
# B. Tech in Electronics & Communication Engineering (Avionics)

**Under the mentorship of Indian Institute of Space Science and Technology (IIST) – Indian Space Research Organization (ISRO)**

## Department of Computer Science and Information Technology

## SCHOOL OF BASIC AND APPLIED SCIENCES

## Central University of Jammu

## Samba, Jammu & Kashmir, India

## About

B.Tech in Electronics and Communication Engineering (Avionics) has been started in 2022 under the mentorship of Indian Institute of Space Science and Technology (IIST), Thiruvananthapuram – Indian Space Research Organization (ISRO). The department runs graduate programs in Electronics and Communication Engineering (Avionics), and carries out research in several areas of aviation and aerospace sciences. The curriculum of the different academic programmes offered by the department ensures that students have a deeper understanding of the subject's fundamentals and advanced courses, with a focus on developing their research skills so they can deal with the challenges in the field of avionics engineering. The department is comprised of outstanding faculty members with recognised research credentials. The department has established a number of laboratories like Avionics and Astronomy lab, Remote Sensing and GIS lab etc., in which various types of research and experiments have been carried out.

The Department embarks with the hope that its graduates will be successful leaders of tomorrow. Besides making available facilities for higher education, training and research in various fields of engineering and technology, the Institute also contributes to the industrial development and economic growth of the country.

| Program Educational Objectives (PEO) | |
|---|---|
| **PEO-1** | Modelling aeronautical communication systems along with the principles of electronics and engineering mathematics. |
| **PEO-2** | Implement, Design, test and maintain electronic systems based on requirement specifications |
| **PEO-3** | Communicate effectively with team members, engage in applying technologies and lead teams in industry. |
| **PEO-4** | Assess the networking and communication systems from the view point of quality, security, privacy, cost, utility, etiquette and ethics. |
| **PEO-5** | Engage in lifelong learning, career enhancement and adapt to changing professional and societal needs |

## Program Articulation Matrix

| PEO / Mission Statements | PEO1 | PEO2 | PEO3 | PEO4 | PEO5 |
|---|---|---|---|---|---|
| Offering high quality education through careful crafted curriculum that are in line with the aviation industry requirements. | 3 | 3 | 2 | 3 | 2 |
| Providing state of the art research facilities in the focus areas of aerospace engineering to deliver knowledge and develop latest technologies. | 2 | 3 | 3 | 3 | 2 |
| Creating connections with world-class organizations in order to strengthen industry-academia collaborations for mutual benefit. | 2 | 3 | 2 | 3 | 2 |

**1-Slightly; 2-Moderately; 3-Substantially**

## Program Outcomes (PO)

| | |
|---|---|
| **PO-1** | **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and Electronics and Communication Engineering to the solution of complex engineering problems. |
| **PO-2** | **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences. |
| **PO-3** | **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations. |
| **PO-4** | **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions. |
| **PO-5** | **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineeringactivities with an understanding of the limitations. |
| **PO-6** | **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilitiesrelevant to the professional engineering practice. |

| | |
|---|---|
| **PO-7** | **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development. |
| **PO-8** | **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice. |
| **PO-9** | **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings |
| **PO-10** | **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions. |
| **PO-11** | **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments. |
| **PO-12** | **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. |

| **Program Specific Outcomes (PSOs)** | |
|---|---|
| **PSO-1** | Analyze and design of electronic circuits, electronic aviation systems, electrical systems, and computer systems to enhance the quality of human life |
| **PSO-2** | Develop innovative and environment-conscious technologies to sustain human life |

# COURSE SCHEME

## B.TECH. ELECTRONICS AND COMMUNICATION ENGINEERING (AVIONICS)

### SEMESTER-I

| Course Code | Course Title | Credits | L | T | P | CIA | MSE | ESE | Marks |
|---|---|---|---|---|---|---|---|---|---|
| BEECA1C01IN | Induction Program | - | 2 | - | - | - | - | - | - |
| BEECA1C001T | Environmental Studies | - | 2 | - | - | - | - | - | - |
| BEECA1C002T | Applied Mathematics | 3 | 3 | 0 | 0 | 18.75 | 18.75 | 37.5 | 75 |
| BEECA1C003T | Applied Physics | 3 | 3 | 0 | 0 | 18.75 | 18.75 | 37.5 | 75 |
| BEECA1C001L | Applied Physics Laboratory | 2 | 0 | 0 | 2 | 12.5 | 12.5 | 25 | 50 |
| BEECA 1C004T | English for Technical Communication | 3 | 3 | 0 | 0 | 18.75 | 18.75 | 37.5 | 75 |
| BEECA1C005T | Basic Electrical Engineering | 3 | 3 | 0 | 0 | 18.75 | 18.75 | 37.5 | 75 |
| BEECA1C002L | Basic Electrical Engineering Laboratory | 2 | 0 | 0 | 2 | 12.5 | 12.5 | 25 | 50 |
| BEECA1C006T | Introduction to Aerospace Engineering | 2 | 2 | 0 | 0 | 12.5 | 12.5 | 25 | 50 |
| BEECA1C006T | Problem Solving and Computer Programming in C | 2 | 2 | 0 | 0 | 12.5 | 12.5 | 25 | 50 |
| | | **20** | **-** | **-** | **-** | - | **-** | **-** | 500 |

# Course Syllabus

# (Semester-I)

# Applied Mathematics

**Course Code:** BEECA1C002T

**Course Title**: Applied Mathematics

**Semester:** I

**Credits:** 03

**Rationale**

To familiarize with the important tools and theorems of calculus and differential equations is essential in all the branches of engineering. It will also develop the in-depth knowledge of types and operations on matrices and algebra in a comprehensive manner.

**Course Outlines**

| **Contents** | **No. of Lectures** |
|---|---|
| **Unit - I**<br>Linear dependence and independence of vectors, Rank of a matrix, Consistency of the system of linear equations, Eigen values and eigenvectors of a matrix, Caley-Hamilton theorem and its applications, Reduction to diagonal form. | **10** |
| **Unit - II**<br>Reduction of a quadratic form to canonical form - orthogonal transformation and congruent transformation, Properties of complex matrices - Hermitian, skew-Hermitian and Unitary matrices. | **10** |
| **Unit -III**<br>Taylor's theorem with remainders, Taylor's and Maclaurin's expansions, Asymptotes, Curvature; Curve tracing, Functions of several variables - partial differentiation, total differentiation, Euler's theorem and generalization, Change of variables – Jacobians, maxima and minima of functions of several variables (2 and 3 variables) - Lagrange's method of multipliers | **10** |
| **Unit - IV**<br>Geometric interpretation of solutions of first order ODE $y' = f(x, y)$, Exact differential equations, integrating factors, orthogonal trajectories, Higher order linear differential equations with constant coefficients - homogeneous and non- homogeneous. | **10** |
| **Unit - V**<br>Euler and Cauchy's differential equations; Method of variation of parameters; System of linear differential equations; applications in physical problems - forced oscillations, electric circuits, etc | **10** |

**Course Outcomes**

Upon successful completion of this course, candidates will be able to:

- Solve the consistent system of linear equations
- Apply orthogonal and congruent transformations to a quadratic form.
- Find the maxima and minima of multivariable functions
- Solve arbitrary order linear differential equations with constant coefficients
- Apply the concepts in solving physical problems arising in engineering.

**Text Books**


1. Advanced Engineering Mathematics, R. K. Jain and S. R. K. Iyengar, Narosa Publishing House, 2016, Fifth Edition.
2. Calculus and Analytic Geometry, George B. Thomas and Ross L. Finney, Pearson, 2020, Ninth Edition.


**Reference Books**


1. Advanced Engineering Mathematics, Erwin Kreyszig, John Wiley and Sons, 2015, Eighth Edition.
2. Advanced Engineering Mathematics, Dennis G. Zill, Jones & Bartlett Learning, 2018, Sixth Edition
3. Higher Engineering Mathematics, B. S. Grewal, Khanna Publishers, 2012, Forty-second Edition.

# Applied Physics

**Course Code:** BEECA1C003T

**Course Title:** Applied Physics

**Semester: I**

**Credits: 03**

**Rationale**

The course aims at making students to understand the basic concepts of Principles of Physics in a broader sense with a view to lay foundation for the various engineering courses. Students will be able to demonstrate competency and understanding of the conceptsϖ found in Mechanics, Harmonic Oscillations, Waves in one dimension, wave Optics, Lasers, Fiber Optics and a broad base of knowledge in physics. The main purpose of this course is to equip engineering undergraduates with anϖ understanding of the scientific method, so that they may use the training beneficially in their higher pursuits.

| Contents | No. of Lectures |
|---|---|
| **Unit-I**<br>Vectors, Statics, and Kinematics: introduction to vectors (linear independence, completeness,basis,dimensionality), inner products, orthogonality – principles of statics, system of forces in plane and space,conditions of equilibrium – displacement, derivatives of a vector, velocity, acceleration – kinematic equations – motion in plane polar coordinates. | **10** |
| **Unit - II**<br>Newtonian Mechanics: momentum, force, Newton's laws, applications – conservation of momentum, impulse, center of mass. | **10** |
| **Unit -III**<br>Work and Energy: integration of the equation of motion – work energy theorem, applications – gradient operator – potential energy and force - interpretation – energy diagrams – law of conservation of energy – power – particle collisions. | **10** |
| **Unit - IV**<br>Rotations: angular momentum – torque on a single particle – moment of inertia – angular momentum ofa system of particles – angular momentum of a rotating rigid body.<br>Central Force Motion: central force motion of two bodies – relative | **10** |

| | |
|---|---|
| coordinates – reduction to one dimensional problem – spherical symmetry | |
| **Unit - V**<br>Conservation of angular momentum, consequences – planetary motion and Kepler's laws. Harmonic Oscillator: 1-D harmonic oscillator – damped and forced harmonic oscillators. Modern Physics: relativity – introduction to quantum physics – atom model – hydrogen atom. | **10** |

**Course Outcomes**

Upon successful completion of this course, candidates will be able to:

- Understand the significance and basis of Electromagnetic Theory.
- Differentiate between the various types of referential frames.
- Gain the knowledge on the basic concepts of Modern Physics and its applications.
- Understand the working principle of various Oscillator and their application in various fields

**Text Books:**


1. Kleppner, D. and Kolenkow, R. J., An Introduction to Mechanics, 2nd ed., Cambridge Univ. Press(2013).
2. Serway, R. A. and Jewett, J. W., Principles of Physics: A Calculus Based Text, 5th ed., ThomsonBrooks/Cole (2012).


**References:**


1. Serway, R. A. and Jewett, J. W., Principles of Physics: A Calculus Based Text, 5th ed., ThomsonBrooks/Cole (2012).
2. Halliday, D., Resnick, R., and Walker, J., Fundamentals of Physics, 9th ed., John Wiley (2010).
3. Young, H. D., Freedman, R. A., Sundin, T. R., and Ford, A. L., Sears and Zemansky's UniversityPhysics, 13th ed., Pearson Education (2011).
4. Concepts of Modern Physics by Arthur Bieser, McGraw Hill.

# Applied Physics Laboratory

**Course Code:** BEECA1C001L

**Course Title:** Applied Physics Laboratory

**Semester:** I

**Credits: 0**2

**Rationale**

This course aims to gain practical knowledge by applying the experimental methods to correlate with the Physics theory, learn the usage of electrical and optical systems for various measurements.,Apply the analytical techniques and graphical analysis to the experimental data and to develop intellectual communication skills and discuss the basic principles of scientific concepts in a group

**Course Outlines**

- Damped driven oscillator
- Waves and oscillation
- Modulus of elasticity
- Surface tension
- Moment of inertia and angular acceleration
- Faraday's law of induction
- Biot-Savarts law
- Ratio of electronic charge to mass
- Brewster's angle and Malu's law
- Earth's magnetic field
- Charge of an electron

**Text Books / References:**

- Lab Manual

**Course Outcomes**

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

- Students will be able to understand the basic principle of designed experiments through simple scientific tools.
- Students will be able to evaluate and interpret scientific data.
    - Students will be able to create different experiments based on scientific understan

# English for Technical Communication

**Course Code:** BEECA1C004T

**Course Title:** English for Technical Communication

**Semester:** I

**Credits:** 03

**Rationale**

The goal of this course is to prepare engineering students with the individual and collaborative technical writing, presentation, and research skills necessary to be effective technical communicators in academic and professional environments.

| **Contents** | **No. of Lectures** |
|---|---|
| **Unit-I**<br>Grammar Principles (Correction of sentences, Concord) and Vocabulary Building (synonyms and antonyms) - Idioms and Phrasal verbs, patterns of use and suggestions for effective employment in varied contexts.<br>Effective Sentence Construction - Strategies for bringing variety and clarity in sentences, removing ambiguity, editing long sentences for brevity and clarity. | **10** |
| **Unit - II**<br>Reported speech - Contexts for use of reported speech, its impact on audiences and readers, active and passive voice, reasons for preference for passive voice in scientific English.<br>Paragraph-writing - Definition of paragraph, types, features of a good paragraph, unity of theme, coherence, linking devices, direction, patterns of development. | **10** |
| **Unit -III**<br>Note-making – Definition, the need for note-making, its benefits, various note formats, like tree diagram, block or list notes, tables, etc.<br>Letter-Writing - Its importance in the context of other channels of communication, qualities of effective letters, types- personal & official letters for various purposes, emphasis on letter of application for jobs, cover letter and resume types, examples and exercises. | **10** |
| **Unit - IV**<br>Reading techniques - Definition- Skills and sub-skills of reading, Skimming and Scanning, their uses and purposes, examples and exercises.<br>Reading Comprehension - Reading silently and with understanding, process of comprehension, types of comprehension questions (technical paper reading, patents). | **10** |
| **Unit - V**<br>Features of Technical English - Description of technical objects and | **10** |

| | |
|---|---|
| process, Report-Writing - definition, purpose, types, and structure, formal and informal reports, stages in developing report, proposal, progress and final reports examples and exercises.<br>Book Reviews - Oral and written review of a chosen novel/play/movie, focus on appropriate vocabulary and structure, language items like special vocabulary and idioms used. | |

**Course Outcomes**

Upon successful completion of this course, candidates will be able to:

- Understand basic grammar principles
- Write clear and coherent passages
- Write effective letters for job application and complaints
- Prepare technical reports and interpret graphs
- Enhance reading comprehension
- Comprehend English speech sound system, stress and intonation

**Text books**

1. English for Engineers and Technologists (Combined edition, Vol. 1 and 2) Orient Blackswan 2010.
2. Ashraf, M Rizvi. Effective Technical Communication. Tata McGraw-Hill, 2006

**Reference books**

1. Meenakshi Raman and Sangeetha Sharma. Technical Communication: Principles and Practice 2nd Edition, Oxford University Press, 2011.

**Language laboratory**

1. English Sound System - vowels, consonants, Diphthongs, phonetic symbols using dictionary to decode phonetic transcription, Received Pronunciation, its value and relevance, transcription of exercises.
2. Stress and Intonation - word and sentence stress, their role and importance in spoken English
3. Intonation in spoken English - definition, patterns of intonation, falling, rising, etc., use of intonation in daily life-exercises
4. Introducing one in formal and social contexts- Role plays, their uses indeveloping fluency and communication in general.
5. Oral presentation - definition, occasions, structure, qualities of a good presentation with emphasis on body language and use of visual aids.
6. Listening Comprehension - Challenges in listening, good listening traits, some standard listening tests, practice and exercises.
7. Debate/ Group Discussions - concepts, types, Do’s and don’ts, intensive practice.

**Software**

1. Clear Pronunciation – Part-1 Learn to Speak English.
2. Clear Pronunciation – Part-2 Speak Clearly with Confidence
3. Study Skills
4. English Pronunciation

# Basic Electrical Engineering

**Course Code:** BEECA1C005T

**Course Title:** Basic Electrical Engineering

**Semester:** I

**Credits:** 03

**Rationale**

To provide comprehensive idea about AC and D C circuit analysis, working principles and applications of basic machines in electrical engineering.

**Course Outlines**

| Contents | No of Lectures |
|---|---|
| **Unit-I**<br>Introduction – Introduction to Electrical Engineering – Review of Fundamental laws of Electricity. Basic elements in electrical circuits – Passive elements: Behavior of Resistor, Inductor and capacitor. Active elements: Characteristics of Voltage source and current source – Independent and dependent sources. | 10 |
| **Unit-II**<br>Dc circuit analysis – Steady state analyses of DC circuits having independent and dependant sources - Kirchhoff's voltage law– Mesh Analysis – concept of super-mesh. Kirchhoff's current law – Nodal analysis – concept of super-node. Network Theorems : Thevenin's theorem, Norton's theorem, Superposition theorem, Maximum power transfer theorem - Transients in DC circuits. | 10 |
| **Unit-III**<br>Ac circuit analysis – Introduction to Alternating Current – Basic concepts of AC circuits – RMS value and average value – Behavior of resistor, capacitor and inductor in AC circuits – concepts of reactance and impedance - Sinusoidal steady state analysis of AC circuits – Phasor analysis - Power in AC circuits Power factor - Resonance in AC circuits | 10 |
| **Unit-IV**<br>Three-phase systems – Basic concepts of balanced three-phase systems- Star and Delta connections – Power in three-phase systems. | 10 |
| **Unit-V** | 10 |

| | |
|---|---|
| Electrical machines – Basic concepts of magnetic circuits – coupled circuits. Transformers: Principle of operation –Transformer on load – Phasor diagram - Equivalent circuit of Transformer – Tests on Transformer – Regulation and efficiency – Autotransformer Rotating electrical machines – Classification, principle of operation, constructional features and characteristics of different types of DC machines and AC machines. | |

**Course Outcomes:**

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

• Analyze the behavior of different electric circuit parameters and have a thorough understanding of different types of energy sources.

• Analyze the different configurations of DC circuits using basic circuit laws like KVL, KCL and tools like mesh analysis and nodal analysis.

**Text Books**


1. Vincent Del Toro : 'Electrical Engineering Fundamentals', Pearson Education, 1989
2. A.E.Fitzgerald, David E Higginbothom, Arvin Grabel: 'Basic Electrical Engineering',TataMcGraw-Hill, 2010.


**Reference Books**


1. Hughes, E. : 'Electrical and Electronic Technology', Pearson Education, 2008.
2. Charles K Alexander, Mathew N O Sadiku: 'Electric Circuits' McGraw-Hill; 4th edition, 2008.
3. Fitzgerald, Kingsley, Umans, 'Electric Machinery', Tata Mcgraw-Hill, 2017.
4. M.G.Say, ' Performance and Design of AC Machines', CBS; 3rd edition, 2002

# Basic Electrical Engineering Lab

**Course Code:** BEECA1C002L

**Course Title:** Basic Electrical Engineering Lab

**Semester: I**

**Credits: 02**

**Rationale**

This course provide exposure to the students with hands on experience on various basic engineering practices in Civil, Mechanical, Electrical and Electronics Engineering.

**Course Outlines**

- Study of general purpose hand tools in workshop
- Assembly and disassembly practices of the following models
    - Gear box assembly
    - Centrifugal pump assembly along with shaft alignment practice
    - Cam and follower mechanisms
    - Transducer (sensor) trainer
- Experiments on different basic machines
    - Turning exercise – straight turning, taper turning, thread cutting practice
    - Milling exercise – spur gear cutting practice
    - Welding practice – arc welding
    - Fitting practice – models with marking and drilling exercisesElectrical Wiring Pracice
      Soldering Practice

**Course Outcomes**

At the end of the course student will be able to

- assemble and disassemble of modals
- work on different types of sensors
- understand the working of basic machines

**Text Books / References:**

- Lab Manual

# Introduction to Aerospace Engineering

**Course Code:** BEECA1C006T

**Course Title**: Introduction to Aerospace Engineering

**Semester:** I

**Credits:** 02

**Rationale**

The objective of this course To introduce the basic concepts of aircrafts, rockets and their functions,to give an introduction on aerodynamics, aircraft structure and aircraft propulsion and provide knowledge about the basic parts and their function and construction details of aerospace vehicles.

**Course Outlines**

| Contents | No of Lectures |
|---|---|
| **Unit-I**<br>History of aviation – standard atmosphere – aerodynamic forces – lift generation – airfoils and wings – drag polar – concept of static stability – anatomy of an aircraft – mechanism of thrust production – propellers – | **8** |
| **Unit-II**<br>Jet engines and their operation – helicopters – aircraft performance – simple manoeuvres – aerospace materials and structural elements – aircraft instruments. | **8** |
| **Unit-III**<br>Elements of rocket propulsion – launch vehicle dynamics – basic orbital mechanics – satellite applications and orbits – future challenges in aerospace engineering. | **8** |

**Course Outcomes**

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After completing the course the student will be able to

- Understand the nature of aerospace technologies.
- Identify the different types of Aircraft components and their functions.

- Assess the forces and moments due to flow over the aircraft components.
- Apply the principles of aerodynamics to different parts of an aeroplane.
- Evaluate the performance of propulsion system. 6. Apply the knowledge of gravitational law, Kepler's law and Newton's law to the space vehicle

**Text Books**

1. Anderson, J.D., "Introduction to Flight", Tata McGraw-Hill, sixth Edition, 2013
2. Szebehely, V. G. and Mark, H., Adventures in Celestial Mechanics, 2nd ed., Wiley (1998).

**Reference Books**

1. Anderson, D. F. and Eberhardt, S., Understanding Flight, 2nd ed., McGraw-Hill (2009).
2. Turner, M. J. L., Rocket and Spacecraft Propulsion: Principles, Practice and New Devel- opments,3rd ed., Springer (2009).
3. Kermode, A.C., "Flight without Formulae", McGraw-Hill, 1997. 2.
4. Sutton, G.P. "Rocket Propulsion Elements", John Wiley,

# Problem Solving and Computer Programming in C

**Course Code:** BEECE1C006T

**Course Title:** Problem Solving and Computer Programming in C

**Semester:** I

**Credits:** 02

**Rationale**

Solving problems is the core of computer science. Purpose of programming is to solve problems. Programmers must first understand how a human solves a problem, then understand how to translate this "algorithm" into something a computer can do, and finally how to "write" the specific syntax (required by a computer) to get the job done.

**Course Outlines**

| **Contents** | **No. of Lectures** |
|---|---|
| **Unit - I**<br>Fundamentals of Computers - Historical perspective, Early computers, Components of a computers, Problems, Flowcharts, Memory, Variables, Values, Instructions, Programs.<br>Problem solving techniques - Algorithmic approach, characteristics of algorithm, Problem solving strategies: Top-down approach, Bottom-up approach, Time and space complexities of algorithms. | **8** |
| **Unit - II**<br>Number systems and data representation - Basics of C, data types, tokens, keywords, variables, Numbers, using flow of control constructs, Conditional statements - If-else, Switch-case constructs, Loops - while, do-while, for. Functions - Modular approach for solving real time problems, user defined functions, library functions, parameter passing - call by value, call by reference, return values, Recursion. Problems on Date and factorials, Solutions | **8** |
| **Unit - III**<br>Introduction to Arrays and Pointers - Sorting and searching algorithms, Large integer arithmetic, Single and Multi-Dimensional Arrays, passing arrays as | **8** |

| | |
|---|---|
| parameters to functions, Magic square and matrix operations using Pointers and Dynamic Arrays, Multidimensional Dynamic Arrays. String processing, File operations. Structures and Union. | |

**Course Outcomes**

Upon successful completion of this course, candidates will be able to:

- Design algorithms for solving simple mathematical problems including computing, searching and sorting.
- Compare and contrast algorithms in terms of space and time complexity to solve simple mathematical problems.
- Explore the internals of computing systems to suitably develop efficient algorithms.
- Examine the suitability of data types and structures to solve specific problems.
- Apply control structures to develop modular programs to solve mathematical problems.
- Apply object oriented features in developing programs to solve real world problems.

**Text Books**

1. Problem Solving and Program Design in C by Jeri R. Hanly, Elliot B. Koffman; Pearson Addison-wesely, 2006.
2. Yashwant Kanetker, Let us C, BPB.
3. Balagurusamy, E., Programming in ANSI C, McGraw-Hill.
4. Computer Science- A Structured Srogramming Approach Using C by Behrouz A. Forouzan, Richard F. Gilberg; 3rd Edition(India Edition), 2007

**References Books**

1. How to Solve it by Computer, R.G. Dromey, Pearson, 2008.
2. Programming in ANSI C, E Balagurusamy, McGraw Hill Education, 8th Edition.
3. Object-Oriented Analysis and Design with Applications, Grady Booch, Robert Maksimchuk, Michael Engle, Bobbi Young Ph.D., Jim Conallen, Kelli Houston , Addison-Wesley Object Technology Series, 3rd Edition