ST. ALOYSIUS' COLLEGE

AUTONOMOUS

JABALPUR- 482001

MADHYA PRADESH, INDIA

CRITERION-1

CURRICULAR ASPECTS

Key Indicator – 1.1

Curriculum Design and Development

Metric No.: 1.1.1

Curricula have relevance to the Local, Regional, National and Global developmental needs which is reflected in Programme outcomes (POs), Programme Specific outcomes (PSOs) and Course Outcomes (COs) of the Programmes offered by the Institution

Document Name

Mapping Faculty of Physical Science

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Faculty of Science

Program Outcomes

Bachelor of Science (B.Sc.)

PO No.	Programme Outcomes After completion of the Programme, the student is able to do:
PO-1	Analysis, investigation and synthesis of organic and inorganic ompounds.
PO-2	Handling of instruments like spectrophotometer, CRO.
PO-3	Gain knowledge of various computer hardware components, including the purpose and functions of operating systems, and develop the skills to troubleshoot a variety of electronic equipment, addressing requirements at global, national, and local/regional levels.
PO-4	Apply the basics of various electronic components like diode, transistor etc., graphical data analysis and interpretation, use of concepts of digital fundamental, memory system and various electronic components.
PO-5	Comprehend computer architecture, network, data structure, database management system and various web based and application-based programming languages.
PO-6	Apply interdisciplinary knowledge and skills to address complex scientific challenges, integrating global best practices with local and regional needs to contribute effectively to scientific advancements, industrial innovation, and sustainable development initiatives.

Faculty of Science (Physical)

Program Specific Outcomes

Bachelor of Science (B.Sc.) – Mathematics

PSO No.	Programme Specific Outcomes After the successful completion of three year B.Sc. (MME) Programme, the graduate will be able to:
PSO-1	Analyse the concepts and theories of Mathematics.
PSO-2	Analyze real-world issues and formulate mathematical equations to derive viable solutions, considering and incorporating global, national, and local/regional contexts and requirements
PSO-3	Develop problem solving skills and scientific reasoning by learning skills.
PSO-4	Develop written and oral communication skills in communicating with diverse Stakeholders.
PSO-5	Create and collaborate in emergent innovative mathematical solutions for glocal industry and academia.
PSO-6	Crack various competitive exams for higher studies and employment

Bachelor of Science (B.Sc. Physics)

PSO No.	Programme Specific Outcomes Upon completion of these courses the student would be able to:
PSO-1	Analyse the concepts and theories of Physics, Computer Science and Mathematics
PSO-2	Analyze real world problems and develop mathematical equations and prepare computer programs to find acceptable solutions.
PSO-3	Develop problem solving skills and scientific reasoning by learning laboratory skills
PSO-4	Develop written and oral communication skills in communicating with diverse Stakeholders.
PSO- 5	Create and collaborate in emergent physical, mathematical and computing Technologies leading to innovative solutions for glocal industry and academia.
PSO- 6	Crack various competitive exams for higher studies and employment.

Bachelor of Science (B.Sc. – Computer Science)

PSO No.	Programme Specific Outcomes Upon completion of these courses the student would be able to:
PSO-1	Analyze the concepts and theories of Computer Science
PSO-2	Analyze real world problems, develop suitable computer programs to find acceptable solutions
PSO-3	Develop problem solving skills and scientific reasoning by learning laboratory skills
PSO-4	Create and collaborate in emergent technologies in computational sciences, leading to innovative solutions for industry and academia
PSO-5	Communicate with diverse stakeholders by acquiring written and oral communication skills

Bachelor of Computer Application (B.C.A.)

PSO No.	Programme Specific Outcomes Upon completion of these courses the student would be able to:
PSO-1	Students will acquire a deep understanding of computer architecture, data structures, algorithms, and programming, enabling them to effectively solve computational and network challenges.
PSO-2	Develop problem-solving abilities and scientific reasoning through hands-on laboratory experiences
PSO-3	Attain proficiency in fundamental computer networking principles, including network configuration, protocols, and security protocols.
PSO-4	Demonstrate comprehension of database concepts, proficiently design and manage databases, and execute SQL queries for data retrieval and manipulation.
PSO-5	Gain familiarity with various software development tools, integrated development environments, and version control systems to facilitate efficient software development processes

Bachelor of Science (B.Sc.) Chemistry

PSO No.	Programme Specific Outcomes Upon completion of these courses, the student would be able to:
PSO-1	Disciplinary knowledge and understanding of fundamentals and principles of Chemistry and allied subjects.
PSO-2	To develop concepts of a wide range of organic, inorganic, physical, analytical and spectroscopic techniques in chemistry.
PSO-3	To develop basic professional skills in specific areas in Chemistry such as spectral analysis, inorganic and organic synthesis, estimation and characterization, physical practical data evaluation, and formulation of results through proper calculations and hands-on experience of usage of instruments like spectrophotometer, conductivity bridge, polarimeter, CRO and others.
PSO-4	To promote teamwork and time management in organizing and working in a chemistry laboratory.
PSO-5	To promote experiential learning by carrying out laboratory-oriented chemistry practicals such as synthesis of complexes, inorganic and organic mixture analysis, gravimetric analysis, spectroscopic techniques, and others.
PSO-6	Adopt the principles of the 3 R's - Reduce, Recycle, and Reuse, while advocating for the implementation of the 12 principles of Green Chemistry in laboratories, ensuring alignment with global, national, and local/regional sustainability goals and requirements.
PSO-7	Promote awareness and utilization of biodegradable, cost-effective, environmentally friendly, and green chemicals and processes, tailored to address local regional needs and priorities
PSO-8	To minimize the use of chemicals and reduce the environmental pollution caused by the department.

Faculty of Physical Science

Course Outcomes

Bachelor of Science (B.Sc.)

Subject: Mathematics B.Sc. I Sem.

Paper- I: Algebra, Vector Analysis and Geometry

CO No.	Course Outcomes	Cognitive Level
CO-1	Recognize consistent and inconsistent systems of linear equation by the row, echelon from the augmented matrix, using the rank of matrix	An
CO-2	To find the Eigen values and corresponding Eigen vectors for a square matrix.	EV
CO-3	Utilizing the principles of vector calculus to address geometric problems, tailored to meet global, national, and local/regional needs and applications	U & An
CO-4	Enhance the knowledge of three dimensional geometrical figure (eg. Cone and cylinder)	App

B.Sc. II Sem.

Paper- II: Calculus and Differential Equations

CO No.	Course Outcomes	Cognitive Level
CO-1	Sketch curves in a plane using its mathematical in the different coordinate systems of reference.	U
CO-2	Using the derivatives in Optimization Social sciences, Physics and Lifesciences etc.	U & Ev
CO-3	Formulate the Differential equations for various Mathematical models.	An & App
CO-4	Applying methods to solve and analyze diverse mathematical models, addressing global, national, and local/regional challenges and requirements.	App & U

B.Sc. II Year

Paper- I: Abstract Algebra and Linear Algebra

CO No.	Course Outcomes	Cognitive Level
CO-1	Recognize the algebraic structures as a group, and classify them as abelian, cyclic and permutation groups, etc.	U & An
CO-2	Link the fundamental concepts of groups and symmetrical figures.	EV
CO-3	Analyze the subgroups of cyclic groups.	U & An
CO-4	Explain the significance of the notion of cosets, normal subgroups, and quotient groups.	App
CO-5	The fundamental concept of rings, fields, subrings, integral domains and the corresponding morphisms	U & An
CO-6	Analyze whether a finite set of vectors in a vector space is linearly independent. Explain the concepts of basis and dimension of a vector space.	U & An
CO-7	Understand the linear transformations, rank and nullity, matrix of a linear transformation, algebra of transformations and change of basis.	U
CO-8	Compute the characteristic polynomial, eigenvalues, eigenvectors, and eigenspaces, as well as the geometric and the algebraic multiplicities of an eigenvalue and apply the basic diagonalization result.	EV

Paper- II: Advanced calculus and Partial differential equations

CO No.	Course Outcomes	Cognitive Level
CO-1	Understand many properties of the real line Rand sequences.	U
CO-2	Calculate the limit superior, the limit inferior, and the limit of a bounded sequence.	U & Ev
CO-3	Apply the mean value theorems and Taylor's theorem.	App
CO-4	Apply the various tests to determine convergence and absolute convergence of an infinite series of real numbers.	App & U
CO-5	Formulate, classify and transform partial differential equations into canonical form.	App

Subject: Physics

B. Sc. I Semester

Paper: Mechanics and General Properties of Matter (Major/Minor)

CO No.	Course Outcomes	Cognitive Level
CO-1	The learner will use second-order linear differential equations tostudy and solve problems in Harmonic oscillations.	U, R, Ap, E
CO -2	Learners will be able to understand/recall the Rigid body, Centre ofmass, and the connection between Rotational Dynamics and moment of inertia. The learner will be able to determine the Moment of inertia about a given axis of symmetry for different uniform mass distributions.	R, U, p, n, R, E
CO-3	The learner will be able to understand and apply the law of conservation of linear momentum and understand the conceptof center of mass, Elasticity, and various elastic moduli	R, U, n, Ap, E
CO -4	Learners will be able to understand the Principles of fluid flow and the equations governing fluid dynamics such as the equation ofcontinuity, Bernoulli's Theorem etc.	R, U, Ap,An, E
CO -5	Learner will be able to understand/recall Conservative force field, Gravitational potential, Gravitational self-energy, Central force, reduced mass, Kepler's law, Scattering.	U, R, Ap, An
CO -6	Learners will be able to understand the principles of Astrophysics and the special theory of relativity, adapting the understanding to align with global, national, and local/regional contexts and needs.	U, Ap, E, C

Paper: Mechanics and General Properties of Matter (Elective)

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
C O -1	The learner will utilize a variety of mathematical tools to analyze and resolve issues across different domains of physics, considering global, national, and local/regional applications and requirements.	1,2,3,6	U, R, E
C O -2	Learner will be able to understand concepts of Gradient, Divergence and Curl and their applications, recall Laws of motion and to build fundamentals of Mechanics, Significance of Kepler's Laws of Planetary Motion & Importance of Collisions	1,2,3,6	R, ,U, Ap, An, R, E
C O-3	Learner will be able to understand the concept of Elasticity and various elastic moduli, Concept of Simple, Periodic & Harmonic Oscillation.	3,4,5,6	R, U, An, Ap, E
C O 4	Learner will be able to extend the concept of Translational and Rotational Dynamics and their application. Learner will be able to evaluate the Moment of inertia about a given axis of symmetry for different uniform mass distributions. Principles of fluid flow and the equations governing fluid dynamics such as equation of continuity, Bernoulli's Theorem etc.	3,4,5,6	R , U , Ap, An, E
C O 5	Learner will be able to understand the concept of Astro Physics, special theory of relativity.	3,4,5,6	Ap, E, C

B. Sc. II Semester

Paper: Thermodynamics and Statistical Physics (Major & Minor)

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO -I	Learner will be able to recollect the Specific Contributions of Indians in thermodynamics andstatistical mechanics.	3,5,6	U, C
CO -II	Learner will be able to make use of Basic concepts of thermodynamics & apply Maxwell's thermodynamic relations to derive various formulae.	1,2	U, R, E, Ap
CO -III	Learner will be able to use and apply the idea of Micro and Macro states, Ensembles, Statistical Probability and Phase Space.	1,3,6	R, U, An , Ap, E
CO -IV	Learner will be able to apply the idea of partition function and distribution function to classical and quantum statistics.	4,5,6	R , U , Ap, An, E

B. Sc. II Semester

Paper: Thermodynamics and Statistical Physics (Elective)

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO -I	The learner will be able to make use of Basic concepts of thermodynamics	1,2,6	U, R, E
CO -II	Learner will be able to apply Maxwell's thermodynamic relations to derive various formulae.	1,2	U, R, E, Ap
CLO -III	Learner will be able to use and apply the idea of Micro and Macro states, Ensembles, Statistical Probability and Phase Space.	1,3,6	R, U, An, Ap, E
CO -IV	Learner will be able to apply the idea of partition function and distribution function toclassical and quantum statistics.	4,5,6	R , U, Ap, An, E

B.Sc. II Year

Paper I : Waves and Optics (Major)

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level*
CO -I	Students will be able to understand the various aspects of harmonic oscillations and waves especially the superposition of collinear and perpendicular harmonic oscillations	1,2,3,4	U, R, E
CO -II	Students will be able to explain various phenomena of daily life based on acoustic and optics	1,2,3,4,5	U, R, Ap, E
CO -III	Students will be able to understand interference and its applications	1,2,3,6	R, U, Ap, An, E
CO -IV	Students will understand diffraction and be able to outline the use of optical instruments depending on diffraction. Will be able to apply Rayleigh's criterion to optical instruments	1,2,3,4,5	R, U, An, Ap, E, C
CO -V	Students will understand polarization, double refraction in anisotropic media and will be able to make use of optical instruments depending on polarization. Will be able to apply Huygen's principle to the phenomenon of polarization	1,2,3,4,5	U, An, Ap, E, R

Paper II: (Electricity, Magnetism, and Electromagnetic Theory)

(Major /Minor& Elective)

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level*
CO -I	The student will arrive at an understanding of ectrostatics, Gauss's theorem, Gauss's law and their application.	1,2,3,4	U, R, E, Ap
CO -II	The student will arrive at an understanding of Magnetostatistics with emphasis on Lorentz force, Biot-Savart law ant its application, Ampere's law, free and bound currents, magnetization vector, and magnetic substances.	1,2,3,4,5	U, Ap, R, E
CO -III	The student will arrive at an understanding ofsteady & a-c ,dc circuits, and various network theorems.	1,2,3,4	R, U,
CO -IV	The student will arrive at an understanding of the motion of charged particles in electric and magnetic fields, the relevant equipment, and their use.	1,2,3,4	U, R, Ap
CO -V	The student will arrive at an understanding of electrodynamics with emphasis on Faraday's laws, Maxwell equations and their application, Fresnel's equations.	1,2,3,4	U, R, Ap,C
CO -VI	The student will arrive at an understanding of electromagnetic waves with an emphasis on, reflection, refraction, and polarization at differentmedia	1,2,3,4	U, Ap, E,C, An

Subject: Computer Science

B.Sc. I Sem

Paper: Minor Programming and Problem Solving through 'C'

CO No.	Course Outcomes	Cognitive Level
CO-1	Recognize scenarios where computational methods and computer technology can offer valuable solutions, tailored to address global, national, and local/regional needs and challenges.	R, U
CO-2	Given a computational problem, identify and abstract the programming task involved	R, U
CO-3	Approach the programming tasks using techniques learned and writepseudo code	AP
CO-4	Choose the right data representation formats based on the requirementsof the problem	AP
CO-5	Use the comparisons and limitations of the various programming constructs and choose the right one for the task in hand	AP
CO-6	Write the program on a computer, edit, compile, debug, correct, recompile and execute it.	AN, C
CO-7	Identify tasks in which the numerical techniques learned are applicable and apply them to write programs, and hence use computerseffectively to solve the task.	AC, C

B.Sc. II sem

Paper: Programming using C++ and Data Structure

CO No.	Course Outcomes	Cognitive Level
CO-1	Develop simple algorithms and flow charts to solve a problem with programming using top down design principles.	AN
CO-2	Writing efficient and well-structured computer algorithms/programs	R, U
CO-3	Acquire the skill to develop iterative solutions and design array processing algorithms to tackle various problems, considering and adapting to global, national, and local/regional contexts and requirements..	R, U, APP
CO-4	Use recursive techniques, pointers and searching methods in programming.	R, U, APP
CO-5	Will be familiar with fundamental data structures, and their implementation: become accustomed to the description of algorithms in both functional and procedural styles.	AN, U
CO-6	Have knowledge of complexity of basic operations like insert. delete, search on these data structures.	
CO-7	Possess ability to choose a data structure to suitably model any data used in computer applications.	
CO-8	Design programs using various data structures including hash tables. Binary and general search trees, heaps, graphs etc.	
CO-9	Assess efficiency tradeoffs among different data structure implementations	
CO-10	Implement and know the applications of algorithms for searching and sorting	

B.Sc. II Year

Paper-Minor

Object Oriented Programming with Java

CO No.	Course Outcomes	Cognitive Level
CO-1	Understand the basics of computer graphics, different graphics systems and applications of computer graphics	U
CO-2	Discuss various algorithms for scan conversion and filling of basic objects and their comparative analysis	U, APP
CO-3	Use of geometric transformations on graphics objects and their application in composite form.	U, APP, C
CO-4	Extract scene with different clipping methods and its transformation to graphics display device	U, App, C
CO-5	Explore projections and visible surface detection techniques for the display of 3D scenes on a 2D screen.	U, APP
CO-6	Understand the basics of computer graphics, different graphics systems and application of computer graphics	U, APP

B.Sc. II Year

Paper: Major

Computer Networks & Information Security

CO No.	Course Outcomes	Cognitive Level
CO-1	Define and describe the components of a data communication system such asvarious protocols. OSI Model, data transmission in analog and digital format	UN, AN
CO-2	Identify and differentiate among the network devices and drivers	R, U, AN
CO-3	Learn and describe various error detection and correction methods	R, U
CO-4	Describe Various terminologies used in the Network and Application layers.	R, U

Bachelor of Science (B.Sc.) Subject: Chemistry

B.Sc. I SEM

Paper- I: Major/Minor (Fundamentals of Chemistry)

CO No.	Course Outcomes	Cognitive Level
CO-1	Gain a thorough knowledge about various theories and principles applied to reveal atomic structure and quantum number	U, An
CO-2	Understand concepts of periodic properties of elements.	R, App
CO-3	Develop the Acid-Base concept and pH buffer	U,App
CO-4	Gain a thorough knowledge about factors responsible for the reactivity of organic molecules	An, Ev
CO-5	Develop an understanding related to basics and Mechanism of Chemical Kinetic	U, K

Paper- I: Elective (Fundamentals of Chemistry)

CO No.	Course Outcomes	Cognitive Level
CO-1	Gain a thorough knowledge about various theories and principles applied to reveal atomic structure and quantum number	U, An
CO-2	Understand concepts of periodic properties of elements.	R, App
CO-3	Develop the Acid-Base concept and pH buffer	U, App
CO-4	Gain a thorough knowledge about factors responsible for reactivity of organic molecules	An, Ev
CO-5	Develop an understanding related to basics and Mechanism of Chemical Kinetic	U, K

B.Sc. II SEM

Paper- II: Major/Minor/Elective (Analytical Chemistry)

CO No.	Course Outcomes	Cognitive Level
CO-1	Comprehend the fundamental applications of mathematics and computers in the field of chemistry, considering and adapting to global, national, and local/regional needs.	U, R
CO-2	Gain a thorough knowledge about the fundamentals of analytical chemistry and steps involved in analysis.	K, C, An
CO-3	Build the concepts of thermodynamics and chemical equilibrium	App, An
CO-4	Develop an understanding about principle of chromatography and spectroscopy and utilization of chromatographic and spectroscopic techniques in analysis	R, Ev

B.Sc. II Year

Major/Minor/Elective

Paper-1

Paper- I: Reaction, reagent and Mechanism in Organic Chemistry

CO No.	Course Outcomes	Cognitive Level
CO-1	Develop knowledge of various organic reactions, reagents and their mechanism in understanding organic synthesis	App, Ev
CO-2	Gain an understanding of the practical applications of reactions in diverse industries such as pharmaceuticals, polymers, pesticides, textiles, and dyes, tailored to meet global, national, and local/regional needs.	U, App
CO-3	Develop knowledge about important key reactions used in higher studies and research in chemistry	R, Ev
CO-4	Perform various reactions, which will be helpful in understanding organic synthesis.	R, App
CO-5	Understand the use reagents while performing experiments based on certain organic reactions	K, An
CO-6	Analyze and Synthesize some organic compounds	U, App

B.Sc. II Year

Major/Minor/Elective (Theory)

Paper 2: Transition Elements, Energetic, Phase equilibrium

CO No.	Course Outcomes	Cognitive Level
CO-1	Develop an understanding about traditional Indian Chemistry	R, Un
CO-2	Understand the concepts of chemistry of d & f block elements, basic concepts of coordination chemistry.	App, U
CO-3	Explain Stereochemistry of transition metal complexes.	R, An
CO-4	Gain a thorough knowledge about Laws of thermodynamics and thermochemistry	K, Un
CO-5	Develop the concept of phase equilibrium with reference to solid solution, liquid-liquid mixture, partially miscible liquids.	App, C
CO-6	Develop an understanding about basic concepts of electrochemistry, various types of electrodes and their reactions.	Un, C

Bachelor of Computer Application (B. C. A.)

Subject: Computer Application

B.C.A. I Sem

Paper: Elective Data Analysis & Visualization through spreadsheet

CO No.	Course Outcomes	Cognitive Level
CO-1	Prepare a spreadsheet file and enter data into the sheet	AN
CO-2	Illustrate formatting and editing capabilities on the data	R, U
CO-3	Demonstrate basic calculation and save data	R, U, APP
CO-4	Demonstrate basic visualizing, analysing, organizing and sharing techniques	R, U, APP

B.C.A. I Sem

Paper: Major Computer Fundamental Organization and Architecture

CO No.	Course Outcomes	Cognitive Level
CO1	To study basic Gates practical implementation (AND, OR, NOT) and verify their truth tables.	R, U
CO2	Practical implementation NAND as Universal gate using IC 7400.	A, A
CO3	Practical implementation of half and full adder.	C, A, E
CO4	Practical Implementation of Flip-Flop and De-Morgan's Law	C, A, E
CO5	Quiz for understanding various types of memories.	U, A

B.C.A. I Sem

Paper: Minor Programming and Problem Solving through 'C'

CO No.	Course Outcomes	Cognitive Level
CO-1	Identify situations where computational methods and computers would be useful.	R, U
CO-2	Given a computational problem, identify and abstract the programming task involved	R, U
CO-3	Approach the programming tasks using techniques learned and write pseudo code	AP
CO-4	Choose the right data representation formats based on the requirements of the problem	AP
CO-5	Use the comparisons and limitations of the various programming constructs and chooses the right one for the task in hand	AP
CO-6	Write the program on a computer, edit, compile, debug, correct, recompile , and execute it.	AN, C
CO-7	Recognize practical applications where the numerical techniques learned are relevant and employ them to develop programs, effectively utilizing computers to address the task at hand, while considering global, national, and local/regional needs and contexts.	AC, C

B.C.A. II Sem

Paper: Computational Mathematics

CO No.	Course Outcomes	Cognitive Level
CO-1	Implement trigonometric solutions for measurements in real-worldscenarios.	AN
CO-2	Implement. simultaneous & quadratic equations to solve complex problems	R, U
CO-3	Use Mathematical Logic and Predicate calculus for solving problems	R, U, APP
CO-4	Apply the concepts of set theory for finding solutions to set-related problems	R, U, APP

B.C.A. II Sem

Paper: Elective Multimedia and Animation

CO No.	Course Outcomes	Cognitive Level
CO-1	Describe the various elements and aspects of multimedia and animation	AN
CO-2	Understand the role played by various multimedia platform	R, U
CO-3	Learn to add pictures, graphics, sound and animation to prepare a project	R, U, APP
CO-4	Acquire presentation skills and foster creative ideas through the use of multimedia tools, considering and adapting to global, national, and local/regional requirements and contexts	R, U, APP
CO-5	Apply tools and techniques to create basic 2D and 3D animation	AN, U

B.C.A. II Sem

Minor Paper: Operating System

CO No.	Course Outcomes	Cognitive Level
CO-1	Describe the importance of computer system resources and the role of operating system in their management policies and algorithms.	AN
CO-2	Specify the objective of modern operating system and describe how operating systems and describe how operating systems have evolved over time.	R, U
CO-3	Understand various process management concept and can compare various scheduling techniques, synchronization and deadlocks.	R, U, APP
CO-4	Describe the concepts of multithreading and memory management techniques.	R, U, APP
CO-5	Identify the best-suited memory management techniques for any process	AN, U
CO-6	Describe various file operations, file allocation methods and disk space management.	
CO-7	To understand and identify potential threats to operating systems and the security features design to guard against them	

B.C.A. II Sem

Paper: Programming using C++ and Data Structure

CO No.	Course Outcomes	Cognitive Level
CO-1	Develop simple algorithms and flow charts to solve a problem with programming using top-down design principles.	AN
CO-2	Writing efficient and well-structured computer algorithms/programs	R, U
CO-3	Learn to formulate iterative solutions and array processing algorithms for problems.	R, U, APP
CO-4	Use recursive techniques, pointers and searching methods in programming.	R, U, APP
CO-5	Will be familiar with fundamental data structures, their implementation: become accustomed to the description of algorithms in both functional and procedural styles.	AN, U
CO-6	Have knowledge of complexity of basic operations like insert. delete, search on these data structures.	
CO-7	Possess the ability to choose a data structure to suitably model any data used in computer applications.	
CO-8	Design programs using various data structures including hash tables. Binary and general search trees, heaps, graphs etc.	
CO-9	Assess efficiency tradeoffs among different data structure implementations	
CO-10	Implement and know the applications of algorithms for searching and sorting	

B.C.A. II Year Paper: Major

Data Communication and Computer Networks

CO No.	Course Outcomes	Cognitive Level
CO-1	Demonstrate the Basic Concepts of Networking, Networking Principles, RoutingAlgorithms, IP Addressing and working of Networking Devices.	AN
CO-2	Demonstrate the significance, purpose and application of Networking protocolsand Standards.	R, U
CO-3	Describe, compare and contrast LAN, WAN, MAN, Intranet, Internet, AM, FM, PM and Various Switching Techniques.	R, U
CO-4	Explain the working of Layers and apply the various protocols of OSI & TCP/IP model.	R, U
CO-5	Analyze the Requirement for a given Organizational structure and select the most appropriate Networking Architecture and Technologies.	AN, U
CO-6	Design the Network Diagram and solve the Networking problems of the The organization with consideration of Human and the Environment install andconfigure the network devices	AN, U, APP

Paper: Minor

Internet Applications using Java Programming

CO No.	Course Outcomes	Cognitive Level
CO-1	Use an integrated development environment to write, compile, run, andtest simple object-oriented Java programs.	AN
CO-2	Read and make elementary modifications to Java programs that solve real-world problems.	R, U
CO-3	Validate input in a Java program.	R, U
CO-4	Design and use basic applet for web page	R, U, APP

B.C.A. II Year

Paper: Minor Data Base Management System

CO No.	Course Outcomes	Cognitive Level
CO-1	Explain the features of database management systems and relationaldatabases.	AN
CO-2	Design conceptual models of a database using ER modeling for real-life applications and construct queries in relational algebra.	R, U
CO-3	Create and populate an RDBMS for a real-life application, with constraints and keys, using SQL.	R, U
CO-4	Retrieve any type of information from a database by formulating complex.	R, U,

	queries in SQL	APP
CO-5	Analyse the existing design of a database schema and apply concepts of normalization to design an optimal database.	AN, U

B.C.A. II Year Paper: Elective

Internet of Things (IOTs)

CO No.	Course Outcomes	Cognitive Level
CO-1	To understand the basics of the Internet of Things	AN
CO-2	To get an idea of some of the application areas where the Internet of Things canbe applied.	R, U
CO-3	To understand the middleware for the Internet of Things and the concepts of the Web of Things.	R, U
CO-4	To understand the concepts of the Cloud of Things with an emphasis on Mobile cloud computing.	R, U, APP
CO-5	To understand the IOT protocols.	AN, U