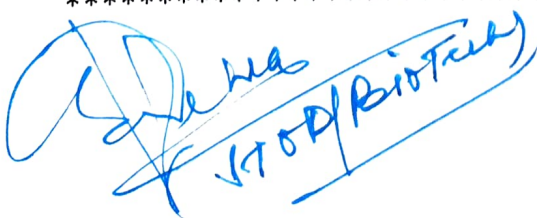


Department of Biotechnology Govt College, Hisar

Programme Outcome

- Comprehensive understanding of the principles and practices of biotechnology which will make them able to work in the areas of research and development.
- To empower the graduates with the ability to think and solve problems in the field of biotechnology.
- Well trained graduates will be able to work in medical laboratories, fermentation industries, pharmaceuticals, food and feed industries, agri. seed production companies in the capacity of analysts, development managers, R & D experts, quality control managers etc.
- Biotech graduates will have the updated current scientific knowledge, well versed with computer programs and web information which will enable them to take online projects in the field of bioinformatics.
- Graduates will be well trained in scientific communication skills so that they can effectively communicate with biotech and other interdisciplinary professionals.
- Graduates with updated knowledge of various disciplines of biotechnology will make good teachers for teaching biotechnology, molecular biology, cell biology, genetics etc at school level education system.

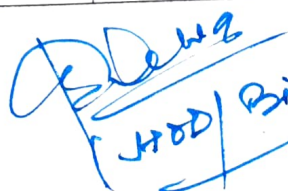

S/O P/BioTech

Department of Biotechnology

Govt College, Hisar

Learning outcome

Course code	Paper	Nomenclature	Learning outcome
BIT 101 L	Core course – Biotechnology Paper I	Introduction to Biotechnology	To provide education that leads to comprehensive understanding of the principles and practices of biotechnology and to ensure students are able to effectively communicate with biotech and other interdisciplinary professionals.
BIT 102 L	Core course - Biotechnology Paper II	Biochemistry – I	To understand the chemistry of life and structure and functions of Biomolecules
BIT 103 P	Core Course – Practical- Paper III	Laboratory Practical- Paper III (Biochemistry)	Students will be able to perform various qualitative and quantitative biochemical experiments and instrumentation
BIT201 L	Core course- Biotechnology Paper IV	General Microbiology	Microbiology students will be able to: Describe how microorganisms are used as model systems to study basic biology, genetics, metabolism and ecology.
BIT 202 L	Core Course- Biotechnology Paper V	Biochemistry – II	Students will be able to understand chemical aspects of biological processes and basic principles of metabolism
BIT 203 P	Core Course- Biotechnology Paper VI Practical/Tutorial	Laboratory Practical- Paper VI (Microbiology)	To give an insight and advanced learning of microbiology and application of microbes in research development in various field.
BIT301 L	Core course- Biotechnology Paper VII	Molecular Biology	To provide a clear understanding of the facts and basic concepts of molecular biology that deals with the molecular mechanisms of biological processes.
BIT302 L	Core Course- Biotechnology Paper VIII	Bio-analytical techniques	To provide scientific understanding of the principle and applications of various instruments. To impart the theoretical knowledge about various


 HOD (Biotech)

			analytical techniques used in biotechnology.
BIT 303 P	Core Course- Biotechnology Paper IX Practical/Tutorial	Laboratory Practical- Paper IX (Molecular Biology & Bio- analytical techniques)	To develop the practical skills of molecular biology and bio-analytical techniques, working of instruments and detailed interpretation of results
BIT 401 L	Core course - Biotechnology Paper X	Immunology	To provide students with a basic understanding of the immune system and its components, the defense mechanisms that can establish a state of immunity against infection, and Immune-related diseases.
BIT 402 L	Core course - Biotechnology Paper XI	Recombinant DNA Technology	To provide the students with scientific understanding of the concepts and processes of genetic engineering. To expose the students to the applications of recombinant DNA technology in biotechnological research and life sciences.
BIT 403 P	Core Course - Practical- Paper XII	Laboratory Practical- Paper XII (Immunology & Recombinant DNA Technology)	To familiarize the students with and give them hands on training for various techniques of immunology and recombinant DNA technology.
BIT 501 L	Discipline Specific Elective - Biotechnology Paper I	Plant biotechnology	Understanding the concepts and principles of Plant tissue culture. Learning the techniques of sterilization and monitoring method of sterilization.
BIT 502 L	Discipline Specific Elective - Biotechnology Paper II	Microbial biotechnology	Students will be able to demonstrate a familiarity with the wide diversity of microbes, and their potential for use in microbial biotechnology. be able to demonstrate a knowledge of microbial gene and genome structure and function, and how these can be manipulated.
BIT 503 P	Laboratory Practical Biotechnology Paper III	Laboratory Practical- Paper II (Plant Biotechnology & Microbial Biotechnology)	To make students aware of basic techniques of handling microbes and plants and to learn the use of plants and microbes for human welfare
BIT 601 L	Discipline	Animal	Be able to describe the structure of

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HOD (Biotech)

	Specific Elective -Biotechnology Paper IV	biotechnology	animal genes and genomes. Be able to describe how genes are expressed and what regulatory mechanisms contribute to control of gene expression. Be able to describe basic principles and techniques in genetic manipulation and genetic engineering.
BIT 602L	Discipline Specific Elective -Biotechnology Paper-V	Bioinformatics	This course gives knowledge and awareness of the basic principles and concepts of biology, computer science and mathematics. Students will learn about existing software and to extract information from large databases and to use this information in computer modeling.
BIT 603 P	Laboratory Practical Biotechnology Paper VI	Laboratory Practical- Paper VI (Animal Biotechnology & Bioinformatics)	Students will be able to learn the practical aspects of implementing bioinformatics analyses, evaluating approaches to analyzing large biological data sets In Animal Biotechnology, students learn how to prepare and sterilize media. They learn how to culture Animal Cells in the laboratory. Students understand how transgenic animals can be produced.
BIT 604L	Skill Enhancement Course Biotechnology Paper-I	Molecular Diagnostics (604 L)	The main purpose of the course in "Molecular Diagnostic Techniques" is to make the student familiar to the procedures used in a Laboratory of Molecular Diagnostics. The course will describe the techniques commonly used in diagnostics and molecular pathology laboratories and the underlying principles and applications, advantages and limitations of each technique.
BIT605L	Skill Enhancement Course Biotechnology Paper-I	Basics in Forensic Science (605L)	This course will demonstrate knowledge and understanding of some of the links between forensic science and the legal system and also demonstrate an understanding of how forensic scientists operate and use scientific evidence in a legal context.

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BIT606P	Skill Enhancement Course Biotechnology Paper-I	Project Work (606P)	Develop an ability to solve, analyze and interpret data generated from experiments done in project work. Appreciate and execute their professional roles in society as biotechnology professionals, employers and employees in various industries, regulators, researchers, educators and managers
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(HOD/Biotech)



GOVT. COLLEGE, HISAR

"NAAC Accredited in the Third Cycle"

PROGRAM OUTCOMES OF B.Sc. Chemistry

Programme	Objective of Program/ Outcome expected (Minimum 4 outcomes)
B.Sc. Chemistry	To educate the students about the various concepts related to atomic structure, Chemical Bonding and study of 3d elements, inner transition elements, organometallic chemistry and role of metal ions in biological system.
	To acquaint the students with Basic Organic Chemistry of aliphatic and aromatic, saturated, unsaturated hydrocarbons and their derivatives, stereochemistry and UV and IR spectroscopy of organic Compound.
	To provide an insight about the various concepts related to gaseous, liquid and solid state, thermodynamic and electrochemical concepts.
	To provide laboratory experience to the students by performing volumetric analysis, gravimetric analysis, pHmetry, Conductometry, calorimetry, phase equilibrium, kinetics, inorganic mixture and organic compounds analysis and experiments based on characterization, synthesis and purification of organic and inorganic compounds.

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HOD Chemistry

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Principal



COURSE OUTCOMES OF B.Sc. CHEMISTRY

SEM - I	CH-104	<p>Students will have firm foundation in the model, theory and principles of atomic structure with some basics of Quantum mechanism.</p> <p>Understanding of quantum numbers and Electronic configurations of the atoms. General characteristics of ionic bonding, Born-Landé equation for calculation of lattice energy, Born-Haber cycle and its applications, Fajan's rules. Shapes of some inorganic molecules and ions on the basis of VSEPR and hybridization, Concept of resonance and resonating structures in various inorganic and organic compounds. Bonding and antibonding MOs and MO treatment of homonuclear diatomic molecules.</p>
SEM - I	CCL-105	<p>The students will be able to differentiate between inductive, mesomeric and resonance effect along with bond fission. They will also develop an understanding of carbocations, carbanions and free radicals, Conformations with respect to ethane, butane and cyclohexane. Concept of chirality (upto two carbon atoms), Configuration: Geometrical and Optical isomerism. Basic concept, preparations and chemical reactions of alkanes, alkenes and alkynes.</p>
SEM - I	CCP-109	<p>The students will acquire the knowledge of Volumetric Analysis, Detection of extra elements and Separation of mixtures by Chromatography.</p>
SEM II	CCL-204	<p>The students will be able to understand the terms and laws involved in chemical thermodynamics along with the concept of Thermochemistry. Free energy change in a chemical reaction, Thermodynamic derivation of the law of chemical equilibrium and Le Chatelier's principle. They will understand the concept of Solubility, Solubility product of Salts, Salt hydrolysis, Buffer solutions, pH scale and common ion effect.</p> <p>Students will be skilled in problem solving and critical thinking.</p>
SEM II	CCL-205	<p>Students understand the basic chemistry of Aromatic hydrocarbons, their preparation and Electrophilic substitution reactions: nitration, halogenation and sulphonation, Friedel-Craft's reaction (alkylation and acylation), the basic chemistry of Alkyl and Aryl Halides, Alcohols, Phenols and Ethers, Aldehydes and ketones</p>



GOVT. COLLEGE, HISAR

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		(aliphatic and aromatic) along with the mechanism of different reactions.
SEM II	CCP-209	The students will acquire the knowledge of thermochemistry, measurement of pH of different solutions, purification of organic compounds by crystallization, Criteria of purity and preparation of organic compounds.
SEM - III	CCL-304	Student gain knowledge about various concepts related to Ideal solutions, Raoult's law, Azeotropes, Colligative properties of solutions and Critical solution temperature.
		Student will understand the concept of Phases, components and degrees of freedom of a system, Gibbs Phase Rule and its thermodynamic derivation, Phase diagrams of one-component systems and two component systems.
		Students should gain the knowledge of Conductivity, equivalent and molar conductivity, Kohlrausch law of independent migration of ions, Transference number, ionic mobility, solubility and solubility products of sparingly soluble salts, ionic product of water, hydrolysis constant of a salt. Understand the concept of pH and pKa, buffer solution, buffer action, Handerson Hazel Blac equation.
		To understand Reversible and irreversible cells, concept of EMF of a cell, Measurement of EMF, Nernst equation and its importance, types of electrodes and Electrochemical series.
SEM - III	CCL-305	Gain the knowledge of preparation, reaction, basic chemistry, and application of carboxylic acid and their derivatives, amines and diazonium salts, Amino Acids, Peptides and Proteins and Carbohydrates.
SEM -III	CCP-309	Students learn about principle, instrumentation, end point determination and applications of different techniques like potentiometry, conductometry and Phase equilibria, Qualitative Organic Analysis of Organic Compounds possessing monofunctional groups
SEM IV	CCL - 404	Learners will get insight into 4f and 5f inner transition elements, crystal field theory, crystal field stabilization energy and crystal field splitting, John - Teller Distortions.
		Students should learn about co-ordination compounds and various terms related to it. Inner and outer orbital complexes of Cr, Fe, Co, Ni and Cu (coordination numbers 4 and 6)



GOVT. COLLEGE, HISAR

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		Students will gain knowledge of transition elements and properties related to it like colour, magnetic properties, Latimer Diagram etc.
SEM IV	CCL - 405	<p>Students understand the importance of chemical kinetics to determine the rate of reaction and the mechanism by which the reaction takes place. They understand the difference between order and molecularity and derive integrated rate equations for first and second order reactions.</p> <p>Students learn the concept of physical measurements like surface tension, viscosity of liquids and their usefulness in elucidating composition and the structure of molecules.</p> <p>To understand crystal lattice structure of solids and try to imagine the various structures and forms of solids</p> <p>They understand the concept of kinetic gas equation, van der Waals equation of state for real gases. Boyle temperature, Critical phenomena, Maxwell Boltzmann distribution laws of molecular velocities and molecular energies (graphic representation – derivation not required)</p>
SEM IV	CCP – 409	The student will be able to understand about theoretical and practical concepts of complexometric titrations, gravimetry, Surface tension, viscosity, chemical kinetics and qualitative analysis of inorganic salts.
SEM V	CCL – 503 (ii)	<p>To understand the different concept of Acids and Bases: Bronsted–Lowry concept, Lewis acid-base concept, Lux-Flood concept and solvent system concept, Hard and soft acids and bases (HSAB concepts).</p> <p>To understand the General Principles of Metallurgy, Ellingham diagrams for reduction of metal oxides and methods of purification of metals.</p> <p>Students understand the concept of Periodicity in s- and p-block elements, General characteristics, and oxidation states of s- and p-block elements, inert-pair effect, diagonal relationships and anomalous behaviour of first member of each group, Allotropy in C, P and S, Complex forming tendency of s block elements and a preliminary idea of crown ethers and cryptates.</p>
SEM V	CCL – 504 (ii)	Students understand the structure, bonding and properties of Diborane, hydrides of Groups 13, 14, 15, 16 and 17 and their applications in industrial and environmental chemistry, Oxides of N and P, Oxoacids of P, S and Cl., Halides and



GOVT. COLLEGE, HISAR

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		<p>oxohalides of P and S (PCl_3, PCl_5, SOCl_2 and SO_2Cl_2) Interhalogen compounds and a brief idea of pseudohalides.</p> <p>To understand the concept of Noble gases, clathrates, preparation, properties and structure of XeF_2, XeF_4 and XeF_6, Student will get familiar with different types of inorganic polymers and understand the structural features, classification and important applications of silicates, silicones, Borazines and cyclophosphazenes.</p>
SEM V	CCL – 504 (ii)	Students will get knowledge about iodometric titrations, gravimetric estimation and preparation of various co-ordination compounds and double salts.
SEM V	CCS-505(ii)	Student gets information about classification of fuel, their uses, composition, carbonization, Coal liquefaction and Solvent Refining. They get detailed information regarding Petroleum, Petrochemical Industry and lubricants.
SEM VI	CCL-603(i)	<p>Students will study about the Chemistry of 3d metal, including preparation and important properties of their compounds.</p> <p>They will learn the concept of Organometallic Compounds their Classification, EAN rule and Preparation, structure, bonding and properties of mononuclear and polynuclear carbonyls.</p> <p>The students will get knowledge about role of various metal ions present in biological systems.</p>
SEM VI	CCL-604(i)	<p>Students learn about preparation, properties and structure of Polynuclear and heteronuclear aromatic compounds.</p> <p>To learn about the basic concepts and application of visible, ultraviolet and infrared spectroscopy in organic molecules.</p>
SEM VI	CCP – 609 (i)	Students will get practical knowledge of chromatographic techniques of inorganic ions and conductivity measurements of inorganic salts

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Chemistry

Principal




PROGRAM OUTCOMES OF B.Sc. Chemistry

Programme	Objective of Program/ Outcome expected (Minimum 4 outcomes)
B.Sc. Chemistry	To educate the students about the various concepts related to atomic structure, Chemical Bonding and study of 3d elements, inner transition elements, organometallic chemistry and role of metal ions in biological system.
	To acquaint the students with Basic Organic Chemistry of aliphatic and aromatic, saturated, unsaturated hydrocarbons and their derivatives, stereochemistry and UV and IR spectroscopy of organic Compound.
	To provide an insight about the various concepts related to gaseous, liquid and solid state, thermodynamic and electrochemical concepts.
	To provide laboratory experience to the students by performing volumetric analysis, gravimetric analysis, pHmetry, Conductometry, calorimetry, phase equilibrium, kinetics, inorganic mixture and organic compounds analysis and experiments based on characterization, synthesis and purification of organic and inorganic compounds.

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HOD Chemistry


Principal



COURSE OUTCOMES OF B.Sc. CHEMISTRY

SEM - I	CH-104	Students will have firm foundation in the model, theory and principles of atomic structure with some basics of Quantum mechanism. Understanding of quantum numbers and Electronic configurations of the atoms. General characteristics of ionic bonding, Born-Landé equation for calculation of lattice energy, Born-Haber cycle and its applications, Fajan's rules. Shapes of some inorganic molecules and ions on the basis of VSEPR and hybridization, Concept of resonance and resonating structures in various inorganic and organic compounds. Bonding and antibonding MOs and MO treatment of homonuclear diatomic molecules.
SEM - I	CCL-105	The students will be able to differentiate between inductive, mesomeric and resonance effect along with bond fission. They will also develop an understanding of carbocations, carbanions and free radicals, Conformations with respect to ethane, butane and cyclohexane. Concept of chirality (upto two carbon atoms), Configuration: Geometrical and Optical isomerism. Basic concept, preparations and chemical reactions of alkanes, alkenes and alkynes.
SEM - I	CCP-109	The students will acquire the knowledge of Volumetric Analysis, Detection of extra elements and Separation of mixtures by Chromatography.
SEM II	CCL-204	The students will be able to understand the terms and laws involved in chemical thermodynamics along with the concept of Thermochemistry. Free energy change in a chemical reaction, Thermodynamic derivation of the law of chemical equilibrium and Le Chatelier's principle. They will understand the concept of Solubility, Solubility product of Salts, Salt hydrolysis, Buffer solutions, pH scale and common ion effect. Students will be skilled in problem solving and critical thinking.
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GOVT. COLLEGE, HISAR

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		(aliphatic and aromatic) along with the mechanism of different reactions.
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		Student will understand the concept of Phases, components and degrees of freedom of a system, Gibbs Phase Rule and its thermodynamic derivation, Phase diagrams of one-component systems and two component systems.
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		To understand Reversible and irreversible cells, concept of EMF of a cell, Measurement of EMF, Nernst equation and its importance, types of electrodes and Electrochemical series.
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SEM IV	CCL - 404	Learners will get insight into 4f and 5f inner transition elements, crystal field theory, crystal field stabilization energy and crystal field splitting, John - Teller Distortions.
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GOVT. COLLEGE, HISAR

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		Students will gain knowledge of transition elements and properties related to it like colour, magnetic properties, Latimer Diagram etc.
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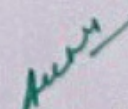


GOVT. COLLEGE, HISAR

"NAAC Accredited in the Third Cycle"

		oxohalides of P and S (PCl_3 , PCl_5 , $SOCl_2$ and SO_2Cl_2) Interhalogen compounds and a brief idea of pseudohalides. To understand the concept of Noble gases, clathrates, preparation, properties and structure of XeF_2 , XeF_4 and XeF_6 , Student will get familiar with different types of inorganic polymers and understand the structural features, classification and important applications of silicates, silicones, Borazines and cyclophosphazenes.
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SEM VI	CCL-604(i)	Students learn about preparation, properties and structure of Polynuclear and heteronuclear aromatic compounds. To learn about the basic concepts and application of visible, ultraviolet and infrared spectroscopy in organic molecules.
SEM VI	CCP – 609 (i)	Students will get practical knowledge of chromatographic techniques of inorganic ions and conductivity measurements of inorganic salts

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H.O.D.
Chemistry


Principal



GOVT. COLLEGE, HISAR

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PROGRAM OUTCOMES OF B.Sc. Physics

Programme	Objective of Program/ Outcome expected (Minimum 4 outcomes)
B.Sc. Physics	To educate the students about Newton's laws and understand their applications
	To educate the students about quantum theory and quantum mechanics
	To provide an insight into the structure of crystals and understand their properties through solid state crystallography
	To expose the students to the role of physics in inter-disciplinary areas and inculcate a knack to take up research in the field of Physics

HOD Physics

Principal

PROGRAM OUTCOMES OF B.Sc. Computer Application

Programme	Objective of Program/ Outcome expected (Minimum 4 outcomes)
B.Sc. Computer Application	To provide specialization in Management with technical, professional and communications skills.
	To train future industry professionals.
	To impart comprehensive knowledge with equal emphasis on theory and practice.
	To keep the students up-to-speed on all the latest and cutting edge technologies.


H.O.D.


PRINCIPAL

PROGRAM OUTCOMES OF B.Sc. (Computer Science)

Programme	Objective of Program/ Outcome expected (Minimum 4 outcomes)
B.Sc. Comp Sc	To equip the students with the knowledge of programming, project management, information security, internet applications, systems analysis etc.
	To enable the students to understand database concepts and database management systems
	To enable the students to analyze and develop a real database system
	To enable students to develop applications




H.O.D.



PRINCIPAL

PROGRAM OUTCOMES OF M.Sc. Computer Science

Programme	Objective of Program/ Outcome expected (Minimum 4 outcomes)
M.Sc. Computer Science	Provides technology-oriented students with the knowledge and ability to develop creative solutions.
	Develop skills to learn new technology.
	Apply computer science theory and software development concepts to construct computing-based solutions.
	Design and develop computer programs/computer-based systems in the areas related to algorithms, networking, web design, cloud computing, Artificial Intelligence, Mobile applications.


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PRINCIPAL

Course Outcome of B.Sc. Computer Science

Semester - I	CCsl-104 Fundamentals of Computers	<p>1. Understanding the concept of input and output devices of Computers Learn the functional units and classify types of computers, how they process information and how individual computers interact with other computing systems and devices.</p> <p>2. Understand an operating system and its working, and solve common problems related to operating systems Learn basic word processi</p>
	CCsl-105 Programming in 'C'	<p>1. Student should be able to understand the logic building used in Programming. Students should be able to write algorithms for solving various real life problems</p>
		<p>2. To convert algorithms into programs using C</p>
Semester- II	CCsl-204 Data Structure using 'C'	<p>1. Data Structure is a technique to manage data so that data can access in easy and efficient way .For that Data structure is basic mathematical tools and techniques of algorithm analysis.</p>
		<p>2. It also increase the skill of student in to develop the ability to choose the appropriate data structure for designing efficient algorithms and that will leads to understand importance of data structures in context of writing efficient programs</p>
	CCsl-205 Computer Organisation	<p>1. Understand the theory and architecture of central processing unit.</p> <p>2. Use appropriate tools to design verify and test the CPU architecture. Learn the concepts of parallel processing, pipelining and interprocessor communication.</p>
Semester - III	CCsl-304 DBMS	<p>1 Demonstrate the basic elements of a relational database management system. Identify the data models for relevant problems.</p>

		<p>2. Design entity relationship and convert entity relationship diagrams into RDBMS and formulate SQL queries on the respect data into RDBMS and formulate SQL queries on the data. Extend normalization for the development of application software's.</p> <p>3. Demonstrate their understanding of key notions of query evaluation and optimization techniques.</p>
	CCsL-305 Operating System	<p>1.To understand Complexity of Operating system as a software</p> <p>2.To understand design issues related to process management and various related algorithms</p> <p>3.To develop and analyze simple concurrent programs using transactional memory and message passing, and to understand the trade-offs and implementation decisions</p>
Semester - IV	CCsL-404 Software Engineering	<p>1. Design documentation, pseudo codes, detailed logic diagrams, process diagrams, and detailed description of all functional or non-functional requirements in Software Engg.</p>
		<p>2. Deals with the design, development, testing, and maintenance of software applications</p>
		<p>3. Software engineers apply engineering principles and knowledge of programming languages to build software solutions for end users.</p>
	CCsL-405 Computer Networks	<p>1. Gain valuable skills in computer networks (switching, routing), system and network administration, computer and network security, operating systems, web programming, databases, and project management.</p> <p>2. Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.</p>

Semester - V	CCsL-503 Object Oriented Programming Using C++	<p>Knowledge gained:</p> <ul style="list-style-type: none"> • an ability to incorporate exception handling in object-oriented programs • an ability to use template classes and the STL library in C++ • an understanding of the concepts of OOPs including inheritance and polymorphism • an ability to overload operators in C++ • an understanding of the difference between function overloading and function overriding <p>Skills gained:</p> <ul style="list-style-type: none"> • Logical thinking • C++ Programming
		<p>Competency developed:</p> <ul style="list-style-type: none"> • Ability to write object-oriented programs of moderate complexity in C++ • Developing real world application using C++
	CCsL-504 Data Analytics	<ol style="list-style-type: none"> 1. Formulate and use appropriate models of data analysis to solve hidden solutions to business-related challenges 2. Analyze and interpret data using an ethically responsible approach
	CCsL-505 Cloud Computing	<p>Knowledge gained:</p> <ul style="list-style-type: none"> • To understand the principles and paradigm of Cloud Computing • Ability to design and deploy Cloud Infrastructure • Understand cloud security issues and solutions • Analyze the virtualization and cloud

		<p>computing concepts.</p> <ul style="list-style-type: none"> Learn the architecture, deployment models, and infrastructure models of Cloud Computing. <p>Skills gained:</p> <ul style="list-style-type: none"> Ability to understand role of Virtualization Technologies <p>Demonstrate knowledge on the cloud computing security, federation, presence, identity, and privacy</p>
Semester - VI	CCsL-603 Computer Graphics	<p>Knowledge gained:</p> <ul style="list-style-type: none"> Learn the concepts of projections, viewing and graphics pipeline <p>Skills gained:</p> <ul style="list-style-type: none"> Develop line and circle generation algorithms
		<p>Competency developed:</p> <ul style="list-style-type: none"> Apply 2D and 3D transformations <p>Develop clipping algorithms for point, line and polygons</p>
	CCsL-604 Python Programming	<p>1. Interpret the fundamental Python syntax and semantics and be fluent in the use of Python control flow statements. Express proficiency in the handling of strings and functions.</p> <p>2. Determine the methods to create and manipulate Python programs by utilizing the data structures like lists, dictionaries, tuples and sets. Articulate the Object-Oriented Programming concepts such as encapsulation, inheritance and polymorphism as used in Python.</p>

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PRINCIPAL

Course Outcome of M.Sc. (Computer Science)

	MCS-11 DBMS	1. Describe the fundamental elements of relational database management systems. Explain the basic concepts of relational data model, entity-relationship model, relational database design, relational algebra and SQL. .
		2. Design ER-models to represent simple database application scenarios • Convert the ER-model to relational tables, populate relational database and formulate SQL queries on data
		3. Improve the database design by normalization
Semester - 1	MCS-12 OOPS USING C++	<p>Knowledge gained:</p> <ul style="list-style-type: none"> • an ability to incorporate exception handling in object-oriented programs • an ability to use template classes and the STL library in C++ • an understanding of the concepts of OOPs including inheritance and polymorphism • an ability to overload operators in C++ • an understanding of the difference between function overloading and function overriding <p>Skills gained:</p> <ul style="list-style-type: none"> • Logical thinking • C++ Programming
	MCS-13 Discrete Mathematics	<p>Knowledge gained:</p> <ul style="list-style-type: none"> • basics of Combinations and Permutations • relations matrices and graphs. <p>Skills gained:</p> <ul style="list-style-type: none"> • Mathematical and logical thinking towards a real world problem solving • Mathematical modelling of real world

		<p>problems Demonstrate the working of Grammars and Languages</p> <p>Competency developed:</p> <ul style="list-style-type: none"> • Comprehend and evaluate mathematical arguments revolving around • Computation • Apply the knowledge on Graphs and Trees to real world applications
	MCS-14 Computer Organisation and Architecture	<p>Understand the basics of instructions sets and their impact on processor design. Demonstrate an understanding of the design of the functional units of a digital computer system. Evaluate cost performance and design trade-offs in designing and constructing a computer processor including memory. Manipulate representations of numbers stored in digital computers</p>
	MCS-15 Computer Networks	<p>1: Analyze the requirements for a given organizational structure and select the most appropriate networking architecture and technologies.</p> <p>2: Have a basic knowledge of the use of cryptography and network security.</p> <p>3: Specify and identify deficiencies in existing protocols, and then go onto formulate new and better protocols.</p> <p>4: Analyze, specify and design the topological and routing strategies for an IP based networking infrastructure</p> <p>5: Have a working knowledge of datagram and internet socket programming.</p>
Semester- II	MCS-21 Data Structure and Algorithms	<p>Assess how the choice of data structures and algorithm design methods impacts the performance of programs. Choose the appropriate data structure and algorithm design method for a specified application. Write programs using object-oriented design principles.</p>
	MCS-22 Java Programming	<p>1. Java Programming is used to design and program stand-alone Java applications.</p>

	<p>2.Used to learn how to design a graphical user interface (GUI) with Java Swing.</p> <p>3.The Java programming language originated as part of a research project to develop advanced software for a wide variety of network devices and embedded systems.</p> <p>4.The main goal of java is to develop a small, reliable, portable, distributed, real-time operating platform</p>
<p>MCS-23 Operating System Concepts</p>	<p>Knowledge gained:</p> <ul style="list-style-type: none"> • To understand Complexity of Operating system as a software • To understand design issues related to process management and various related algorithms • To understand design issues related to memory management and various related algorithms • Allocate Main Memory based on various memory management techniques • Compare Memory allocation using Best fit, Worst fit, and first fit policies • Apply page replacement policies for dynamic memory management • Schedule CPU time using scheduling algorithm for processors • Compare various device scheduling algorithms <p>Skills gained:</p> <ul style="list-style-type: none"> • To evaluate, and compare OS components through instrumentation for performance analysis. • To analyze the various device and resource management techniques for

	<p>timesharing and distributed systems</p> <p>Competency developed:</p> <ul style="list-style-type: none"> • To design and understand the following OS components: System calls, Schedulers, Memory management systems, Virtual Memory and Paging systems • To develop and analyze simple concurrent programs using transactional memory and message passing, and to understand the trade-offs and implementation decisions
MCS-24 Computer Graphics	<p>Knowledge gained:</p> <ul style="list-style-type: none"> • Learn the concepts of projections, viewing and graphics pipeline <p>Skills gained:</p> <ul style="list-style-type: none"> • Develop line and circle generation algorithms <p>Competency developed:</p> <ul style="list-style-type: none"> • Apply 2D and 3D transformations • Develop clipping algorithms for point, line and polygons
MCS-25 Theory of Computations	<ul style="list-style-type: none"> • Will apply knowledge of computing and mathematics appropriate to the discipline • Learn about Automata theory and its application in Language Design • Learn about Turing Machines and Pushdown Automata and understand Linear Bound Automata and its applications • Discuss key notions of computation, such as algorithm, computability, decidability, reducibility, and complexity, through problem solving • Solve computational problems regarding their computability and complexity and prove the basic results

		of the theory of computation
Semester - III	MCS-31 Artificial Intelligence	Develop systems that process unstructured, uncurated data automatically using artificial intelligence (AI) frameworks and platforms. Determine the framework in which AI bots may function, including interactions with users and environments. Design and implement cognitive automation for different industries.
	MCS-32 Python Programming	<p>Knowledge gained:</p> <ul style="list-style-type: none"> • To understand why Python is a useful scripting language for developers. • To learn how to use lists, tuples, and dictionaries in Python programs. • To learn how to identify Python object types. • To learn how to use indexing and slicing to access data in Python programs. • To define the structure and components of a Python program. • To learn how to write loops and decision statements in Python. • To learn how to write functions and pass arguments in Python. • To learn how to build and package Python modules for reusability. • To learn how to read and write files in Python. • To learn how to design object-oriented programs with Python classes. • To learn how to use class inheritance in Python for reusability. • To learn how to use exception handling in Python applications for error handling. • To acquire programming skills in core Python. • To acquire Object Oriented Skills in Python

		<p>Skills gained:</p> <ul style="list-style-type: none"> To learn how to design and program Python applications. <p>Competency developed:</p> <ul style="list-style-type: none"> To develop the ability to write database applications in Python To develop the skill of designing Graphical user Interfaces in Python
	MCS-33 Software Engineering	Software Engineering Outcomes. Graduates of the program are expected to demonstrate: an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
	MCS-34 ADBMS	Understand the basic principles of database management systems. Draw Entity-Relationship diagrams to represent simple database application scenarios write SQL queries for a given context in relational database. Discuss normalization techniques with simple examples. Describe transaction processing and concurrency control concepts.
	MCS-35 High Speed Networks	<ul style="list-style-type: none"> Compare and analyse the fundamental principles of various high speed communication networks and their protocol architectures Analyse the methods adopted for performance modeling of traffic flow and estimation Examine the congestion control issues and traffic management in tcp/ip and atm networks Compare, analyse and implement the various routing protocols in simulation software tools Examine the various services
Semester - IV	MCS-41 IOT and Cloud Computing	<ul style="list-style-type: none"> 1 Here students will learn use of cloud services provided by multiple vendors.

	<ul style="list-style-type: none"> • 2. This course gives students an insight into the basics of cloud computing along with virtualization,
	<ul style="list-style-type: none"> • 3. It will provide the students basic understanding about cloud and virtualization along with it how one can migrate over it.
	<ul style="list-style-type: none"> • 4. cloud computing is the delivery of computing services—including servers, storage, databases, networking, software, analytics, and intelligence
<p>MCS-42 Data Warehouse and data Mining</p>	<p>1. Be familiar with mathematical foundations of data mining tools. Understand and implement classical models and algorithms in data warehouses and data mining.</p>
	<p>2. Characterize the kinds of patterns that can be discovered by association rule mining, classification and clustering. Master data mining techniques in various applications like social, scientific and environmental context.</p>
	<p>3. Develop skill in selecting the appropriate data mining algorithm for solving practical problems.</p>
<p>MCS-43 Web Development</p>	<ul style="list-style-type: none"> • To introduce the fundamentals of Internet, and the principles of web design. • To construct basic websites using HTML and Cascading Style Sheets. • To build dynamic web pages with validation using Java Script objects and by applying different event handling mechanisms. • To develop modern interactive web applications using PHP, XML and MySQL

MCS-44 Cyber Security

To prepare students with the technical knowledge and skills needed to protect and defend computer systems and networks. To develop graduates that can plan, implement, and monitor cyber security mechanisms to help ensure the protection of information technology assets.

MCS-45(iii) Mobile Application Development

Knowledge gained:

- Pass data between fragments
- To gain knowledge of installing Android Studio and Cross Platform Integrated Development Environment.
- An ability to use the techniques, skills, and modern technology.

Skills gained:

- Debug android apps and create UI fragments
- Create database and communicate with mobile apps

Competency developed:

- Design apps with audio play back.
- To develop the different applications that mobile computing offers to people, employees, and businesses
- To develop high levels of technical competence in the field of mobile technology.


H.O.D.


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Course Outcome of B.Sc. Computer Application

Semester - I	CCaL-105	1. Learn MSword Learn MS Power point Know MS Excel
		2. To introduce the poetry composition of poets in Hindi
		3. To expose the students art of translation and letter writing.
		4. To enhance the hindi language of the students by tracing in Hindi.
Semester - II	CCaL-204 Information Technology	1. To aware them about basic of computer and its evolution. Provide knowledge of different units of computer like processing unit, IO unit, and storage unit.
		2. How to operate windows OS and its features. DOS OS and its internal and external commands.
	CCsl-205 Programming in C	1.. The learning objective in a computer programming Languages Like C or High Level Programming Languages is to help students improve their understanding and skills in programming and also guide them how the computer program actually works to solve the user's problems.
		2. The programming skill also develops computational thinking skills throughout the educational process.
Semester - III	CCal-304 Web Development	1 Demonstrate the basic elements of a relational database management system. Identify the data models for relevant problems.
		2. Design entity relationship and convert entity relationship diagrams into RDBMS and formulate SQL queries on the respect data into RDBMS and formulate SQL queries on the data. Extend normalization for the development of application software's.
		3. Demonstrate their understanding of key notions of query evaluation and optimization techniques.

	CCaL-305 Operating System	<p>1.To understand Complexity of Operating system as a software</p> <p>2.To understand design issues related to process management and various related algorithms</p> <p>3.To develop and analyze simple concurrent programs using transactional memory and message passing, and to understand the trade-offs and implementation decisions</p>
Semester - IV	CCaL-404 DBMS	<p>1 Demonstrate the basic elements of a relational database management system. Identify the data models for relevant problems.</p> <p>2. Design entity relationship and convert entity relationship diagrams into RDBMS and formulate SQL queries on the respect data into RDBMS and formulate SQL queries on the data. Extend normalization for the development of application software's.</p>
	CCaL-405 Data Analytics	<p>1.Data analytics help a business optimize its performance, perform more efficiently, maximize profit, or make more strategically-guided decisions.</p> <p>2.Today's highly competitive market, businesses that can effectively analyze and interpret data have a distinct advantage.</p>
		<p>3.Data analytic is very useful in the health care industry during patient clinical trials</p>
		<p>4.Data analytic visualization presents a clear picture of what the data actually means. Using bar graphs, pie charts, tables and other visuals, data visualization makes the data easier for those making business decisions to comprehend.</p>

Semester - V	CCaL-503 Object Oriented Programing Using Java	<p>Knowledge gained:</p> <ul style="list-style-type: none"> • To learn Object Oriented Programming language • To learn database programming using Java • To handle abnormal termination of a program using exception handling • Analyzing the handling formatted I/O and unformatted.
		<p>Competency developed:</p> <ul style="list-style-type: none"> • To develop a game application using multithreading • To develop application using multithreading
	CCaL-504 Computer Network	<p>Knowledge gained:</p> <ul style="list-style-type: none"> • Basic networking concepts, types of networks, various topologies and application of networks types of addresses, data communication. • wired and wireless networks, its types, functionality of layer • importance of network security and cryptography concept of networking models, protocols, functionality of each layer <p>Skills gained:</p> <ul style="list-style-type: none"> • Learn basic networking hardware and tools. • Create hybrid topologies using the existing topologies, and check efficiency. • Apply different encoding and decoding mechanisms involved in different types of transmission media and to measure the transmission impairments.
		<p>Competency developed:</p> <ul style="list-style-type: none"> • Create a new protocol and test its efficiency. • Design a new network architecture using protocols and interfaces. • Design a model internet with various categories of networks and test the

		transmission rate.
	CCaL-505 Python Programming	<p>1. Interpret the fundamental Python syntax and semantics and be fluent in the use of Python control flow statements. Express proficiency in the handling of strings and functions.</p> <p>2. Determine the methods to create and manipulate Python programs by utilizing the data structures like lists, dictionaries, tuples and sets. Articulate the Object-Oriented Programming concepts such as encapsulation, inheritance and polymorphism as used in Python.</p>
Semester - VI	CCaL-604 Cloud Computing	<p>Knowledge gained:</p> <ul style="list-style-type: none"> • To understand the principles and paradigm of Cloud Computing • Ability to design and deploy Cloud Infrastructure • Understand cloud security issues and solutions • Analyze the virtualization and cloud computing concepts. • Learn the architecture, deployment models, and infrastructure models of Cloud Computing. <p>Skills gained:</p> <ul style="list-style-type: none"> • Ability to understand role of Virtualization Technologies • Demonstrate knowledge on the cloud computing security, federation, presence, identity, and privacy
		<p>Competency developed:</p> <ul style="list-style-type: none"> • Design & develop backup strategies for cloud data based on features • Familiarity with open source cloud computing software, and free/commercial cloud services. • Learn the privacy policy of cloud providers
	CCaL-603 Mobile Application Development	<p>Knowledge gained:</p> <ul style="list-style-type: none"> • Pass data between fragments • To gain knowledge of installing Android

		<p>Studio and Cross Platform</p> <ul style="list-style-type: none"> • Integrated Development Environment. • An ability to use the techniques, skills, and modern technology. <p>Skills gained:</p> <ul style="list-style-type: none"> • Debug android apps and create UI fragments • Create database and communicate with mobile apps <p>Competency developed:</p> <ul style="list-style-type: none"> • Design apps with audio play back. • To develop the different applications that mobile computing offers to people, employees, and businesses • To develop high levels of technical competence in the field of mobile technology
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Sudash
H.O.D.

Arun
PRINCIPAL

DEPARTMENT OF ZOOLOGY

LEARNING OUTCOMES

- Zoology is a study & investigation of animal life
- Subject deals with animal kingdom, its structure, classification, habits & distribution of animals both living & extinct.
- By studying the subject, students will be able to understand how we function & interact with the world around us.
- It also inculcates the spirit of resource conservation and love for nature that leads to save biodiversity and environment that is the need of the hour.
- It induces entrepreneurship skills among students by imparting Knowledge of pisciculture, apiculture, sericulture and many more.
- By studying Zoology, the students can be employed as life science scientist, marine biologists, educationists, wild life scientists, forensic science and many more.

K. Srinivas
HOD

A. Srinivas

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Government College, Hisar
Department of Zoology
Learning Outcomes of Zoology Course.

Course Code	Paper	Nomenclature	Learning Outcomes
ZOO-101 L	Core Course - Paper I	Animal Diversity	Able to identify & classify the major groups of animals.
ZOO-102 L	Core Course- Paper II	Animal Diversity	Within a phylogenetic framework (Protists, invertebrates & vertebrates) In-depth knowledge of certain topics applied to these groups.
ZOO-103 P	Core Course: III	Laboratory Practicals of Animal Diversity I & II	Able to identify Invertebrates & vertebrates get training to make an "Animal Album" having in-depth knowledge of various taxa. To know about the different varieties of snakes & a key for their identification (Poisonous snakes)
ZOO 201 L	Core Course: IV	Comparative Anatomy & Developmental Biology of Vertebrates	To become aware of the anatomical features of different groups of vertebrates & understand their similarities & differences. 1) Able to use the evidence of comparative biology to explain how the theory of evolution offers the only scientific explanation of emergence of life on earth.
ZOO 202 L	Core Course: V	Comparative Anatomy & Developmental Biology of vertebrates II	To understand the finer details of embryology and fundamental processes in development.
ZOO 203 P	Core Course: VI	Laboratory Practicals of comparative anatomy and developmental biology of vertebrates I&II	In-depth knowledge of Osteology - Axial & Appendicular skeleton. Practical aspect of embryology of animals (developmental stages of animals & complete examination of sperm & ova)
ZOO 301 L	Core Course: VII	Physiology and Biochemistry I	To get informed about the details of mammalian physiology
ZOO 302 L	Core Course: VIII	Physiology and Biochemistry II	To understand the metabolism of different nutrients in mammals.
ZOO 303 P	Core Course: IX Zoology-Practical	Laboratory practicals of physiology & Biochemistry I&II	Learn by doing the experiments concerning with animal physiology and metabolism.
ZOO 401 L	Core Course X	Genetics and Evolutionary Biology I	To get knowledge that the genes contain a record of the way that the organisms evolved & evidences of common origin of animals.
ZOO 402 L	Core Course XI	Genetics and Evolutionary Biology II	
ZOO 403 P	Core Course XII	Laboratory Practicals of genetics and evolutionary Biology I&II	Understand the principles of genetics by solving numerical problems and statistical methods for drawing inferences from genetic data is human genetics understand evolution by preparing a no of projects on Micro & Mega & Macro evolution.
ZOO 404 L	Skill enhancement Course I	Apiculture	To know about the apiculture technology. Become aware of the commercialisation of this technology & its role in pharmaceutical industry.
ZOO 501 L	Discipline specific elective course I	Applied zoology I	Acquire and apply foundational knowledge concepts & theories in Biology.
ZOO 502 L	Discipline specific elective course II	Applied zoology II	Major focuses on the practical use of biological information within health sciences & commercial farming.
ZOO 503 P	Discipline specific elective course III	Laboratory practicals of applied zoology I&II	Able to identify the pests of standing crops and stored products knowledge of parasites & vectors related to human diseases. Learn the concept of animal breeding by visiting animal breeding center. In-depth knowledge of freshwater aquarium by preparing it.
ZOO 504 L	DSE I	Aquatic Biology I	In-depth knowledge of ecology, freshwater & marine biology. Able to understand the basic biological processes that occur in nature & believe organisms.
ZOO 505 L	DSE II	Aquatic Biology II	Basic knowledge of the organisms found in freshwater & marine. To get Knowledge of the management of aquatic resources.
ZOO 506 L	DSE III	Laboratory Practicals of aquatic biology I&II	Learn by Modern analytical methods used in environmental monitoring. Learn by visiting How pollution & other human influences affect the aquatic systems.
ZOO 601 L	DSE IV	Reproductive Biology I	In-depth information about the histological & biological processes of reproduction able to learn about the reproductive Health (sex, sexuality & fertility.)
ZOO 602 L	DSE V	Reproductive Biology II	In-depth information about the histological & biological processes of reproduction able to learn about the reproductive Health (sex, sexuality & fertility.)
ZOO 603 P	DSL VI	Laboratory Practicals of Reproductive Biology I & II	In-depth knowledge of O & O+ reproductive organs. Learn surgical techniques in experimental animals for population control. To get information of modern contraceptive devices. Learn sperm health by technique of early detection of sperm analysis uterine cervix cancer.
ZOO 604 L	DSE IV	Insect, vectors & diseases I	To know about the insects : Insect vectors & pathogens for human health
ZOO 605 L	DSE V	Insect, vectors & diseases II	To know about the insects : Insect vectors & pathogens for human health
ZOO 606 L	DSE VI Zoology Practical	Laboratory Practicals of Insect, Vectors and diseases I&II	Learn by identification of insect vectors through slides. Understand the different types of mouth parts. Learn by submitting project report on any insect vector & disease transmitted.

Alomsh
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Arshad
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