

Secondary Education Society's
Arts & Science College, Bhalod,
Course Outcome
2020-21

DEPARTMENT OF CHEMISTRY		
Class	Paper	Course Outcomes (Students will be able to)
F.Y. B.Sc	CH-101: Physical and Inorganic Chemistry	Understanding of fundamental concepts of chemistry, critical constants, electrical Conductance, Types of adsorption isotherms, to understand specific and equivalent conductance, cell constant and use of it to obtain specific and equivalent conductance. Use conceptual and mathematical tools to express and predict atomic and molecular behaviour, understanding of variation in periodic table
	CH-102: Organic and Inorganic Chemistry	Understand the general properties of organic compounds, applications of organic compounds. Common and IUPAC nomenclature of various type of organic compound. Understand of S- block Elements of alkali metals and Alkaline earth metals Arrhenius theory, Bronsted-Lowry theory, and Lewis theory, ionic product of water, Buffer solutions
	CH-103: Chemistry Practical	Acquire skill of calibration of glassware. Able to carry out qualitative and quantitative analysis. Understand the determination of heat of solution, equivalent weight, surface tension etc.
	CH-201: Physical and Inorganic Chemistry	Understand the kinetic theory of ideal gases, Study of Surface tension phenomenon, Viscosity, P-block element Metals and metallurgy. To understand the second law of thermodynamics
	CH-202: Organic and Inorganic Chemistry	Understand the preparations, reactions and properties of aldehyde ketones, amines, and aromatic Carboxylic acid. determine the Molecular weight, formula weight, equivalent weight of organic compounds. Understand chemical bonding and structure the Electronic structures, Types of overlap

	CH-203: Chemistry Practical	Preparation and standardization of solutions. Perform qualitative analysis of organic compounds. Carry out quantitative analysis by instrumental method using Conductometer. Estimation of organic compounds
S.Y.B.Sc	CH 301: Physical and inorganic chemistry	To understand Types of solutions its properties, numerical calculations of Gibbs free energy. Understand concept of Colligative Properties Osmosis and osmotic pressure, Relation of osmotic pressure to vapour pressure, Helmholtz free energy Understand the concept of physical properties of metals Learn methods of purification of ores.
	CH 302: Organic and Inorganic chemistry	Understand the basic concept of stereochemistry. Study of reactivity, preparation and reactions of heterocyclic compounds Study of synthesis and reaction of 5, 6 member's heterocyclic systems. Understand the concept of solvents, solutions acids and bases.
	CH 303: Chemistry practical:	Understand techniques chromatography for separation of components in the mixture, Volumetric method of analysis, Determination of standard electrode potential of Cu/Cu ²⁺ or Ag/Ag ⁺ , Zn/Zn ²⁺ electrodes potentiometrically. Determine molecular weight by depression of freezing point method and elevation in boiling point method. Preparation of derivatives,
	CH 401 Physical and inorganic chemistry	To understand Electromotive force and its measurements, thermodynamics of electrode potential Standard potential and equilibrium constant, Classification of electrodes. Study of Calculation of free energy changes, Fugacity and activity concepts, The reaction isotherm, Standard free energy change of formation,
	CH402: Organic and Inorganic chemistry	To understand preparation and synthetic applications of synthetic reagents, study of organometallic compounds preparation uses and types of bonding. Study of s-s, s-p, p-p, p-d and d-d combination of orbitals. Molecular orbital treatment for Hetero nuclear diatomic molecules
	CH 403: chemistry practical	Estimate of Nickel and Barium gravimetrically. Preparation of various inorganic complexes Carry out qualitative analysis of organic compounds. Determination of normality and strength of HCl titrating with standard NaOH Potentiometrically.

	SEC-1: Basic Analytical Chemistry	To understand the concept of acid base titration and precipitation titration. Introduction of Analytical chemistry, its interdisciplinary nature, importance of types of analysis: qualitative and quantitative analysis Concept of sampling, Accuracy, precision, significant figures, Errors, Material safety data sheet (MSDS), fire safety, Handling of chemicals. Study of Chromatography techniques.
		To understand the concept of Redox titration and Complexometric titration, Gravimetric analysis Steps of gravimetric analysis.
T.Y.B.Sc.	CH 351: Physical chemistry	Understand the concept electrochemical cell and determination of potential of cell, laws of photochemistry, quantum yield and fluorescence and phosphorescence from Jablonski diagram. Understand the various devices to measure the radiation from radioactive sample.
	CH-352: Inorganic chemistry	Understand the modern theories of metal-ligand bond related to valence bond theory Understand the basic concept of CFT, Spin magnetic moment, crystal field stabilization energy related to weak and strong field, limitation of theory.
	CH-353: Organic chemistry	Understand Nucleophilic and electrophilic substitution reactions. Molecular rearrangement involving migration to C, N and Oxygen. Understand Polarity picture of carbonyl group and nucleophilic addition reaction to it.
	CH-354: Analytical Chemistry	Understand the application of Ion Exchange Chromatography, Size Exclusion Chromatography, Gas Chromatography, HPLC Understand Principles of Electrophoresis and choice of techniques of electrophoresis for various applications.
	CH-355: Industrial chemistry	Understand manufacturing of Sugar, Beer and spirit. Understands various types of fertilizer. Understand the aspects of small scale industry.
	CH-356: BioChemistry	Understand classification of carbohydrates, amino acids, enzymes, and lipids. Separation of amino acids and proteins Get information about carbohydrates, amino acids, lipid amino acids metabolism
	T.Y.B.Sc Sem VI CH-361: Physical chemistry	Understand the first, second and third order reaction. Understand the types of spectra, Rotational, Vibration and Electronic energy levels

		Learn concept Photoelectric effect, Compton Effect and Heisenberg uncertainty principals.
CH-362: Inorganic chemistry		Understand the concept of Hard and Soft acid bases concept theories, application and limitations. know about the all basic theory of Acid and bases. know the different types and theories of Corrosion and how to protect Metal from corrosion.
CH-363: Organic chemistry		Understand the concept of Spectroscopic techniques. determination which includes IR, UV and NMR. Able to design the organic compound using retro synthesis
CH-364 Analytical Chemistry		Acquire knowledge of different spectrometry like AAS FES, Turbidimetry and Nephelometry. Plasma emission spectrometry Understand principle, Instrumentation and applications of thermogravimetric methods like TGA, DTA and DSC.
CH-365: Industrial chemistry		Understand the process of manufacturing of soaps and detergents. Know the information related to drugs and pharmaceuticals. Understand classification of dyes and paints.
CH 366: Polymer chemistry		Understand the different methods of polymerization. Understand the preparation, properties and applications of PE, PVC, Polystyrene, polyacrilonytrile, Study of some important polymers
CH-357,367: Physical Chemistry Practical		Determination of the concentration of given solution by different instrumental methods. Use of of Microsoft Excel or Origin Determine the refractive index of four liquids, hence specific and molar refraction
CH 358,368: Inorganic practical		Carry out the estimation of metals by gravimetry, volumetric method. Preparation of various inorganic complex. Estimation by spectrophotometric methods
CH 359,369: Organic practical:		Preparation of various organic compounds. Separation of water soluble and water insoluble organic mixtures. Understand the chromatographic techniques
Department of Zoology		

F.Y.B.Sc	ZOO 101 Animal Diversity I	<p>Student will learn about general taxonomic rules on animal classification</p> <p>Student will learn the identification of non-chordates.</p> <p>Student will come know anatomy and physiology of non-chordates animals.</p> <p>Student will develop the knowledge of Classification of animals, fossils study and geographical distribution of animals.</p> <p>Student will develop the skill of Microscope handling & care.</p>
	ZOO 102 Animal Diversity II	<p>Student will learn about general taxonomic rules on animal classification.</p> <p>Student will learn the identification of Chordates.</p> <p>Student will come know anatomy and physiology of Chordates animals.</p> <p>Student will develop the knowledge of Classification of animals, fossils study and geographical distribution of animals.</p> <p>Student will develop the skill of Microscope handling & care.</p>
	ZOO 103 Zoology Practical based on Animal Diversity I & II	<p>Student came to knowing the rules of taxonomy and the principle of animal classification.</p> <p>Student identified the taxonomic status of the entire chordates and discussed the evolutionary model of the group.</p> <p>Student understood the diversity morphology, biological characters and taxonomical importance some selected museum specimens of different animal groups.</p>
	ZOO 201 Comparative Anatomy of Vertebrates	<p>Student Compare the functioning of organ systems across the animal world.</p> <p>Learn more about human physiology and anatomy.</p> <p>Students will demonstrate a fundamental knowledge of comparative vertebrate animal physiology and anatomy.</p> <p>Student Gains knowledge of functional anatomy of vertebrates from fishes to mammals</p>
	ZOO 202 Developmental Biology of Vertebrates	<p>Student will learn Basic concepts of developmental biology.</p> <p>Student understood the process of development of animals.</p> <p>Student understood the process of organogenesis of selected organs, development of extra embryonic membrane and the nature and physiology of placenta.</p>

		<p>Student came to know the inducer and inductor role in embryogenesis and knowledge about metamorphosis and the process of regeneration.</p>
	<p>ZOO 203</p> <p>Zoology Practical based on Comparative Anatomy & Developmental Biology of Vertebrates</p>	<p>Student familiar with various stages involved in the developing embryo.</p> <p>Student acquired knowledge of principles and working mechanisms of microscopes.</p> <p>Preparation, direct observation and appreciation of sperm motility and types of placenta of animals.</p> <p>Student familiarize with the principle of developmental biology.</p> <p>Student familiarize with various Techniques and tools of Embryology.</p> <p>Student came to know about internal skeletons and osteology of different bone structures.</p>
S.Y.B.Sc	<p>ZOO 301</p> <p>Non-Chordates - II</p>	<p>Students understood the diversity and classification and functional aspects of different systems of phylum Arthropoda, Mollusca and Echinodermata.</p> <p>Student came to know about the resemblance and evolutionary significance of larval forms of echinoderms.</p> <p>Student came to know about the different types of mouth parts of insects & their feeding habits.</p> <p>Student came to know about the Locomotory organelles of protozoa like Pseudopodia, Flagella & Cilia.</p> <p>Student came to know about the ways of locomotion in protozoa like amoeboid movement, flagellar movement and ciliary movement.</p> <p>Student came to know about the Canal System in Sponges.</p>
	<p>ZOO 302</p> <p>Medical Zoology</p>	<p>Student realize the factors affecting Health</p> <p>Student apply the knowledge to lead a healthy lifestyle</p> <p>Student familiar with various Lifestyle diseases.</p> <p>Student redress problems associated with health and sex thereby promoting fitness and wellbeing.</p> <p>Student Understand the mode of infection of parasite, vaccine strategies and proteomic approaches.</p> <p>Student gets detailed understanding of parasites of veterinary importance and their management.</p> <p>Student Understand the Description of parasites, insect vectors and their significance, nematode parasites of human & animals and host parasite interactions.</p>

	ZOO 303 Zoology Practical	<p>Students understood the diversity and classification and functional aspects of different systems of phylum Echinodermata.</p> <p>Student came to know about the Canal System in Sponges.</p> <p>Student realizes the factors affecting Health.</p> <p>Student Understand the mode of infection of parasite, molecular biology of parasite and drug targets, mechanism of drug resistance, vaccine strategies and proteomic approaches, vaccine strategies.</p> <p>Student familiar with various Lifestyle diseases.</p>
	ZOO 401 Chordates – II	<p>Student understands the external as well as internal characters of class Aves, by studying animal <i>Columba livia domestica</i>.</p> <p>Student understands the various systems of pigeon.</p> <p>Student understands the General Topics like Accessory respiratory organs in fishes.</p> <p>Student able to know the reptiles of Mesozoic era.</p> <p>Student understands the adaptations in aquatic mammals.</p>
	ZOO 402 Applied Zoology	<p>Student understands the term apiculture.</p> <p>Students aware about the economic importance of Apiculture.</p> <p>Student understands the Bee keeping equipments and apiary management.</p> <p>Student understands the various species of Bees.</p>
	ZOO 403 Zoology Practical	<p>Student understands the Evolutionary history of animals.</p> <p>Student understands the types of fins.</p> <p>Student understands the adaptation in Aquatic mammals ex. whale and seal.</p> <p>Student understands the diseases, pest, parasites and predators of Honey Bee.</p> <p>Student understands honey bee products and their uses.</p> <p>Student aware about the adulteration of honey.</p>
Department of Mathematics		
F.Y.B.Sc	MTH-101 Matrix Algebra	<p>a) Understand concepts on matrix operations and rank of the matrix.</p> <p>b) Understand use of matrix to the system of linear equations.</p>

		<p>c) Understand the method to find Eigen values and eigen vectors.</p> <p>d) Apply Cayley-Hamilton theorem to find the inverse of the matrix.</p> <p>e) Know the matrix transformation and its applications in rotation, reflection, translation.</p>
	MTH-102 Calculus	<p>After learning this course a student will be able to:</p> <p>a) understand basic concepts of limits and continuity.</p> <p>b) Understand use of differentiation in various fields.</p> <p>c) Know the Mean value theorems and its applications.</p> <p>d) Apply Taylor's and Maclaurin's theorems.</p> <p>e) Know reduction formulae and their application to evaluate specific definite integrals.</p>
	MTH-103 (A) Co-ordinate Geometry	<p>After learning this course a student can visualize geometrical concepts and can understand two dimensional figures and can find their standard forms by using equations of translation and rotation. A Student can also understand three dimensional figures and their equations particularly Sphere, Cone and Cylinder.</p>
S.Y.B.Sc.	MTH-301 Calculus of Several Variables	<p>After learning this course a student will be able to understand:</p> <p>a) limit and continuity of functions of several variables</p> <p>b) how to find series expansion of functions.</p> <p>c) methods of finding extreme values of a function of two or more variables.</p> <p>d) concept of double integral, methods of evaluation and its application to find area</p> <p>e) how to solve triple integrals and to use them to find volume of a solid region.</p>

	MTH-302(A) Group Theory	<p>After learning this course a student will be able to:</p> <p>a) understand different operations in a Group and its Subgroup. b) understand Lagrange, Euler and Fermat theorems.</p> <p>c) understand concepts of homomorphism, isomorphism and automorphism</p> <p>d) understand operations in rings, integral domains, fields and Boolean ring and to know some of the applications of these abstract structures.</p>
	MTH-303 Practical Course Based on MTH-301 and MTH-302	<p>After completion of the practical course a student will be able to understand and solve several amount of problems by himself with lot of interest.</p>

Department of Botany

F.Y. B.Sc	Bot:101. Microbial Diversity, Algae And Fungi	<ol style="list-style-type: none"> 1. Diversity among Microbes. 2. Life cycle pattern of Bacteria, Viruses, Algae & Fungi 3. Systematic, morphology and structure of Bacteria, Viruses Algae and Fungi 3. Useful and harmful activity of Bacteria, Viruses, Algae & Fungi.
	Bot:102 Plants Taxonomy.	<ol style="list-style-type: none"> 1. Understand the diversity of angiosperms. 2. Understand the comparative account among the families of angiosperms. 3. Know the economic importance of the angiosperm plants. 4. Understand the distinguishing features of angiosperm families.
	Bot: 201 Diversity Of Archegoniate	<ol style="list-style-type: none"> 1. Know the salient feature of Archegoniate. 2. Student know economic and ecological importance of Archegoniate. 3. Life cycle pattern of selected genera.

		4. To make student aware of the status of higher cryptogams & Gymnosperm as a group in plant Kingdome..
	Bot.202. Plant Ecology	<ol style="list-style-type: none"> 1 Know the scope and importance of the discipline. 2.To highlight the conservation of biodiversity 3. Student know plant communities and ecological adaptions in plant. 4. Awareness of the botanical region of Indian and vegetation type of Maharashtra.
	Bot 103 & 203: Practical Course (Based On Bot.101, Bot.102 & Bot.201, Bot.202)	<ol style="list-style-type: none"> 1. Understand the morphological diversity among Bacteria, Viruses, Algae and Fungi. 2. Observe vegetative and reproductive parts of various life forms of Bacteria, Viruses, Algae and Fung 3. Know botanical source/s, characteristics and utilities of Plants/ plant products. 4. Learn about the industrial applications of various plants and plant products.
S.Y. B.Sc.	Bot.301: Plant Anatomy	<ol style="list-style-type: none"> 1. Understand the Various plant tissue system. 2. Know Primary structure of Dicot and Monocot Plants. 3.Understand the Scope and importance of plant anatomy 4. Understand normal secondary growth in plants and their causes. 5. Know the Protective tissue system..
	Bot.302: Plant Physiology	<ol style="list-style-type: none"> 1. Understand the plants and plant cells in relation to water. 2. Learn about the movement of sap and absorption of water in plant body.

		<p>3. Understand the process of photosynthesis in higher plants with particular emphasis on light and dark reactions, C3 and C4 pathways.</p> <p>4. Understand the respiration in higher plants with particular emphasis on aerobic and anaerobic respiration.</p>
	Bot.304: Mushroom Cultivation Technology	<p>1. Know the history, scope and importance of mushroom technology.</p> <p>2. Understand and nutritional and medicinal values of edible mushroom.</p> <p>3. Know about the storage, making and various food preparations of mushroom.</p> <p>4. Understand the economic importance of mushroom cultivation</p>
	Bot.401: Plant Embryology	<p>1. Know the scope and Importance of plant Embryology.</p> <p>2. Understand the structure of Micro and Mega sporangium.</p> <p>3. Know the pollination, fertilization, Endosperm and Embryology.</p> <p>4. Give exposure of techniques in embryology.</p> <p>habit of the angiosperm plant body.</p>
	Bot.402: Plant Metabolism.	<p>1. Know the scope and Importance of Plant Metabolism.</p> <p>2. Understand the properties, mechanism and classification of enzymes.</p> <p>3. Understand the process of photosynthesis in higher plants with particular emphasis on light and dark reactions, C3 and C4 pathways.</p>

		4. Understand the respiration in higher plants with particular emphasis on aerobic and anaerobic respiration.
	Bot.404: Nursery And Gardening.	<ol style="list-style-type: none"> 1. Know the concept of Nursery and Gardening. 2. Give to improve the skill for growing fresh and safe vegetables. 3. Give to create awareness about home gardening 4. Understand to the develop different skills regarding the gardening operations among the student
	Bot:303 And 403 : Practical Course (Based On Bot.301, Bot.302 & Bot401,Bot. 402)	<ol style="list-style-type: none"> 1. Understand the Various plant tissue system 2. Observe to the Various Photographs and Slide T.S.in plant stem, Root and Leaf. 2. Know the physiological techniques. 3. Develop practical skill among the students.
Department of Physics		
F.Y.B.Sc	PHY-101 Basic Mechanics	<p>Understand fundamental theory of different physical properties</p> <p>Understand the set of physical laws, describing the motion of bodies, under influence of system of forces.</p>
	PHY-102 Dynamics and Elasticity	<p>Demonstrate a rigorous understanding of core theories and principle of physics which include Static and Dynamics.</p> <p>Learn the concept of laws in physics.</p>
	PHY-103 LAB –I and PHY-203 LAB –II	<p>The students should study physics with keen interest, develop their experimental skill and problem solving ability.</p> <p>Develop practical, analytical and mathematical skills in Physics.</p>

	PHY-201 Electricity and Electrostatics	Learn the concept of laws in physics. Specialized knowledge and expertise to identify, formulate, investigate, analyze and implement on the problems in physical sciences.
	PHY-202 Magnetism and Electromagnetism	Provide knowledge about materials properties and its application for new developing technology Acquire a comprehensive knowledge and sound understanding of fundamentals of Physics.
S.Y.B.Sc.	PHY 301 Thermodynamics and Kinetic theory of gases	Acquire a comprehensive knowledge and sound understanding of fundamentals of Physics. Continuous learning attitude to adopt new skills and techniques to overcome the challenges related with new technologies.
	PHY 302(A) OR PHY 302(B) Electronics-I	Understand Basic Circuits using Active Devices. Learn basic test instruments such as power supply, Function generator etc. their construction and working principle.
	PHY 303 LAB-III and PHY 403 Lab IV	The students should study physics with keen interest, develop their experimental skill and problem solving ability. Built small electric circuit which is useful for our practical's. Develop practical, analytical and mathematical skills in Physics.
	PHY 401 Waves, Oscillations and acoustics	Demonstrate a rigorous understanding of core theories and principle of physics which include Waves theories. Learn the concept of laws in physics.
Department of History		
F.Y.B.A.	DSC-HIS: Sem.-I- A-1 [History of India 1857-1950] DSC-HIS: Sem.-II- A-2	To Introduce various perspectives of the Indian Freedom To develop the spirit of nationalism among students. To bring an awareness among the students as responsible citizen of the country To inculcate Liberty, Equality, and Fraternity among the students.

	[History of India 1857-1950]	
S.Y.B.A. (Gen.2)	DSC-HIS - 231 Sem.-III – History of Marathas (AD 1605-1750) DSC-HIS - 241 Sem.-IV – History of Marathas (AD 1605-1750)	To create and enhance interest about regional History among the students. To acknowledge students how Shivaji Maharaj created the empire in adverse circumstances. To motivate students for the research work of the Maratha History Useful for the preparation of the competitive examinations.
S.Y.B.A. (Skill)	SEC – HIS 234 Sem. III Research Methodology in History SEC – HIS 244 Sem. IV Introduction of Archives in India	The paper is designed to provide adequate conceptual base, bring better understanding of history and its forces, help interrogate existing paradigms and challenge the outdated help in developing critique, help research in terms of formulating hypotheses & develop and frames of interaction with other social sciences and attain certain level of Interdisciplinary approach. To create awareness among the students about the role of Archives in the preservation of Heritage. To introduce the importance of Archives in study of History To create awareness to conserve the historical records in their local areas. To encourage students to visit Archives. To create interest of students to pursuer career in the field of Archives.
T.Y.B.A. (G-3)	HIS- 351 A Sem. V History of Modern World (1789-1900) HIS- 361 A Sem. V History of Modern World (1901-1945)	Syllabus covers the competitive Examinations Career & Job Oriented Syllabus To make awareness about World History To Develop the skill and opportunities among the students.

Department of English		
FYBA	COMPULSORY ENGLISH	To develop the ability to appreciate ideas and think critically. Use the values learnt through literary works.
	OPTIONAL ENGLISH	Development of moral and human values and comprehensive ability among students. Inculcation of moral and human values among students. Understanding of the basic forms of poetry.
SYBA	COMPULSORY ENGLISH	The students could improve vocabulary and improve vocabulary. The students are able to use English effectively in formal and informal situations of life.
	General Paper -2	Students are familiarizing them with different types of short stories in English. Students are able to appreciate literature critically.
	Special Paper -I	The students are able to use their creative and critical faculties of mind in real life situation and could implement the values of literature in life.
	Special Paper -II	Students could learn Language through literature. Expose students to varied cultural experiences through literature.

Department of Computer Science

Class: F. Y. B. Sc. Computer Science
Course Name: Essentials of Computer: Course Code: CS 101
Objectives of the course: To introduce the various computer components, the concept of Computer Network, the concept of Virus and the concept of Operating System.
Expected Learning Outcomes: Students are familiar with: History, Generations and types of computer, various Input, Output and Auxiliary devices, Primary and Secondary Memories, Hardware, Software, Firmware, Interpreter and Compiler, Various programming languages e.g., High, Middle and Low Level Languages. Computer Network and Types of Networks LAN, WAN and MAN, Wired and wireless network etc. Information about web browser and Search Engines. Various type of Computer Viruses their indication of Virus infections. They learn the computer ethics: Hacking, software piracy, Spamming and Phishing, various types of Operating Systems and their functions: Batch operating system, Time sharing Operating System, distributed operating System, Network operating System and Real Time operating System.

Course Name: C Programming Language-I: Course Code: CS 102
<p>Objectives of the course:</p> <p>The objective of this course is to provide a comprehensive study of the C programming language, stressing upon the strengths of C, which provide the students with the means of writing modular, efficient, maintainable, and portable code.</p>
<p>Expected Learning Outcomes:</p> <p>Students are able to write, compile and debug programs in C language, different data types in a computer program, design programs involving decision structures, loops and functions</p>
Course Name: LAB Course on Essential of Computer and C programming: Course Code: CS 103
<p>Objectives of the course:</p> <p>To introduce the various computer components, installation of software, DOS Commands, web browser, how to create an Email account, sending and receiving mail and concept of LAN.</p>
<p>Expected Learning Outcomes: Students are familiar with:</p> <p>The various input, output devices, able to install various software, various Dos Commands, web browsers and their functions, able to create an email account, sending an email and receiving an email, how LAN working in laboratory, sharing of computer and printer in Network.</p>
Semester: II
Class: F. Y. B. Sc. Computer Science
Course Name: Internet Computing: Course Code: CS 201
<p>Objectives of the course:</p> <p>To introduce the concepts of Website, Web Design Process, Page Types and Navigation Theory, HTML Programming and CSS.</p>
<p>Expected Learning Outcomes: Students are familiar with:</p> <p>Website, its Types Site Structure, Site Organization Model, Site Planning and Testing, Web Design, Web Design Pyramid, Web Process Model, Modified Waterfall Model, Joint Application</p>

Development Model. Page Types, Page Size and Margins, Navigation and types of Navigation, HTML programming, Structure of HTML Document, Text Formatting Tags and Character Entity References, List Tags, Image and Anchor Tag, Media Elements: Audio tag, Video tag, Table Tags, Frame and Form Tag with Form elements, CSS, Types of Style sheet (Internal, External, and Inline), Syntax of CSS with Example, Selectors (Class, ID, Group, Element)

Course Name: C Programming Language-II: Course Code: CS 202

Objectives of the course:

The objective of this course is to provide a comprehensive study of the C programming language, stressing upon the strengths of C, which provide the students with the means of writing modular, efficient, maintainable, and portable code.

Expected Learning Outcomes:

Students should be able to explain the difference between call by value and call by reference, understand the dynamics of memory by the use of pointers, and use different data structures and create/update basic data files.

Course Name: LAB Course on Internet Computing and C Programming: Course Code: CS 203

Objectives of the course:

To introduce the Basics of Programming, the concepts of C-Programming, understands how to use programming in day to day Applications, and to Know the concepts of HTML.

Expected Learning Outcomes:

Students should be able to understand the programming language C, learns to understand the logic of a problem and write structure of C program. Known the concepts of HTML.

Semester: III

Class: S. Y. B. Sc. Computer Science

Course Name: Data Structure – I: Course Code: COMP 211

Objectives of the course:

To explore and understand the concepts of Data Structures and its significance in programming. Provide and holistic approach to design, use and implement abstract data types.

Expected Learning Outcomes:

Students are familiar with Data structures, its types and significance in computing. Explore about Abstract Data types and its implementation.

Course Name: Programming in C++-I: Course Code: COMP-212

Objectives of the course:

To introduce C++ programming Language, Classes and Objects, Functions in C++, Function Overloading in C++, and Operator Overloading in C++.

Expected Learning Outcomes: Students are familiar with:

Basics of C++, Structure of C++ Program, keywords in C++, Data types hierarchy in C++, Operators in C++, Scope resolution operator, Insertion and Extraction operator, New and Delete operators, reference operators. Manipulators: endl, setw, setfill, set precision, Classes, object, specifying a class, Access specifiers, Class members defining member functions: Inside and Outside the class definition Creating objects. Array of objects, Pointer and object, Array of pointer to object. Basics of function and its need, Functions Prototype. Call by value, Call by reference with object. Functions with default arguments. Inline function. Friend function, friend class. Concept of Polymorphism. Function overloading, Function overloading with arguments. Scoping rules & features of function overloading. Operator overloading, rules of operator overloading, Unary and binary operators, Comparison, arithmetic, assignment operator, Overloading new & delete operators

Course Name: Software & Hardware Installation Skills

Course Code: CS SEC-I (Skill Enhancement Course-I)

Objectives of the course:

To introduce the concept of Operating System Basics & Installation, the Various types of Software Installation, the Device Installation, the concepts of Diagnostic Tools & PC Maintenance, Basic Network Introduction & Installation.

Expected Learning Outcomes: Students are familiar with:

Operating system, Types of Operating systems, System files FAT and NTFS Dos 6.22, Windows 7 and Red Hat Linux and Multi Boot Operating System, Various types of Software Installation 6 L MS-Office 2010, Photoshop 7 and CS5, Tally 7.0 and ERP, Acrobat Reader X, Java, Visual Studio, C & C++, Multimedia software's, and Internet Browsers like- IE9, Google Chrome, Mozilla Firefox, Device, Installation 6 L Graphics Card, Sound Card, LAN Card, Wireless LAN Card, SCSI Card, External Drive, Flash Cards, Web Camera, CCTV Camera, Mobile Devices, Fire wire Cards, Modem,

Plotter, Wireless LAN, Access Point, Diagnostic Tools & PC Maintenance 6 L Introduction, Virus and its types, Effect of Virus for Computer System, Scanning and Antivirus remover tools, Antivirus Utilities for Diagnostic, Safety and Preventive Maintenance Tools, Data Recovery, Troubleshooting PC Hardware: O/S Troubleshooting issues in computer System, Basic Network Introduction & Installation 6 L Introduction About Network, Installing Network Operating System Server and Windows 2008 Server, Cable Crimping, Network Sharing and user Permission, Internet Connection, E-Mail, Cloud Networking, Google Drive, Sky Drive, Drop box etc.

Course Name: PRACTICAL COURSE: Course Code: COMP 213

Objectives of the course:

To introduce the need for data structure when building an application, the methods to calculate and measure the efficiency of a code.

Expected Learning Outcomes:

Students are able to develop programs by using various data structure and write extensible and efficient program.

Semester: IV

Class: S. Y. B. Sc. Computer Science

Course Name: Data Structure – II: Course Code: Comp-221

Objectives of the course:

To understand the commonly used data structures and various forms of its implementation. Understand different techniques for designing the algorithm.

Expected Learning Outcomes:

Students are able to use various data structures and various forms of its implementation in various applications using Array.

Course Name: Programming in C++-II: Course Code: COMP-222

Objectives of the course:

To Introduce Constructor and Destructor, Inheritance and Extending Classes, Exception Handling, Templates & Introduction to Standard Template Library, Working with Files.

Expected Learning Outcomes:

Concept of Constructor, Types of Constructor: Default Constructor, Parameterized Constructor, Copy Constructor, Overloaded Constructors in a class, Constructor with default arguments, Destructors, Inheritance, Types of Inheritance, Derived Class Constructors, Benefits of inheritance in C++, this pointer, Abstract class, pure virtual function, Concept of Exception Handling mechanism, Concept of try, throw and catch, Multiple catch statements, Standard Exception in C++, Basic of templates, Function templates, Class templates, Templates with multiple parameter, Introduction to STL, Components of STL, Containers, Hierarchy of File Stream Classes, Opening and Closing Files, File modes, File Input/output with fstream class.

Course Name: Network Security

Course Code: CS SEC-II (Skill Enhancement Course-II)

Objectives of the course:

To introduce the Network Security, the concept of Malicious Software, the Types of Attack, the concept of Firewalls, the concept of Intrusion Detection System (IDS) and the System security.

Expected Learning Outcomes: Students are familiar with:

Need of Security, Security approaches, Principles of Security, Anti-virus Software, Access Control, Firewall, Smart cards, Biometric, Encryption, Physical Security Mechanisms. Types of Malicious Software, Viruses, Virus Counter measures, Worms, Distributed Denial of Service, Attacks. Snooping, Eavesdropping, Interception, Denial of Service attack, Hacking Techniques – Open Sharing, Bad Passwords, Programming Flaw, Sniffing Switch Network, IP Spoofing. The Need for Firewalls, Firewall Characteristics, Types of Firewalls, Firewall Basing, Firewall Location and Configurations. Introduction; IDS limitations – teardrop attacks, counter measures; Host based IDS set up. Operating system hardening, general steps for securing windows operating system, Hardening, Unix/Linux based operating system, updates: hot fix, patch, service pack.

Course Name: PRACTICAL COURSE: Course Code: COMP 223

Objectives of the course:

To introduce the need for data structure and C++ programming when building advanced applications.

Expected Learning Outcomes:

Students are able to develop programs by using C++ based on Object oriented concepts.

Semester: V

Class: T. Y. B. Sc. Computer Science

(1) Course Name: System Programming: Course Code: UG-CS-311

Objectives of the course:

To Introduce System Programming, System Programming Software Tools, System Programming Overview of Language Processors, System Programming Assembler, System Programming Macro and Micro Pre-processor, System Programming Compiler, System Programming Linkers and Loaders.

Expected Learning Outcomes: Students are Familiar with:

System Software, Goal of system software, System program and System programming, View of system software, Software Tools, Software Tools for Program Developments Editors, Debug Monitors, and Programming Environments. Programming Languages and Language Processors, Language Processing Activities, Fundamentals of Language Processing. Features of assembly language, advantages, Statement format, types of statements, Constants and Literals, Advanced assembler directives, Design of assembler – Analysis Phase and Synthesis Phase, Overview of assembly process, Pass Structure of Assembler – One pass, two pass assembler, Problems of One-pass assembler, Design of Two-pass Assembler. Macro Definition and Call, Macro Expansion, Nested Macro Calls, Tables used in Macro, Advanced Macro Facilities, Design of Macro Pre-processor, Compiler, Scanning and Parsing, Programming Language Grammars, Scanning, Parsing, Language Processors Development Tools, Relocation and Linking Concepts, Self-Relocating Programs, Linking for Overlays, Dynamic Linking, Loaders.

(2) Course Name: Database Management System: Course Code: UG-CS-312

Objectives of the course:

To introduce the Database Management system, conceptual design (E-R Model) of database, Relational Data Model, Relational Algebra, Database Implementations, concurrency control, Backup and recovery.

Expected Learning Outcomes: Students are familiar with:

Database Management System, various types of database, various types of data model, level of abstraction, data independence, Queries in database, various uses and advantages. Database Design, E-R Data Model (entities, attributes, entity sets, relations, relationship sets) and Conceptual design using E-R. Relation, Conversion of E-R to relational model, Integrity Constraints (key, referential integrity, general constraints), Codd's Rule, Functional Dependency and Data Normalization (1NF, 2NF, 3NF, BCNF). Relational Algebra (selection, projection, set operations, renaming, joins, division). Database security, Database integrity, Transaction Concept, Transaction State, Transaction Properties (ACID), Lock-Based protocol, and Timestamp-Based protocol, Log base Recovery, Shadow Paging, Differed Updates.

(3) Course Name: Software Engineering: Course Code: UG-CS-313

Objectives of the course:

To Introduce Introduction to Software Engineering, Software Development Mode, Requirement Analysis and Specification, Design Engineering, Software Coding and Testing, Software Quality.

Expected Learning Outcomes: Students are familiar with:

Software and Software Engineering, Evolution of Software, Software Characteristics, Software Applications, Software Myths, Software Process, Software Development Life Cycle (SDLC), Waterfall Model, Prototyping Model, Incremental Development Model, RAD model, Spiral Model. Requirements Engineering, Fact finding Techniques, Types of Requirement Modeling, Data Modeling Concepts- Data Objects, Data Attributes & Relationship. Characteristics of good Software Design, Design Concepts- Architecture, Modularity, Information Hiding, Cohesion & Coupling, Decision Table & Decision Tree, Data flow Diagram, Data Dictionary. Coding standards & Guidelines, Testing, Testing Activities, Black box testing, White box testing, Debugging Approaches – Brute force Method, Backtracking, Case Elimination Method, Programming Slicing. Quality, Software Quality - Garvin's quality dimensions, Mc Calls quality factors, ISO9125 quality factors, Elements of Software Quality Assurance, ISO 9000 & Certification.

(4) Course Name: Computer Aided Graphics: Course Code: UG-CS-314

Objectives of the course:

To acquaint the learner with the basic concepts of Computer Graphics, learn the various algorithms for generating and rendering graphical figures, get familiar with mathematics behind the graphical transformations, understand and apply various methods and techniques regarding projections, animation, shading, illumination and lighting.

Expected Learning Outcomes: Students are familiar with:

Students will be able to apply mathematics and logic to develop Computer programs for elementary graphic operations, develop scientific and strategic approach to solve complex problems in the domain of Computer Graphics, Develop the competency to understand the concepts related to Computer Vision and Virtual reality and Apply the logic to develop animation and gaming programs.

(5) Course Name: Programming in VB.NET: Course Code: UG-CS-315

Objectives of the course:

To introduce the .Net platform, the Concept VB.NET, various programming styles in vb.net, the concept of Object Oriented Programming in vb.net and the concept Data Access with ADO.Net.

Expected Learning Outcomes: Students are familiar with:

Web Client/Server Model, Protocols for Web Client/Server communication, Introduction to .NET Framework, Components of .NET Framework, Overview of IIS, ISAPI Extensions, ISAPI Filters,

Common Language Runtime and Class Library. Concept of VB.Net, Structure of vb.net program, Variable: Declaring and assigning variables, scope of variables, Constant, Operators, Functions and Subroutine. Concept of Array in VB.NET, Types of array, controlling program flow, Conditional Statements: if, if else, select-case statements, Looping Statements: The while, do, for, and for Each Statements Flow Control Statements: goto, break, continue and Exit statement, Exception Handling- Unstructured Error Handling, Structured Exception Handling. Concept of Class Basics Class Properties, Constructors and Destructors, Inheritance, Interface, Polymorphism, Operator Overloading, Introduction to Multithreaded Programming. Concept What is Database? Overview of ADO.Net, ADO.NET object – Connection object, Command Object, Data Adapter Object, Dataset object, Data Reader Object.

(6) Course Name: JAVA Programming-I: Course Code: UG-CS-316 B)

Objectives of the course:

The objective of this course is to teach the learner how to use Object Oriented paradigm to develop code and understand the concepts of Core Java and to cover-up with the pre-requisites of Core java.

Expected Learning Outcomes: Students are familiar with:

Object oriented programming concepts using Java. Knowledge of input, its processing and getting suitable output. Understand, design, implement and evaluate classes and applets. Knowledge and implementation of AWT package. Students acquire skills in using Java programming language and development of small to medium sized application programs.

(7) Course Name: Lab on System Programming UG: Course Code: UG-CS-Lab-301

Objectives of the course:

The objective of this course is to create awareness about system software and their Editors, Understand detail working of assembler, macro pre-processor, compiler, linker and loader.

Expected Learning Outcomes:

Students are able to develop system program to provide basic applications for computing line editor, interrupt handler, smaco, and lexical analyzer.

(8) Course Name: Lab on Programming in VB.NET, Computer Aided Graphics: Course Code:UG-CS-Lab-302

Objectives of the course:

The objective of this course is to create objects through 2D and 3D modelling, add effects using light and material and create animated frames. A student learns object oriented concepts in VB.NET.

Expected Learning Outcomes:

Students are able to perform 2D & 3D transformation on different images. Also able to explore different line and circle drawing algorithm. Get aware about .NET Platform and understand object oriented programming in VB.NET.

(9) Course Name: Lab on JAVA Programming –I: Course Code: UG-CS-Lab-303 B)

Objectives of the course:

The objective of this course is to learn JDK environment, explore the concept of polymorphism, Operator overloading and overriding.

Expected Learning Outcomes:

Students are able to develop efficient program which provides graphical user interface for easy handling of computers using JAVA.

Semester: VI

Class: T. Y. B. Sc. Computer Science

(1) Course Name: Operating System: Course Code: UG-CS-321

Objectives of the course:

To Introduce CPU scheduling, Memory Management, Disk and Drum Scheduling, Deadlocks and Overview of Android Operating system.

Expected Learning Outcomes: Students are familiar with:

Operating system, Types of Operating System, Services of Operating System, Functions of operating system. Multiprogramming Concepts, Basic Concept of CPU scheduling, Scheduling Algorithms. Logical versus Physical Address space, Swapping, Multiple partition allocation MFT, MVT, Paging, Segmentation. First Come first serve scheduling, Shortest Seek Time First Scheduling, SCAN Scheduling, C-SCAN Scheduling. Concept of Deadlock, Deadlock Characterization, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock. Android operating system, Android Architecture, Features of Android operating system, Applications of android operating system, Google play store.

(2) Course Name: MS SQL Server: Course Code: UG-CS-322

Objectives of the course:

To Introduce the concept of SQL and MS SQL Server, Database and Table Operations, SQL – Statements, Operators, Functions, VIEW, JOIN and DATA CONSTRAINTS in SQL, Stored Procedures, TRIGGERS and ERROR HANDLING

Expected Learning Outcomes: Students are familiar with:

SQL, Overview of MS SQL Server, New Features in MS SQL Server, Data types in MS SQL Server MS SQL Server Editions. Database Operations: 1. Creating a Database 2. Dropping the Database Table Operations: 1. Create 2. Alter 3. Truncate 4. Drop, Opening the Query Editor Window, SQL Data Statements: SELECT, INSERT, UPDATE, DELETE, Operators Arithmetic, Logical, Comparison, Assignment, Bitwise, Relational, String-Concatenation, Unary, Compound Assignment, Functions-Aggregate functions, Date and Time functions, String functions, Control -Control Flow Statements, BEGIN...END, GOTO, IF...ELSE, WHILE, Constraints - Data Integrity, Entity Integrity- PRIMARY KEY, UNIQUE, FOREIGN KEY, CHECK, Views - Create, Alter, Drop, Join - Joins, Cross Join, Inner Join, Outer Join, Self-Join, Statement - MERGE Statement. Benefits of Stored Procedures, Types of Stored Procedures - System Stored Procedures, User-Defined Stored Procedures, Creating and Altering Stored Procedure, Indexing: -Creating an Index, Optimizing the Index Performance, Removing the Index, Trigger, trigger Vs constraints, DML Triggers, DDL Triggers. Error Handling, Function: - Using the @@ERROR Function, Statement: - RAISERROR, TRY...CATCH Statement

(3) Course Name: Internet Programming using PHP: Course Code: UG-CS-323

Objectives of the course:

To Introduce the concept of Basics of PHP, Arrays, Function and String, Object-Oriented PHP, Web Techniques and PHP with MySQL.

Expected Learning Outcomes: Students are familiar with:

PHP, Features & Drawbacks of PHP, PHP Working, Version of PHP, Lexical Structure of PHP- Structure & Syntax of PHP, PHP with HTML, Comments, Data Types and Variables., Operator. They are familiar with Flow Control Statements- Conditional Statements, Looping Statements Exit, Return, Die, Include and Require Statements .Array in PHP- Index Vs Associative Array, Multidimensional Array, Different array function in PHP, Traversing arrays, Sorting arrays, Introduction to Function- Defining and Calling a function, Scope of variables in function, Function Parameters, Returning Values from a function, Recursive Functions, Types of strings in PHP, Printing functions, Comparing strings, Manipulating and Searching strings, Regular Expressions. Object-Oriented PHP Benefits of OOPs, Creating a Class, Creating an Object- Adding a Method, Adding a Properties, Visibility (Public, Private and Protected), Constructor and Destructors, Inheritance (Extending a class) Abstract classes, Final classes, Interfaces, Exception handling, Serialization. Web Techniques, HTTP Basics, Processing Forms-Methods (Get and Post Method), Parameters (\$_GET and \$_POST), Self-Processing Pages, File Uploads, Maintaining State-Cookies, Sessions, Combining Cookies and Sessions, Interaction between PHP and MySQL, PHP, PHP functions to manipulate, MYSQL database, Error Checking, Execute DDL Statements, Execute DML Statements.

(4) Course Name: Theoretical Computer Science: Course Code: UG-CS-324

Objectives of the course:

To provide the comprehensive insight into theory of computation by understanding grammar, languages and other elements of modern language design. Also to develop capabilities to design and develop formulations for computing models and identify its applications in diverse areas.

Expected Learning Outcomes:

Students able to Understand Grammar and Languages, Learn about Automata theory and its application in Language Design, Turing Machines and Pushdown Automata , Understand Linear Bound Automata and its applications.

(5) Course Name: Computer Network: Course Code: UG-CS-325

Objectives of the course:

To Introduce Introduction to Computer Network and Network Model, Physical Layer, The Data link Layer, The Network Layer, Transport Layer, Cryptography and Public key Infrastructure.

Expected Learning Outcomes: Students are familiar with:

Computer Network, Application of Computer Networks, Transmission Mode, Network Structure, Network Topologies, ISO OSI Reference Models, TCP / IP Reference Model & their Comparison. Guided Media: Twisted Pair, Coaxial Cable, Fiber Optics, Satellite Communication, Microwave Communication, Submarine Cables. Unguided Media: Electromagnetic Spectrum, Radio Transmission, Microwave Transmission, Infrared & Millimeter Waves, Light wave Transmission. Services Provided to Network Layer, Framing, Error Control, Flow Control, Error Detection – Redundancy, Parity Check, Checksum & CRC, Error Correction – Hamming Code. Logical Addressing: - IP v4 Addresses, Address Space, Classful Addressing, Classless Addressing. Routing Algorithm: Shortest Path, Multicast Routing. Congestion Control: Introduction to Congestion Control, Deadlocks. Process to Process Delivery: Client-Server Paradigm, Multiplexing and Demultiplexing, Connectionless v/s Connection Oriented Services, Reliable v/s Unreliable Transmission. UDP and TCP: UDP Operations and uses, TCP Services and features. Introduction:- Cryptography, Cryptanalysis, Cryptology, Substitution, Techniques: Caesar's cipher, Monoalphabetic and Polyalphabetic, Transposition techniques Rail fence technique, Simple Columnar, Public key infrastructures: basics, digital certificates, certificate authorities, registration authorities, Digital Signature.

(6) Course Name: JAVA Programming-II: Course Code: UG-CS-326 B)

Objectives of the course:

Objectives of the course are to explore advanced topic of Java programming for solving problems.

Expected Learning Outcomes:

Students are able to understand the concepts related to Java Technology. Explore and understand use of Java Server Programming.

(7) Course Name: Lab on MS SQL Server: Course Code: UG-CS-Lab-304

Objectives of the course:

Objectives of the course are to understand features and data types in SQL Server. Also Create and Manipulate Databases for various applications.

Expected Learning Outcomes:

Students are able to Develop database management system using features and services provided by MS SQL server.

(8) Course Name: Lab on Internet Programming using PHP: Course Code: UG-CS-Lab-305

Objectives of the course:

Objectives of the course are to understand how PHP works. Student also aware about different web techniques used in PHP.

Expected Learning Outcomes:

Students are able to develop interactive static as well as dynamic websites.

(9) Course Name: Lab on JAVA Programming II: Course Code: UG-CS-Lab-306 B)

Objectives of the course:

Objectives of the course are to understand program using graphical user interface with swing classes and handle different kinds of events while handling windows. Also learns menus dialog boxes, applets and advanced JAVA concepts.

Expected Learning Outcomes:

Students are able to perform application using graphical user interface with swing classes. Also perform program for Website using applets.