong Number by making function
4. Check whether a number can be expressed as the sum of two prime number

**Week 7 - Functions**

1. Find sum of natural numbers using recursion
2. Calculate factorial of a number using recursion
3. Find G.C.D using recursion
4. Reverse a sentence using recursion

**Week 8 - Functions**

1. Calculate the power of a number using recursion
2. Convert binary number to decimal and vice-versa
3. Convert octal Number to decimal and vice-versa
4. Convert binary number to octal and vice-versa

**Week 9 - Files**

1. Read name and marks of students and store it in file
2. Read name and marks of students and store it in file. If file already exists, add information to it.
3. Write members of arrays to a file using fwrite()
4. Write a C program which copies one file to another.
5. Program to Write a Sentence to a File
6. Program to Read a Line From a File and Display it

**Week 10 – Memory Management**

1. Find Largest Number Using Dynamic Memory Allocation
2. Store Information Using Structures with Dynamically Memory Allocation.
3. Write C++ Programs using Basic concepts Like data types,operators etc.
4. Write C++ programs using Loops and Conditional Statements.

**Week 11 & 12**

Project using C

**PHILOSOPHY**

***(Open Elective - I)***

**COURSE OUTCOMES:**

At the end of the course, the students will be develop ability to

1. Explain the core philosophical concepts and approaches.
2. Identify and distinguish Indian and Western Philosophy.
3. Describe and Distinguish the main divisions of philosophy.
4. Understand and explain the abstract philosophical concepts.
5. Understand the applications and implications of philosophical principles in real time situations.

**UNIT I**

Introduction to Philosophy, nature, scope and significance of philosophy, western philosophy, philosophic thought, history of philosophy, the Sophists and Socrates, Plato and Aristotle.

**UNIT II**

Introduction to Indian Philosophy, the ancient Vedas, the Upanishads, the epics and the treatises of the Heterodox and Orthodox systems, Buddhism, Advaitha, Jainism, and Sikhism

**UNIT III**

The classification of Philosophy - The main divisions of Philosophy, Logic, the Philosophy of mathematics, Philosophy of nature, philosophy and the special science, philosophy of art: ethics philosophy and theology, philosophy and Common Sense.

**UNIT IV**

Criticism (Epistemology), Ontology: Essence, Substance and Accident,.

**UNIT V**

Modern Philosophy: Political Philosophy, Religious Philosophy, Western or European Philosophy, Eastern Philosophy.

**UNIT VI**

Relevance of philosophy in modern world: Application of philosophical principles in modern India, its impact and usefulness.

**TEXT BOOKS**

1. Jacques Maritain, “An Introduction to Philosophy”, Rowman and Littlefield Pub Inc., 2005.
2. John Cottingham, “Western Philosophy: An Anthology”, 2ndEdition, Wiley-Blackwell, 2008.

**REFERENCE BOOKS**

1. SarvepalliRadha Krishnan and Charles A. Moore, “A Source Book in Indian Philosophy”, Princeton University Press.
2. Bertrand Russell, “A History of Western Philosophy”, Taylor and Francis Ltd.