Bhavan's Vivekananda College

of Science, Humanities and Commerce
Sainikpuri, Secunderabad – 500 094
Autonomous College - Affiliated to Osmania University
Accredited with 'A' grade by NAAC

B.Sc. (MPCs)

Program Outcomes

PO1 Knowledge: Acquire the knowledge with facts and figures related to Mathematics, Physics, Electronics, Computer Science and Statistics and understand the basic concepts, fundamental principles and scientific theories related to various scientific phenomena and their relevance in day-to-day life.

PO2 Skills: Acquire the skills in handling scientific instruments & skills of observation and drawing logical inference from scientific experiments.

PO3 Modern Tool Usage: Apply appropriate techniques, skills, modern tools and IT tools to practice.

PO4 Creativity & Analysis: Think creatively to propose novel ideas in explaining the evidence of data and provide new solutions to the problems and analyse the given scientific data systematically and have the ability to draw conclusion.

PO5 Communication: Communicate effectively on problems, issues and solutions with 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.

PO6 Ethics & Environment: Apply ethical principles and commit to professional ethics and responsibilities and norms in research and the functional areas, understand the issues of environmental context and sustainable development.

PO7 Individual and Team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO8 Self-directed and Life-long Learning: Acquire the ability to engage in independent and life-long learning in the broadest context of socio, economic and technological changes.

Program Specific Outcomes

PSO1: Understand the basic concepts, develop problem solving skills, improve logical thinking and develop systematic approach to tackling situations

PSO2: Develop proficiency to apply basic concepts in problem solving and provide foundation to the advanced topics of Physics.

PSO3: Understand and analyse integrated frame work environment and to develop real time applications

Course Outcomes

Mathematics:

Name of the Course	DIFFERENTIAL EQUATIONS AND GROUP THEORY
Course Code	MT121
CO1	Solve differential equations of first order & first degree.
CO2	Apply concepts of differentiation to calculate problems on Total differential equations, Simultaneous Total differential equations and differential equations of first order but not first degree.
CO3	Determine various concepts in Group theory
CO4	Prove the concepts of Group theory

Name of the Course	DIFFERENTIAL EQUATIONS AND DIFFERENTIAL CALCULUS
Course Code	MT221
CO1	Use analytical methods to find solutions higher order linear differential equations
CO2	Find solutions of non-homogenous higher order linear differential equations.
CO3	Analyze and interpret concepts of differentiation, continuity and derivability.

Name of the Course	RING THEORY&PARTIAL DIFFERENTIAL EQUATIONS
Course Code	MT321
CO1	Determine various concepts in Ring theory.
CO2	Prove the concepts of Ring theory.
CO3	Solve linear and nonlinear partial differential equations of first order.
CO4	Solve homogeneous and non-homogeneous linear partial differential equations.

Name of the Course	Theory of Equations
Course Code	SEC321
CO1	By using the concepts learnt the students are expected to solve some of the polynomial equation

Name of the Course	REAL ANALYSIS
Course Code	MT421
CO1	Determine various concepts in Sequences, Series, Sequences functions, Series of functions and Integration.
CO2	Determine various properties of Sequences, Series, Sequences functions, Series of functions and Integration.
CO3	Prove the concepts of Sequences, Series, Sequences functions, Series of functions and Integration.
CO4	Apply various tests for the convergence of Sequences, Series, Sequences functions, Series of functions and Integrability of functions.

Name of the Course	SEC LOGIC AND SETS
Course Code	SEC421
CO1	After the completion of the course students appreciate its importance in the development of computer science

Name of the Course	LINEAR ALGEBRA
Course Code	MT521
CO1	After completion of this course students appreciate its interdisciplinary nature. Learn the concepts of basis and dimension of vector space, express vector spaces in different dimensions, base concept of a vector space and properties of vectors on the base.
CO2	Find row and column space of a matrix, learn some functions defined between vector spaces, learn required conditions for a transformation in order to be a linear transformation, find kernel of a linear transformation, learn the algebraic operations between linear transformations, matrix representation of a linear transformation.
CO3	Learn how to calculate eigenvalues and eigenvectors of a linear transformation, concepts of eigenvalues and eigenvectors of a matrix.
CO4	Students learn Concepts of inner product on vector spaces, find the length of a vector in some vector spaces and the angle between two vectors, explain that two vectors are orthogonal, express that a set is orthogonal and orthonormal.

Name of the Course	VECTOR CALCULUS
Course Code	MT521A
CO1	Students realize the way Vector Calculus is used to address some of the problems of Physics. After learning this course students will learn to define concepts of point and vector and also learn to apply differences and similarities in many fields of Science.
CO2	Apply dot and cross product to determine angles between vectors, orientation of axes, areas of triangles and parallelograms in space, scalar and vector projections
CO3	Calculate directional derivatives and gradients ,and learn concept of a conservative vector field, state and apply theorems that give necessary and sufficient conditions for when a vector field is conservative, definitions of curl and divergence of vector field and describe application Green's Theorem, Gauss Theorem and Stokes' Theorem and compute them.
CO4	Learn applications of these theorems in Physics and Engineering.

Name of the Course	SEC NUMBER THEORY
Course Code	SEC521
CO1	Students shall be able to understand and analyze the properties of numbers in a broader prospect

Name of the Course	GE MATHEMATICAL APTITUDE -I
Course Code	GE521
CO1	Students will be benefitted by these concepts to crack competitive examinations

Name of the Course	NUMERICAL ANALYSIS
Course Code	MT621
CO1	After learning the course students realize the importance of the subject in solving some problems of algebra and calculus, understand the theoretical and practical aspects of the use of numerical analysis. Students will be equipped with the knowledge of finding the roots of algebraic and transcendental equations.
CO2	Students will be equipped with the knowledge of calculating the interpolation, extrapolation values without actually finding the function will learn to and evaluate a derivative at a value using an appropriate numerical method. Proficient in implementing numerical methods for a variety of multidisciplinary applications. Establish the limitations, advantages and disadvantages of numerical analysis.
CO3	Derive numerical methods for interpolation, differentiation,

	integration and also solve linear equations.
CO4	Understand common numerical analysis and how they are used to obtain approximate solutions.

Name of the Course	SOLID GEOMETRY
Course Code	MT621A
CO1	After completion of this course students will be able to understand the beautiful interplay between Algebra and Solid Geometry.
CO2	Students will be able to analyze and differentiate the differences in recognizing few types of conics.
CO3	Students will become familiar with different concepts in Analytical Geometry and will able to solve different properties of various conics.

Name of the Course	SEC GRAPH THEORY
Course Code	SEC621
CO1	Students can use the concepts of graphs and their properties various fields of Science.

Name of the Course	GE MATHEMATICAL APTITUDE -II
Course Code	GE621
CO1	Students will be benefitted by these concepts to crack competitive examinations

Physics:

Name of the Course	MECHANICS
Course Code	PH 123
CO1	Use the concepts of vector differentiation, integration and remember impact of variation of mass in motion.
CO2	Apply concepts of elastic collision to Rutherford experiment and outline concepts of central forces.
CO3	Remember various types of rigid body motion and different mechanical properties.
CO4	Outline the concept of relativity.

Name of the Course	WAVES AND OSCILLATIONS
Course Code	PH 223
CO1	To evaluate physical constants in simple oscillation and outline combinations of simple vibrations .
CO2	To differentiate damped and forced vibrations.
CO3	To analyze different types of complex vibrations and describe the properties of ultrasonics.

CO4	To determine the behaviour of vibrations in bars and strings.

Name of the Course	THERMODYNAMICS
Course Code	PH 323
CO1	To recognize the importance of the Laws of Thermodynamics
CO2	To apply the concepts of Maxwell's relations in various applications
CO3	To differentiate between Transport phenomenon, classical – quantum statistics
CO4	To understand the Laws of Radiation

Name of the Course	BASIC INSTRUMENTATION SKILLS
Course Code	SE 323
CO1	Having completed this course, student should be familiar to basic mechanical and electrical instruments

Name of the Course	OPTICS
Course Code	PH 423
CO1	To acquire knowledge of analyzing optical systems
CO2	To use the acquired information about interference.
CO3	Outline the concept of diffraction
CO4	To get an insight to analyze polarized light
CO5	To recognize the importance of laser

Name of the Course	RENEWABLE ENERGY AND ENERGY HARVESTING
Course Code	SE 423
CO1	Having completed this course, student should understand necessity of alternate energy sources and conservation of conventional energy.

Name of the Course	ELECTRICITY AND MAGNETISM
Course Code	PH 523
CO1	To become cognizant of basics of Electrostatics
CO2	To apply the concepts of Dielectrics in various applications
CO3	To understand various concepts of Magnetism
CO4	To recognize the importance of EMI

Name of the Course	Solid State Physics and Spectroscopy
Course Code	PH523A
CO1	Having studied this unit the student acquires the basic knowledge of dependence of various properties of materials on

	the structural arrangement of the crystal constituting the material.
CO2	Having done this unit the student gets familiarized with different types of solids such as magnetic materials, superconducting materials and nanomaterials.
CO3	Having done this unit the student will be able to understand the fundamentals of emission and absorption spectra and analyze visible and basic alkali spectra and fine structure spectrum.
CO4	Having studied this unit the student will be able to understand the different types of molecular spectra caused by the various motions in a molecule. The student also gains the knowledge about the probable interactions between matter and electromagnetic radiation and their applications in spectroscopy.

Name of the Course	Circuit Simulation using PSPICE
Course Code	SE 523
CO1	Students will learn the usage of virtual components and instruments to make simulated measurements. They will become proficient in designing and testing simple Digital and Analog circuits.

Name of the Course	RENEWABLE ENERGY AND ENERGY HARVESTING
Course Code	GE 523
CO1	Having completed this course, student should understand necessity of alternate energy sources and conservation of conventional energy.

Name of the Course	MODERN PHYSICS
Course Code	PH 623
CO1	Understand the complementary nature of the wave and particle properties of a material particle
CO2	Apply the Schrödinger's time independent equation to any given system with a specified potential and hence find the solution
CO3	Get an insight to basic nuclear structure, models and transformations
CO4	Understand the decay of Radioactive particles such as α particle in terms of quantum mechanical tunnelling

Name of the Course	ELECTRONICS
Course Code	PH 623A
CO1	To apply the Kirchoff's laws to the electrical circuits & analyze the circuits involving transients and resonance
CO2	To use the acquired information about the operation of semiconductor devices (Diodes & BJTs) and utilize their concepts to design Rectifiers, Amplifiers & Oscillators.
CO3	To recognize different number systems and solve the binary arithmetic problems.
CO4	To get an insight to analyze and design various logic gates & combinational circuits.

Name of the Course	Boolean Algebra
Course Code	SE623
CO1	The students will be able to Use number systems to solve problems.
CO2	The students will be able to Design logic circuits and give their truth tables.
C03	The students will be able to reduce digital circuits using Boolean algebra.
CO4	The students will be able to Get familiarized with Combinational Logic circuits

Name of the Course	BIOPHYSICS
Course Code	GE 623
CO1	Students will get familiarize with basics of physics involved in functioning of Eye and Ear
CO2	Students will be able to analyse the properties from the medical images

Computer Science:

Name of the Course	Programming in 'C'
Course Code	CS125
CO1	Write basic programs on their own using C.
CO2	Get equipped to use control statements, decision making and looping statements.
CO3	Use the concepts of arrays, strings and functions
CO4	Use the concepts of structure, unions, pointers and pre-processors

Name of the Course	Programming in 'C' Lab
Course Code	CS125P
CO1	Developing logic skills using control and looping statements
CO2	'C' concepts implemented with a practical approach(arrays,strings,functions,structure,union,pointers,pre processors)

Name of the Course	Programming in 'C++'
Course Code	CS225
CO1	Write basic C++ programs on their own
CO2	Get equipped to use the functions and object oriented programming concepts
CO3	Use the concepts of inheritance and polymorphism
CO4	Use the concepts of templates and exception handling

Name of the Course	Programming in 'C++' Lab
Course Code	CS225P
CO1	Developing real time applications using OOP's concepts
CO2	Practical approach is implemented using Inheritance and Polymorphism

Name of the Course	Data Structures
Course Code	CS325
CO1	Able to write different searching and sorting technique programs
CO2	Able to write programs on stacks, queues, deques, priority queues
CO3	Able to write programs on linked list, doubly linked list
CO4	Able to write programs on Binary Search Tree operations and Tree Traversal techniques

Name of the Course	Data Structures Using C++ Lab
Course Code	CS325P
CO1	Able to write programs for different searching, sorting, stacks, queues, deques and priority queues.
CO2	Able to write programs on linked list, doubly linked list and Binary Search Tree operations.

Name of the Course	PC Maintenance
Course Code	SE325A
CO1	Students will acquire knowledge about motherboard components & hardware components of the PC and the basic technologies used in networks
CO2	Perform basic assembling and disassembling of the computer and troubleshooting, upgrade of computer operating systems and troubleshoot using system tools and diagnostic software.

Name of the Course	Database Management Systems
Course Code	CS425
CO1	Acquire knowledge on database concepts.
CO2	Understanding the features of SQL
CO3	Understanding the concept of Database maintenance
CO4	Understand technical and management roles of database administration & data administrator

Name of the Course	Database Management Systems Lab
Course Code	CS425P
CO1	Students will be able to interact with Database using SQL (Lab).
CO2	Students will be able to write simple SQL queries

Name of the Course	Libre Office Calc and Libre Office Base
Course Code	SE425A
CO1	Get knowledge about Spreadsheet formulas and functions & Be familiarized about formatting, linking and protecting worksheets
CO2	Be able to prepare pivot tables, conditional formatting and data validation in Spreadsheet and be able to learn Table creation, Query creation, Form wizard and Report wizard in Base

Name of the Course	Programming in Java
Course Code	CS525
CO1	Students will learn fundamentals of OOPs, classes, objects.
CO2	Students will learn java programs relating to classes, arrays, strings, interfaces.
CO3	Students will learn java programs relating to the concepts of packages and multithreading.
CO4	Students will learn java programs relating to the concepts of exception handling and applets.

Name of the Course	Programming in Java Lab
Course Code	CS525P
CO1	To demonstrate looping statements, arrays, oops concepts
CO2	To construct user-defined packages ,threads and applet programs by using exception handling mechanisms.

Name of the Course	Software Engineering (Elective-I)
Course Code	CS525A
CO1	Students will be capable to analyze Software Engineering and its specifications
CO2	Students will learn designing Architectural styles, object oriented system analysis and its types of designs

CO3	Students will be capable to implement Software development
CO4	Students will learn Software testing and its quality

Name of the Course	Software Engineering Lab (Elective-I)
Course Code	CS525AP
CO1	Students will be acquiring knowledge about implementing tools and models in software engineering
CO2	Students will be able to design software using different types of UML models

Name of the Course	Operating Systems (Elective-II)
Course Code	CS525B
CO1	At the end of the course students will be able to paraphrase the basic concepts of Operating Systems and its Structure
CO2	At the end of the course students will be able to summarize the various Process Management Services of an OS and the problems that could arise due to Synchronization and their respective solutions suggested.
CO3	At the end of the course students will be able to determine the Process Scheduling Algorithm or the Deadlock Handling Method to be used.
CO4	At the end of the course students will be able to Discuss the process of Memory and Virtual Memory Managements.

Name of the Course	Operating Systems Lab (Elective-II)
Course Code	CS525BP
CO1	Students will be able acquire knowledge on UNIX commands and basic programs using conditional statements
CO2	Students will be able acquire knowledge on UNIX programs using looping statements.

Name of the Course	Python
Course Code	SE525A
CO1	Acquire Knowledge on python programming features and develop applications using conditional and looping statements
CO2	Develop applications using functions, files and exception handling, list and tuples

Name of the Course	Libre Office Calc (GE-I)
Course Code	-----
CO1	Work with multiple worksheets & workbook Protect data and Import and export from various database applications.
CO2	Analyze data and implement functions, formula and data validation methods

Name of the Course	Basics of Python (GE-II)
Course Code	----
CO1	Acquire Knowledge on python programming features and develop applications using conditional statements.
CO2	Develop applications using looping statements and functions.

Name of the Course	Computer Networks
Course Code	CS625
CO1	Students would have learnt fundamental concepts and terminology in networking and seven layers and OSI network model
CO2	Students would have learnt different interfaces along with their functionalities and know about multiplexing techniques(FDM,TDM) and Error Detection Methods and correction methods
CO3	Students would have learnt how data link layer is implemented at Local Area Networks and get familiarized with flow control and error control mechanisms at data link layer
CO4	Students would have learnt Routing Algorithms

Name of the Course	Computer Networks Lab
Course Code	CS625P
CO1	Students will be able to create basic messaging programs.
CO2	Students will be able to design simple chatting applications

Name of the Course	Web Technologies (Elective-I)
Course Code	CS625A
CO1	Students will be able to design static web pages
CO2	Students can create web pages using CSS
CO3	Students will be able to design dynamic web program
CO4	Student will be more interaction with web browsers, web servers and case study

Name of the Course	Web Technologies Lab (Elective-I)
Course Code	CS625AP
CO1	Student will be able to design static web pages using style sheets with more formatting features
CO2	Student will be able to design dynamic web pages using CSS, HTML and Scripting language

Name of the Course	GUI Programming using JAVA
Course Code	SE625A
CO1	Students will be develop programs using applets and event handling mechanisms in applets
CO2	Students will be develop programs using swing components

Name of the Course	.NET
Course Code	SE625B
CO1	Students are capable to understand .net platform, application development basics
CO2	Capable to develop Windows form based application with backend connectivity

Name of the Course	Multimedia (GE-I)
Course Code	----
CO1	Students will be able to create, edit and modify simple image files with various extensions.
CO2	Students will be able to implement filter and graphical effects for selected page

Name of the Course	E-Commerce (GE-II)
Course Code	--------
CO1	Student will be able to analyse the impact of E-Commerce on Business Models and EDl
CO2	Students will be able to analyze the Risks of Insecure Systems, Risk Management and Online Payment System