Department of Physics

Course Specific Outcomes
&
Programme Specific Outcomes

For B.Sc. Course

DYAL SINGH COLEEGE, KARNAL

NAME OF THE PROGRAMME   : BACHELOR OF SCIENCE (B.Sc.) Non-medical
DURATION   : THREE YEARS

PROGRAMME OUTCOMES (POs)		
PO1	Knowledge	Capable of demonstrating comprehensive disciplinary knowledge gained duringcourse of study.
PO2	Communication	Ability to communicate effectively on general and scientific topics with the scientificcommunity and with society at large.
PO3	Problem Solving	Capability of applying knowledge to solve scientific and otherproblems.
PO4	Individual and Team Work	Capable to learn and work effectively as an individual, and as a member or leader indiverse teams, in multidisciplinary settings.
PO5	Investigation of Problems	Ability of critical thinking, analytical reasoning and research-based knowledgeincluding design of experiments, analysis andinterpretation of data to provideconclusions.
PO6	Modern Tool Usage	Ability to use and learn techniques, skills and modern tools for scientific practise.
PO7	Science and Society	Ability to apply reasoning to access the different issues related to society and theConsequent responsibilities relevant to theprofessional scientific practices.
PO8	Life-Long Learning	Aptitude to apply knowledge and skills that are necessary forparticipating inlearning activities throughout the life.
PO9	Environment and Sustainability	Ability to design and develop modern systems which areenvironmentally sensitiveand to understand the importance of sustainable development.
PO10	Ethics	Apply ethical principles and professional responsibilities inscientific practices.
PO11	Project Management	Ability to demonstrate knowledge and understanding of thescientific principles andapply these to manage projects.

PROGRAMME SPECIFIC OUTCOMES (PSOs)	
The objective of the program designed for BSc course is to foster the scientifictalent of studentsforproficientskill in the field of education and research.	
PSO1	Acquire athorough acquaintance, understanding and knowledge of the basic perceptions of Physics and be able to recognize how various phenomena detected in nature follow from a small set of fundamental laws through rational reasoning.
PSO2	Be accomplishedwith the understanding of the core physical laws to understand the basic concepts, latest advancementand applications of certain fields of Physics such as Mechanics, Electricity and Magnetism, Properties of Matter, Semiconductor Electronics, Optics, Thermodynamics, Statistical Physics,Nuclear Physics, Atomic and Molecular Spectroscopy, Quantum Mechanics and Solid-StatePhysics.
PSO3	Gain hands-on skills for carrying out certain basic and various branch related experiments of Physics and attain the ability of critical thinking, problem mapping and solving usingfundamental principles of Physics, systematic analysis and interpretation of results.
PSO4	Have a new vision to look at the world with scientific temperament that empowers them topursue studies at higher and research level.
PSO5	Have awareness of the impact of Physics oncommunity and variouscommercial and environmental issues.

Classical Mechanics and Theory of Relativity (PH-101)

Course Objectives: The aim of this course is to introduce the basic concepts of Classical mechanics, Generalized Notations, Theory of relativity and Applications of theory of relativity.

Course Outcomes: At the end of this course, the students will be able to:

PH-101.1 Understand the mechanics of single and system of particles along with conservation laws.

PH-101.2 Understand generalized co-ordinates, Hamilton's Principle, Lagrange's equation and their applications.

PH-101.3 Learn the basic concepts of the theory of relativity, frames of references, Michelson's Morley experiment.

PH-101.4 Understand the concepts of special theory of relativity including Lorentz invariance, length contraction, time dilation, twin paradox, mass variation and energy-mass equivalence.

CO-PO Mapping Matrix for Course Code: PH-101

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
PH-101.1	3	2	3	3	3	3	3	3	2	2	3
PH-101.2	3	2	3	3	3	3	2	3	2	2	3
PH-101.3	3	2	3	3	2	3	3	2	2	2	2
PH-101.4	3	2	3	3	3	3	2	2	2	2	2
Average	3	2	3	3	2.75	3	2.5	2.5	2	2	2.5

CO-PSO Mapping Matrix for Course Code: PH-101

CO	PSO1	PSO2	PSO3	PSO4	PSO5
PH-101.1	3	3	2	2	2
PH-101.2	3	3	2	2	2
PH-101.3	3	3	3	2	3
PH-101.4	2	3	3	2	3
Average	2.75	3	2.5	2	2.5

Electricity, Magnetism and Electromagnetic theory (PH-102)

Course Objectives: The aim of this course is to introduce Vector background and Electric field, Magnetism, Electromagnetic theory and A. C. Analysis of simple circuits.

Course Outcomes: At the end of this course, the students will be able to:

PH-102.1 Understand the scalar and vector potentials with significance, Gauss's law of electrostatics and its applications.

PH-102.2 The important properties of magnetic field and theories of dia, para and ferromagnetic materials.

PH-102.3 Derive Maxwell's equations and introduce the role of displacement current, boundary conditions at interface between different media, propagation of electromagnetic waves.

PH-102.4 Analysis of AC circuits with combination of capacitance, resistance and inductance, Q- factor.

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CO-PO Mapping Matrix for Course Code: PH-102

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CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
PH-102.1	3	3	3	2	2	1	2	3	1	2	2
PH-102.2	3	3	3	2	2	1	2	3	1	2	2
PH-102.3	3	3	3	2	2	1	2	3	1	2	2
PH-102.4	3	3	3	2	2	2	2	3	1	2	2
Average	3	3	3	2	2	1.25	2	3	1	2	2

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CO-PSO Mapping Matrix for Course Code: PH-102

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CO	PSO1	PSO2	PSO3	3	PSO5
PH-102.1	3	3	2	3	2
PH-102.2	3	3	2	3	2
PH-102.3	3	3	2	3	2
PH-102.4	3	3	2	3	2
Average	3	3	2	3	2

Properties of matter and kinetic theory of gases (PH-201)
Course Objectives: The aim of this course is to introduce the moment of inertia, Elasticity, kinetic theory of gases and experimental verifications of Maxwell's Law.
Course Outcomes: At the end of this course, the students will be able to: PH-201.1 Understand the concept of Moment of Inertia and theorems of perpendicular and parallel axes and evaluation of moment of inertia of different objects like sphere, spherical shell etc. PH-201.2 Describe the basic concepts of Hooke's Law, Poisson's ratio, determination of coefficient of modulus of rigidity for different materials. PH-201.3 Understand the assumptions of kinetic theory of gases, degree of freedom, specific heat of gases and Vander wall's equations. PH-201.4 Study the experiment verifications of Maxwell's Law of speed distribution: most probable speed, average and r.m.s. speed, mean free path etc.

CO-PO Mapping Matrix for Course Code: PH-201

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
PH-201.1	3	2	3	3	3	3	3	3	2	2	2
PH-201.2	3	2	3	3	3	3	2	3	2	2	3
PH-201.3	3	2	3	3	3	2	3	3	2	2	3
PH-201.4	3	3	2	3	3	3	3	3	2	2	3
Average	3	2.25	2.75	3	3	2.75	2.75	3	2	2	2.75

CO-PSO Mapping Matrix for Course Code: PH-201

CO	PSO1	PSO2	PSO3	PSO4	PSO5
PH-201.1	3	3	3	3	2
PH-201.2	3	3	2	2	2
PH-201.3	3	2	2	3	2
PH-201.4	3	3	3	2	2
Average	3	2.75	2.5	2.25	2

Semiconductor Devices (PH-202)

Course Objectives: The aim of this course is to introduce the basic concepts of semiconductor, transistor, amplifiers and oscillators.

Course Outcomes: At the end of this course, the students will be able to:

PH-202.1 Understand the basic concepts of semiconductor devices including PN junction diode, Zener diode, rectifiers, LED, photodiode, solar cell and filter circuits.

PH-202.2 Understand the basic characteristics of transistors, biasing and stabilization.

PH-202.3 Study different amplifiers, their classifications concept of feedback, coupling and distortion in amplifiers.

PH-202.4 Understand the principle of oscillation, classification of oscillators, and condition for self-sustained oscillation, tuned collector common emitter oscillator, Hartley oscillator and C.R.O.

CO-PO Mapping Matrix for Course Code: PH-202

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
PH-202.1	3	3	3	2	3	3	2	3	1	2	3
PH-202.2	3	3	3	2	3	3	2	3	1	2	3
PH-202.3	3	3	3	2	3	3	2	3	1	2	3
PH-201.4	3	3	3	2	3	3	2	3	1	2	3
Average	3	3	3	2	3	3	2	3	1	2	3

CO-PSO Mapping Matrix for Course Code: PH-202

CO	PSO1	PSO2	PSO3	PSO4	PSO5
PH-202.1	3	3	3	3	2
PH-202.2	3	3	3	3	2
PH-202.3	3	3	3	3	2
PH-202.4	3	3	3	3	2
Average	3	3	3	3	2

Computer Programming and Thermodynamics: (PH-301)

Course Objectives: The aim of this course is to introduce Computer Programming, Applications of FORTRAN programming, and thermodynamics.

Course Outcomes: At the end of this course, the students will be able to:

PH-301.1 Learn about the basic computer organization, Problem solution with the help of algorithm and flow charts, Fundamentals of Fortran Programming including control structures and Function subprogram and sub routine.

PH-301.2 Learn to solve various mathematical problems using Fortran Programming language learnt in the previous chapter.

PH-301.3 Understand the basic concepts of thermodynamics, the first and the second law of thermodynamics, Joule Thomson effect, Joule-Thomson (Porous plug) experiment, the concept of entropy and the associated theorems, calculations of entropy of reversible & irreversible process, T-S diagram and Nernst heat law (third law of thermodynamics).

PH-301.4 Students will learn to derive the Clausius-Clapeyron latent heat equations and understand their significance. The students will also be able to learn about Maxwell's thermodynamic relations, their physical interpretations and their application to derive the relation between two specific heats, to derive Clausius-Clapeyron equation, to derive Joule Thomson Effect.

CO-PO Mapping Matrix for Course Code: PH-301										
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
PH-301.1	3	3	3	2	3	3	2	3	1	2	3
PH-301.2	3	3	3	2	3	3	2	3	1	2	3
PH-301.3	3	3	3	2	2	2	2	2	1	2	2
PH-301.4	3	3	3	2	2	2	2	2	1	2	2
Average	3	3	3	2	2.5	2.5	2	2.5	1	2	2.5

CO-PSO Mapping Matrix for Course Code: PH-301					
CO	PSO1	PSO2	PSO3	PSO4	PSO5
PH-301.1	3	3	3	3	2
PH-301.2	3	3	3	3	2
PH-301.3	3	3	2	2	2
PH-301.4	3	3	2	2	2
Average	3	3	2.5	2.5	2

Wave & optics –I (PH-302)

Course Objectives: The aim of this course is to introduce the optical phenomena: interference and applications related to interference, diffraction and application, experiment based on diffraction.

Course Outcomes: At the end of this course, the students will be able to:

PH-302.1 Understand the concept of interference and applications under division of wavefront: Fresnel's Biprism, Lloyd's mirror and phase change.

PH-302.2 Interference concept due to division of amplitude, thin film reflection and transmission, Newton's rings, wedge shaped film and Michelson Interferometer.

PH-303.3 Understand the basic concept of diffraction: Fresnel's diffraction, zone plate and application under Fresnel's diffraction.

PH -303.4 Solve problems and application based on Fraunhoffer's diffraction, plane transmission diffraction grating, resolving & dispersive power of telescope and grating.

CO-PO Mapping Matrix for Course Code: PH-302

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
PH-302.1	3	3	3	3	3	2	2	2	2	3	2
PH-302.2	3	3	3	2	2	2	2	2	2	2	2
PH-302.3	3	2	2	3	2	2	2	2	1	1	2
PH-302.4	3	3	3	3	2	2	2	2	2	2	2
Average	3	2.75	2.75	2.75	2.25	2	2	2	1.75	2	2

CO-PSO Mapping Matrix for Course Code: PH-302

CO	PSO1	PSO2	PSO3	PSO4	PSO5
PH-302.1	3	3	2	3	3
PH-302.2	3	3	2	2	2
PH-302.3	2	2	3	2	2
PH-302.4	2	3	3	2	3
Average	2.5	2.75	2.5	2.25	2.5

Statistical Physics:(PH-401)

Course Objectives: The aim of this course is to introduce the Statistical Physics, Quantum Statistics and Theory of Specific Heat of Solids.

Course Outcomes: At the end of this course, the students will be able to:

PH-401.1 Learn about the basic concepts of Probability, thermodynamic probability, distribution of distinguishable and indistinguishable particles in boxes of equal size and in compartments of different size, condition of equilibrium between two systems in thermal contact. Students will be able to understand the relation between Thermodynamics and Probability (Boltzmann relation).

PH-401.2 Learn about the concept of phase space and its division into cells, basic approach to three kinds of statistics, Maxwell Boltzmann statistics applied to derive the energy distribution, speed distribution and velocity distribution laws. Application of these laws to derive RMS and Average speeds and velocities.

PH-401.3 Understand the need and application of Quantum Statistics: Bose-Einstein & Fermi-Dirac statistics and their application to derive important laws of Physics like Planck's Radiation Law and energy distribution law for electron gas in metals. Also students will be able to articulate the connection as well as comparison between classical statistical mechanics and quantum statistical mechanics.

PH-401.4 Learn and understand the different law's and theory of specific heat of solids and their significance.

CO-PO Mapping Matrix for Course Code: PH-401										
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
PH-401.1	3	3	3	2	3	2	2	3	1	2	2
PH-401.2	3	3	2	2	2	1	2	2	1	2	2
PH-401.3	3	3	2	2	2	1	2	2	1	2	2
PH-401.4	3	3	2	2	2	1	2	2	1	2	2
Average	3	3	2.25	2	2.25	1.25	2	2.25	1	2	2

CO-PSO Mapping Matrix for Course Code: PH-401					
CO	PSO1	PSO2	PSO3	PSO4	PSO5
PH-401.1	3	3	2	2	2
PH-401.2	3	3	2	2	2
PH-401.3	3	3	2	2	2
PH-401.4	3	3	2	2	2
Average	3	3	2	2	2

Wave & Optics –II: (PH-402)

Course Objectives: The aim of this course is to introduce the concept of polarization, Fourier theorem and series, Fourier Transform, aberrations and fiber optics.

Course Outcomes: At the end of this course, the students will be able to :

PH-402.1 Understand the theory of polarization, Nicol prism, plane polarized light, circularly and elliptically polarized light. Also able to understand optical rotation, specific rotation and polarimeters.

PH-402.2 Understand Concept of Fourier theorem and series, applications based on Fourier series: square wave, triangular wave etc.

PH- 402.3 Concept of Fourier Transform, its properties and applications, basic concept of matrix methods, unit planes, nodal planes.

PH-402.4 Understand the concept of aberrations and concept of fiber optics along with its applications.

CO-PO Mapping Matrix for Course Code: PH-402

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
PH-402.1	3	3	3	2	3	2	2	2	2	2	2
PH-402.2	3	3	3	2	3	2	3	2	2	2	2
PH-402.3	3	2	3	3	2	2	2	2	1	1	2
PH-402.4	3	3	3	2	2	2	2	2	2	2	2
Average	3	2.75	3	2.25	2.5	2	2.25	2	1.75	1.75	2

CO-PSO Mapping Matrix for Course Code: PH-402

CO	PSO1	PSO2	PSO3	PSO4	PSO5
PH-402.1	3	3	2	2	3
PH-402.2	2	3	2	2	2
PH-402.3	3	2	2	2	2
PH-402.4	2	3	2	2	2
Average	2.5	2.75	2	2	2.25

Quantum Mechanics and Laser: PH-501

Course Objectives: The aim of this course is to introduce Origin of quantum physics (Experimental basis), Application of Schrodinger wave equation and Laser Physics.

Course Outcomes: At the end of this course, the students will be able to

PH-501.1 Get insights of the inability of classical mechanics to explain various phenomenon which leads to the development of Quantum mechanics which includes developing the idea of probability interpretation. Discussion of the formulation of Schrodinger equation which includes both time dependent and time independent cases.

PH-501.2 Understand the behaviour of quantum particle encountering infinite potential barrier, step potential, quantum tunnelling and linear harmonic oscillator.

PH-501.3 Familiarize with optical phenomena and different concepts related to laser physics, characteristics of Laser Light, and different types of pumping.

PH-501.4 Qualitative understanding of basic lasing mechanism, types of Lasers (Solid state laser and Low power gas laser), application of laser in medicine, industry and military.

CO-PO Mapping Matrix for Course Code: PH-501										
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
PH-502.1	3	3	3	2	2	1	2	3	1	2	2
PH-502.2	3	3	3	2	2	1	2	3	1	2	2
PH-502.3	3	3	3	2	2	1	2	2	1	2	2
PH-502.4	3	3	3	2	2	1	2	2	1	2	2
Average	3	3	3	2	2	1	2	2.5	1	2	2

CO-PSO Mapping Matrix for Course Code: PH-501				
CO	PSO1	PSO2	PSO3	PSO4	PSO5
PH-502.1	3	3	2	2	2
PH-502.2	3	3	2	2	2
PH-502.3	3	3	2	3	2
PH-502.4	3	3	2	2	3
Average	3	3	2	2.25	2.25

NUCLEAR PHYSICS: PH-502

Course Objectives: The aim of this course is to introduce the structure, properties, stability and energy content of the nucleus along with origin, interaction, detection and acceleration of nuclear particles.

Course Outcomes: At the end of this course, the students will be able to

PH-502.1. Understand the structure, properties, their determination and the stability of the nucleus.

PH-502.2. Understand origin and interaction of nuclear particles like α, β and γ with matter.

PH-502.3. Understand detection and acceleration of nuclear particles.

PH-502.4.Understand the nuclear reactions, Q-value, fission, fusion and nuclear reactors to harness nuclear energy.

CO-PO Mapping Matrix for Course Code: PH-502

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
PH-502.1	3	3	3	2	2	1	2	3	1	2	2
PH-502.2	3	3	3	2	2	1	2	3	1	2	2
PH-502.3	3	3	3	2	2	2	2	2	2	2	2
PH-502.4	3	3	3	2	2	2	2	2	2	2	2
Average	3	3	3	2	2	1.5	2	2.5	1.5	2	2

CO-PSO Mapping Matrix for Course Code: PH-502

CO	PSO1	PSO2	PSO3	PSO4	PSO5
PH-502.1	3	3	2	2	2
PH-502.2	3	3	2	2	2
PH-502.3	3	3	2	3	2
PH-502.4	3	3	2	2	3
Average	3	3	2	2.25	2.25

SOLID STATE AND NANO PHYSICS: PH-601

Course Objectives: The aim of this course is to introduce the crystalline structures and their determination, superconductivity and its uses, nanomaterials and their applications.

Course Outcomes: At the end of this course, the student will be able to

PH-601.1. understand crystals, crystal lattice, unit cell, crystal structure, their characteristics and symmetries, Bravais lattices, crystal planes, Miller indices and the structures of some crystals like diamond, sodium chloride and zinc sulphide.

PH-601.2. understand crystal structure determination using x-ray diffraction and reciprocal lattice and their properties.

PH-601.3. understand basic ideas of superconductivity, classification of superconductors, London and BCS theory of superconductivity and the applications of superconductivity.

PH-601.4. understand the concept of nanomaterials, nanotechnology, Nano-Physics and the applications of nanomaterials and nanotechnology.

CO-PO Mapping Matrix for Course Code: PH-601

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
PH-601.1	3	3	3	2	2	2	2	3	1	2	3
PH-601.2	3	3	3	2	2	2	2	2	1	2	2
PH-601.3	3	3	3	2	2	2	2	2	2	2	1
PH-601.4	3	3	3	2	2	2	3	3	2	2	3
Average	3	3	3	2	2	2	2.25	2.5	1.5	2	2.25

CO-PSO Mapping Matrix for Course Code: PH-601					
CO	PSO1	PSO2	PSO3	PSO4	PSO5
PH-601.1	3	3	2	2	3
PH-601.2	3	3	2	2	2
PH-601.3	3	3	2	2	3
PH-601.4	3	3	2	3	3
Average	3	3	2	2.25	2.75

Atomic and Molecular spectroscopy: PH-602

Course Objectives: The aim of this course is to introduce the Historical background of atomic spectroscopy, Vector atom model (single and two valance electrons) and Atom in External Field.

Course Outcomes: At the end of this course, the student will be able to

PH-602.1 Acquire knowledge about the historical background and developments of atomic spectroscopy through the study of spectral series in Hydrogen atom, effect of nuclear motion on line spectra (correction of finite nuclear mass), short comings of Bohr's theory, Wilson Sommerfeld quantization rule, Sommerfeld's extension of Bohr's model, Sommerfeld relativistic correction, Short comings of Bohr-Sommerfeld theory and finally Vector atom model.

PH-602.2 Understand and explain the vector atom model, various coupling schemes and atomic spectra of one and two electron atoms.

PH-602.3. Explain the influence on the spectra of atoms in the presence of external applied electric and magnetic field i.e. Zeeman effect, Paschen-Back effect, Stark effect.

PH-602.4 Have basic idea about the rotational, vibrational and rotational-vibrational spectra of diatomic molecules and basic idea of Raman Effect.

CO-PO Mapping Matrix for Course Code: PH-602										
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
PH-602.1	3	3	3	2	2	2	2	3	1	2	3
PH-602.2	3	3	3	2	2	2	2	2	1	2	2
PH-602.3	3	3	3	2	2	1	2	2	1	2	1
PH-602.4	3	3	3	2	2	1	3	3	2	2	3
Average	3	3	3	2	2	1.5	2.25	2.5	1.25	2	2.25

CO-PSO Mapping Matrix for Course Code: PH-602					
CO	PSO1	PSO2	PSO3	PSO4	PSO5
PH-602.1	3	3	2	2	3
PH-602.2	3	3	2	2	2
PH-602.3	3	3	2	2	3
PH-602.4	3	3	2	3	3
Average	3	3	2	2.25	2.75

B.SC -1 Lab Practical : PH-203

Course Objectives: The aim of this course is to have hands on experience with different instruments related to mechanics and electronics.

Course Outcomes: At the end of this course:

PH-203.1 Students are able to understand the different concepts related to different experiments in Physics.

PH-203.2 Verify some fundamental principles, effects and concepts of physics through experiements.

PH-203.3 Performed experiments related to mechanics: bar pendulum, flywheel, Young's modulus, Modulus of rigidity, Searle's method.

PH-203.4 Verify basic laws of electronics using PN junction, photo cell, Zener diode, sonometer, impedance of A. C circuits. Learn to present observations, results and analysis in suitable form.

CO-PO Mapping Matrix for Course Code: PH-203

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
PH-203.1	3	3	3	2	2	2	2	3	1	2	3
PH-203.2	3	3	3	2	2	2	2	2	1	2	2
PH-203.3	3	3	3	2	2	1	2	2	1	2	1
PH-203.4	3	3	3	2	2	1	3	3	2	2	3
Average	3	3	3	2	2	1.5	2.25	2.5	1.25	2	2.25

CO-PSO Mapping Matrix for Course Code: PH-203

CO	PSO1	PSO2	PSO3	PSO4	PSO5
PH-203.1	3	3	2	2	3
PH-203.2	3	3	2	2	2
PH-203.3	3	3	2	2	3
PH-203.4	3	3	2	3	3
Average	3	3	2	2.25	2.75

B.SC -2 Lab Practical: PH-403

Course Objectives: The aim of this course is to have hands on experience with different instruments related to optics, electronics and Fortran language.

Course Outcomes: At the end of this course:

PH-403.1 Understand various optical phenomena, principle, and applications.

PH-403.2 Verified: interference and diffraction related experiments like Newton's rings, Diffraction grating, prism and resolving power of telescope.

PH-403.3 Basic concept of Fortran, statements under Fortran and program based on Fortran : Ascending–descending order, even/odd number, area of sphere, circle and triangle.

PH-403.4 Learn to present observations, results and analysis in suitable form.

CO-PO Mapping Matrix for Course Code: PH-403										
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
PH-403.1	3	3	3	2	2	2	2	3	1	2	3
PH-403.2	3	3	3	2	2	2	2	2	1	2	2
PH-403.3	3	3	3	2	2	1	2	2	1	2	1
PH-403.4	3	3	3	2	2	1	3	3	2	2	3
Average	3	3	3	2	2	1.5	2.25	2.5	1.25	2	2.25

CO-PSO Mapping Matrix for Course Code: PH-403					
CO	PSO1	PSO2	PSO3	PSO4	PSO5
PH-403.1	3	3	2	2	3
PH-403.2	3	3	2	2	2
PH-403.3	3	3	2	2	3
PH-403.4	3	3	2	3	3
Average	3	3	2	2.25	2.75

B.SC -3 Lab Practical: PH-603

Course Objectives: The aim of this course is to have hands on experience with different instruments related to optics, electronics and Fortran language.

Course Outcomes: At the end of this course:

PH-603.1 Perform experiments to determine the resistance& band gap of semiconductor materials and handling of different instruments such as C.R.O.

PH-603.2 Learn the concepts of diffraction and interference by performing experiments like: resolving power of prism and grating, diameter of Lycopodium powder, wavelength of light by Fresnel's biprism etc.

PH-603.3 Understand the applications of FORTRAN in various mathematical problems: Simpson's 1/3 rule, least square fitting, sum of finite series and standard deviation.

PH-603.4 Learn to present observations, results and analysis in suitable form.

CO-PO Mapping Matrix for Course Code: PH-603

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
PH-603.1	3	3	3	2	2	2	2	3	1	2	3
PH-603.2	3	3	3	2	2	2	2	2	1	2	2
PH-603.3	3	3	3	2	2	1	2	2	1	2	1
PH-403.4	3	3	3	2	2	1	3	3	2	2	3
Average	3	3	3	2	2	1.5	2.25	2.5	1.25	2	2.25

CO-PSO Mapping Matrix for Course Code: PH-603

CO	PSO1	PSO2	PSO3	PSO4	PSO5
PH-603.1	3	3	2	2	3
PH-603.2	3	3	2	2	2
PH-603.3	3	3	2	2	3
PH-603.4	3	3	2	3	3
Average	3	3	2	2.25	2.75

Principal
Dyal Singh College
KARNAL

Department of Mathematics

Course Specific Outcomes
&
Programme Specific Outcomes

For B.Sc. (NM) Course

B.A./ B.Sc. with Mathematics

Program Outcomes (PO) for Under Graduate Programme in the Faculty of Sciences, Dyal Singh College, Karnal

PO1	Knowledge	Capable of acquiring comprehensive subject knowledge to compete globally
PO2	Communication	To have effective communication skills with their peers , society around them and the scientific community
PO3	Problem Solving	To be able to solve scientific and other Mathematical problems
PO4	Individual and Team Work	Capable of working effectively and efficiently as an individual, as a member or a leader in diverse teams in multidisciplinary areas
PO5	Investigation of Problems	To be able to develop critical thinking, logical and analytical reasoning and research based knowledge, design of experiments, analysis and data interpretation to reach logical conclusions
PO6	Modern Tool usage	Ability to learn techniques, skills and modern tools and apply them in various areas of Science and Mathematics
PO7	Science and Society	Ability to apply reasoning and critical thinking to assess the different issues related to world and discharging their responsibilities towards the society
PO8	Life-Long Learning	To gain natural liking to apply knowledge and skills required to keep learning process on throughout the life
PO9	Environment and Sustainability	Ability to have awareness of and able to develop solution oriented approach towards various social and environmental issues, understand the importance of sustainable development and contribute in sustainable environment
PO10	Ethics	Apply and adhere to ethical principles, professional responsibilities in scientific practices and discharging duties in serving the world
PO11	Project Management	Ability to apply knowledge and understanding of the scientific principles and apply these to manage various projects in Science and Mathematics

Program Specific Outcomes (PSO)

After successful completion of the programme, a student will be able to:

PSO1	Have basic understanding and knowledge in different core areas of Mathematics such as Algebra, Real analysis, Calculus, Differential Equations, Statics, Dynamics and Numerical Analysis. Develop thinking in a critical way. Demonstrate and to be able to effectively use that information to find the solution of problems at hand
PSO2	Gain a good knowledge of Mathematical concepts and develop the mathematical reasoning, knowledge, critical thinking, skills and aptitude for pursuing high quality research in Mathematics. Understand, formulate and use quantitative models
PSO3	Inculcate problem solving skills, creative talent and power of communication necessary for various kinds of employment and have good and effective communication by presentation, written, computational and graphical means
PSO4	Inculcate a new perspective to look at problems from scientific point of view and enabling them to pursue higher studies at post-graduate and research level. Enhance their employability in government/private sectors, jobs in banking/insurance and investment sectors

BM-111 ALGEBRA

Course objectives: The aim of this course is to study the concepts of Algebra.
Course outcomes: This course will enable the student to:

BM-111.1   Understand the basic concepts of symmetric, skew symmetric, Hermitian and skew Hermitian matrices. Determine rank of a matrix ,inverse , eigen values , eigen vectors and the characteristic equations of matrices. Understand linear independence and dependence of vectors and to solve related problems.

BM- 111.2   Find the solutions of Homogenous and non homogeneous system of linear equations using matrices. Know about unitary and orthogonal matrices and to solve related problem.

BM-111.3   Determine relations between the roots of and coefficients of polynomial equations. Identify Common and multiple roots.

BM-111.4   Applications of Descartes's rule of sign. Solve cubic and biquadratic equations. Solve practical problem of cubic equations by Cardon's method and biquadratic equations by Ferrari's method.

CO-PO Mapping matrix for course code: BM-111: ALGEBRA

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BM-111.1	3	3	3	3	3	2	2	2	2	2	2
BM-111.2	3	3	3	3	3	2	3	2	2	2	3
BM-111.3	3	3	3	3	3	2	3	3	2	2	2
BM-111.4	3	3	3	3	3	2	2	3	2	2	3
Average	3	3	3	3	3	2	2.5	2.5	2	2	2.5

CO-PSO Mapping matrix for course: BM-111: ALGEBRA

Cos	PSO1	PSO2	PSO3	PSO4
BM-111.1	3	3	3	3
BM-111.2	3	3	3	3
BM-111.3	3	3	3	3
BM-111.4	3	3	3	3
Average	3	3	3	3

BM-112 : CALCULUS

COURSE OBJECTIVE: The aim of this course is to study the fundamental concepts of calculus.

Course outcomes: At the end of this course, the students will be able to :

BM-112.1 Familiarize with the basic concepts of limit, continuity and differentiability; successive differentiation of functions and series expansions.

BM-112.2 Understand the concepts of asymptote, curvature, evolute and involute of a curve, their geometrical meanings and to solve related problems; determine singular points of a curve and their types.

BM-112.3 Learn about the tracing of curves and their rectification; Reduction formulae.

BM-112.4 Understand the concepts of quadrature and compute the area bounded by closed curves, volumes and surface areas of solids formed by revolution of curves.

CO-PO Mapping Matrix for Course Code: BM-112: CALCULUS

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BM-112.1	3	3	3	3	2	3	2	3	2	2	2
BM-112.2	3	3	3	2	3	2	2	3	2	2	3
BM-112.3	3	3	3	2	3	3	3	3	2	2	2
BM-112.4	3	3	3	3	3	2	3	3	2	2	2
Average	3	3	3	2.5	2.75	2.5	2.5	3	2	2	2.25

CO-PSO Mapping Matrix for Course Code: BM-112: CALCULUS

Cos	PSO1	PSO2	PSO3	PSO4
BM-112.1	3	3	3	3
BM-112.2	3	3	3	3
BM-112.3	3	3	3	3
BM-112.4	3	3	3	3
Average	3	3	3	3

BM –113 : SOLID GEOMETRY

Course Objective: To understand the concepts & advance topics related to two & three dimensional geometry.

Course Outcomes: At the end of this course, students will be able to:

BM-113.1 Learn about General equation of second degree. Tracing of conics, Polar equation of a conic, tangent and normal to the conic.

BM-113.2 Know about Co-axal system of spheres Cones. Right circular cone, enveloping cone and reciprocal cone. Cylinder: Right circular cylinder and enveloping cylinder

BM-113.3 Identify Central Conicoids ,Equation of tangent plane, Director sphere.
BM-113.4 Know Confocal conicoid, Reduction of second degree equations.

CO-PO Matrix : BM – 113 : SOLID GEOMETRY

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BM – 113.1	3	3	3	3	3	3	3	3	2	2	3
BM – 113.2	3	3	3	3	3	3	3	3	2	2	3
BM – 113.3	3	3	3	3	3	3	3	3	2	2	3
BM – 113.4	3	3	3	3	3	3	3	3	2	2	3
Average	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**2**	**3**

CO-PSO matrix :BM – 113 : SOLID GEOMETRY

Cos	PSO1	PSO2	PSO3	PSO4
BM – 113.1	3	3	3	3
BM – 113.2	3	3	3	3
BM – 113.3	3	3	3	3
BM – 113.4	3	3	3	3
Average	**3**	**3**	**3**	**3**

BM-121: NUMBER THEORY AND TRIGNOMETRY

COURSE OBJECTIVE: The aim of this course is to study the concepts of number theory and trigonometry.

Course outcomes: This course will enable the students to:

BM-121.1   Understand the basis concepts of number theory and their applications in problem solving.   Prove Fermat and Wilson's theorems and their applications.

BM-121.2   Learn complete Residue system and Reduced Residue system modulo m.

Prove Chinese reminder theorem and their applications. Know about Quadratic residues.

BM-121.3   Prove De -Moivre's theorem and their applications. Understand the direct circular and hyperbolic functions and their properties.

BM-121.4   Know about the summations of trigonometric series and its problem. Understand the inverse circular and hyperbolic functions and its properties.

CO-PO Mapping matrix for course code: BM-121: NUMBER THEORY AND TRIGONOMETRY

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BM-121.1	3	3	3	3	3	3	2	2	2	2	3
BM-121.2	3	3	3	3	3	3	3	3	2	2	2
BM-121.3	3	3	3	3	3	3	2	3	2	2	3
BM-121.4	3	3	3	3	3	3	2	3	2	2	3
Average	3	3	3	3	3	3	2.25	2.75	2	2	2.75

CO-PSO Mapping matrix for course: BM-121: NUMBER THEORY AND TRIGONOMETRY

Cos	PSO1	PSO2	PSO3	PSO4
BM-121.1	3	3	3	3
BM-121.2	3	3	3	3
BM-121.3	3	3	3	3
BM-121.4	3	3	3	3
Average	3	3	3	3

BM-122: ORDINARY DIFFERENTIAL EQUATIONS

COURSE OBJECTIVE: The aim of this course is to study the concepts of ordinary differential equations.

Course outcomes : This course will enable the student to:

BM-122.1   Understand the basic concepts of ordinary differential equations, exact differential equations and to learn various techniques of finding the solutions of first order differential equations.

BM-122.2   Develop the skills of solving homogenous linear ordinary differential equations with constant co-efficient.

BM122.3   Know about the linear differential equations of second order and their solutions using different methods. Develop skills of solving ODEs.

BM-122.4   Learn about ordinary simultaneous ordinary differential equations, total differential equations and their solutions.

CO-PO Mapping matrix for course code: BM-122: ORDINARY DIFFERENTIALEQUATIONS

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BM-232.1	3	3	3	3	3	3	3	3	2	2	3
BM-232.2	3	3	3	3	3	3	3	3	2	2	3
BM-232.3	3	3	3	3	3	3	3	3	2	2	3
BM-232.4	3	3	3	3	3	3	3	3	2	2	3
Average	3	3	3	3	3	3	3	3	2	2	3

CO-PSO Mapping matrix for course: BM-122: ORDINARY DIFFERENTIAL EQUATIONS

Cos	PSO1	PSO2	PSO3	PSO4
BM-232.1	3	3	3	3
BM-232.2	3	3	3	3
BM-232.3	3	3	3	3
BM-232.4	3	3	3	3
Average	3	3	3	3

BM-123: VECTOR CALCULUS

COURSE OBJECTIVE: The aim of this course is to study the concepts of vector calculus.

Course Outcomes: At the end of this course, the student will be able to:

BM-123.1 Learn the concepts of scalar and vector product of vectors and solve related problems. Understand directional derivatives, vector differentiation and scalar and vector valued functions.

BM-123.2 Know about gradient, divergence and curl operators. Use these operators in problem solving.

BM-123.3 Learn about the various conditions for orthogonality and also gradient, divergence, curl and Laplacian operators in terms of orthogonal curvilinear co-ordinates.

BM-123.4 Understand vector integration, line integral, surface integral and volume integral and proof of related theorems and solve problems based on these.

CO-PO Mapping Matrix for Course Code: BM-123: VECTOR CALCULUS

COs#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BM-123.1	3	3	3	3	3	2	2	3	2	2	2
BM-123.2	3	3	3	2	3	2	2	3	2	2	2
BM-123.3	3	3	3	2	3	3	2	3	2	2	2
BM-123.4	3	3	3	2	3	3	2	3	2	2	2
Average	3	3	3	2.25	3	2.5	2	3	2	2	2

CO-PSO Mapping Matrix for Course Code: BM- 123: VECTOR CALCULUS

COs	PSO1	PSO2	PSO3	PSO4
BM-123.1	3	3	3	3
BM-123.2	3	3	3	3
BM-123.3	3	3	3	3
BM-123.4	3	3	3	3
Average	3	3	3	3

BM-231: ADVANCED CALCULUS

Course Objectives : The aim of this course is to study concepts of Advanced Calculus.

Course Outcomes: This course will enable the students to:

BM-231.1 Understand the concepts of Rolle's Theorem, Mean Value Theorem and their geometrical interpretations. To determine indeterminate forms.

BM-231.2 Learn concepts of limit, continuity, partial differentiation of functions of two variables. To understand composite functions, homogeneous functions and to solve related problems.

BM-231.3 Understand differentiability of real valued functions of two variables and to prove associated results. To determine maximum and minimum of functions of two variables and to apply multivariable calculus in optimization problems.

BM-231.4 Learn to find locus of spherical curvature, involutes, evolutes, Tangent planes, one parameter family of surfaces, Envelopes.

CO-PO Mapping Matrix for Course Code: BM-231: ADVANCED CALCULUS

COs#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BM-231.1	3	3	3	3	3	2	2	3	2	2	2
BM-231.2	3	3	3	2	3	2	2	3	2	2	2
BM-231.3	3	3	3	2	3	3	2	3	2	2	2
BM-231.4	3	3	3	2	3	3	2	3	2	2	2
Average	3	3	3	2.25	3	2.5	2	3	2	2	2

CO-PSO Mapping Matrix for Course Code: BM- 231: ADVANCED CALCULUS

Cos	PSO1	PSO2	PSO3	PSO4
BM-231.1	3	3	3	3
BM-231.2	3	3	3	3
BM-231.3	3	3	3	3
BM-231.4	3	3	3	3
Average	3	3	3	3

BM-232: PARTIAL DIFFERENTIAL EQUATIONS

COURSE OBJECTIVE: The aim of this course is to study the concepts of partial differential Equations.

Course outcomes: This course will enable the students to:

BM-232.1   Understand the basic concepts of partial differential equations. Learn methods and techniques for solving linear and non linear PDEs of first order.   Understand compatible systems and charpit's method, Jacobi's methods for solving PDEs.

BM-232.2   Learn techniques of solving second and higher order PDEs.

BM-232.3   Learn classification and canonical forms of second order linear PDEs and methods of solving those. Apply Monge's method to solve the problems for second order PDEs. Attain skills to reduce PDEs into canonical form.

BM-232.4   Find characteristics of second order PDEs and Cauchy's problem. Learn methods of separation of variables: solutions of Laplace's, Wave and Heat equations in Cartesian coordinate system.

CO-PO Mapping matrix for course code: BM-232: PARTIAL DIFFERENTIAL EQUATIONS

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BM-232.1	3	3	3	3	3	3	3	3	2	2	3
BM-232.2	3	3	3	3	3	3	3	3	2	2	3
BM-232.3	3	3	3	3	3	3	3	3	2	2	3
BM-232.4	3	3	3	3	3	3	3	3	2	2	3
Average	3	3	3	3	3	3	3	3	2	2	3

CO-PSO Mapping matrix for course: BM-232: PARTIAL DIFFERENTIAL EQUATIONS

Cos	PSO1	PSO2	PSO3	PSO4
BM-232.1	3	3	3	3
BM-232.2	3	3	3	3
BM-232.3	3	3	3	3
BM-232.4	3	3	3	3
Average	3	3	3	3

BM-233 : Statics

Course Objective : To analyze forces and moments in two and three dimensions due to concentrated and distributes forces in various systems.

Course Outcomes: At the end of this course, students will be able to learn:

BM-233.1 Composition and resolution of forces. Parallel forces. Moments and Couples.
BM-233.2 Analytical conditions of equilibrium of coplanar forces. Friction. Centre of Gravity.
BM-233.3 Virtual work. Forces in three dimensions. Poinsots central axis.
BM-233.4 Wrenches. Null lines and planes. Stable and unstable equilibrium

CO-PO matrix : BM -233 : Statics

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BM -233.1	3	3	3	3	3	3	3	3	2	2	3
BM -233.2	3	3	3	3	3	3	3	3	2	2	3
BM -233.3	3	3	3	3	3	3	3	3	2	2	3
BM -233.4	3	3	3	3	3	3	3	3	2	2	3
Average	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**2**	**3**

CO-PSO matrix: BM -233 : Statics

Cos	PSO1	PSO2	PSO3	PSO4
BM -233.1	3	3	3	3
BM -233.2	3	3	3	3
BM -233.3	3	3	3	3
BM -233.4	3	3	3	3
Average	**3**	**3**	**3**	**3**

Course objective: The objective of this course is to study concepts of sequence and series.

Course outcomes: This course will enable the students to:

BM-241.1 Study basic concepts of boundedness of set of real numbers, neighbourhoods of a point, interior points, limit points, closure points, open sets, closed sets, compact sets, results related to these concepts.

BM-241.2 Study concept of real sequences, their limits, boundedness, monotone, convergence and divergence behavior, subsequences, Cauchy sequences, theorem related to these concepts.

BM-241.3 Study the convergence and divergence behavior of Infinite series using comparison tests, p-test and other tests.

BM-241.4 Study the convergence, absolute, conditional and divergence behavior of alternating series, arbitrary series. Understand the re-arrangement of terms in series and related theorems.

CO-PO matrix for the course BM-241 : Sequence and Series

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BM-241.1	3	3	3	2	3	2	2	3	2	2	2
BM-241.2	3	3	3	2	3	2	2	3	2	2	3
BM-241.3	3	3	3	2	3	2	2	3	2	2	3
BM-241.4	3	3	3	2	3	2	2	3	2	2	2
Average	**3**	**3**	**3**	**2**	**3**	**2**	**2**	**3**	**2**	**2**	**2.5**

CO-PSO matrix for the course BM-241 : Sequence and Series

Cos	PSO1	PSO2	PSO3	PSO4
BM-241.1	3	3	2	3
BM-241.2	3	3	2	3
BM-241.3	3	3	2	3
BM-241.4	3	3	2	2
Average	**3**	**3**	**2**	**2.75**

BM -242 : Special Functions and Integral Transforms

Course Objective: To analyze properties of special functions by their integral representations.

Course Outcomes: At the end of this course, students will be able to learn:

BM.242.1:Power series method, Definitions of Beta and Gamma functions. Bessel equations and its solution: Bessel functions.

BM.242.2: Legendre and Hermite differentials equations and their solutions: Legendre and Hermite functions and their properties.

BM.242.3: Laplace transforms of derivatives and integrals, Differentiation and integration of Laplace transforms.

BM.242.4 Fourier transforms: Linearity property, Shifting, Modulation, Convolution Theorem, Fourier Transforms of Derivatives.

CO-PO matrix: BM -242 : Special Functions And Integral Transforms

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BM -242.**1**	3	3	3	3	3	3	3	3	2	2	3
BM -242.**2**	3	3	3	3	3	3	3	3	2	2	3
BM -242.**3**	3	3	3	3	3	3	3	3	2	2	3
BM -242.**4**	3	3	3	3	3	3	3	3	2	2	3
Average	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**2**	**3**

CO-PSO matrix: BM -242 : Special Functions And Integral Transforms

Cos	PSO1	PSO2	PSO3	PSO4
BM -242.**1**	3	3	3	3
BM -242.**2**	3	3	3	3
BM -242.**3**	3	3	3	3
BM -242.**4**	3	3	3	3
Average	**3**	**3**	**3**	**3**

BM-243 : Programming in C and Numerical methods (Theory)

Course objective: The objective of this course is to develop skills to solve real time practical problems by using Programming in C and Numerical methods.

Course Outcomes: This course will enable the students to:

BM-243.1 Learn algorithms and flow chart corresponding to practical problems, C programming language, character set of C language, data types, constants and variables, operations, operators, expressions, Input / Output functions, tools to write basis programs in C.

BM-243.2 Learn decision making statements, logical and conditional statements, loop structures, arrays, functions and preprocessors. Learn tools to write C programs which involve decision making statements, loop structures, arrays and functions.

BM-243.3 Learn character data types of strings, built-in functions to handle strings, structures and pointers and use of structure and pointers with arrays and functions. Learn tools to write programs related to practical problems involving use of strings, pointers and structures.

BM-243.4 Learn numerical methods to find the roots of algebraic and transcendental equations in single variable and to find the solution of system of algebraic equations. Implementation of these numerical methods to solve practical problems.

CO-PO matrix for the course BM-243: Programming in C and Numerical methods (Theory)

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BM-243.1	3	3	3	3	3	3	3	3	2	2	3
BM-243.2	3	3	3	3	3	3	3	3	2	2	3
BM-243.3	3	3	3	3	3	3	3	3	2	2	3
BM-243.4	3	3	3	3	3	3	3	3	2	2	3
Average	3	3	3	3	3	3	3	3	2	2	3

CO-PSO matrix for the course BM-243: Programming in C and Numerical methods(Theory)

Cos	PSO1	PSO2	PSO3	PSO4
BM-243.1	3	3	3	3
BM-243.2	3	3	3	3
BM-243.3	3	3	3	3
BM-243.4	3	3	3	3
Average	3	3	3	3

BM-243: Programming in C and Numerical methods (Practicals)

Course objective: The objective of this course is to provide skill to students to develop programs in C language to solve real life practical problems.

Course Outcomes: This course will enable the students to:

BM-243.1 Develop understanding of syntax and structure of simple programs in C.

BM-243.2 Attain skills of writing codes in the C programming language.

BM-243.3 Learn to write programs in the programming language C.

BM-243.4 Learn to run and debug programs in C for different mathematical and other practical problems of daily or scientific use.

CO-PO matrix for the course BM-243 : Practical

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BM-243.1	3	3	3	3	3	3	3	3	2	2	3
BM-243.2	3	3	3	3	3	3	3	3	2	2	3
BM-243.3	3	3	3	3	3	3	3	3	2	2	3
BM-243.4	3	3	3	3	3	3	3	3	2	2	3
Average	3	3	3	3	3	3	3	3	2	2	3

CO-PSO matrix for the course BM-243 : Programming in C and Numerical methods (Practicals)

Cos	PSO1	PSO2	PSO3	PSO4
BM-243.1	3	3	3	3
BM-243.2	3	3	3	3
BM-243.3	3	3	3	3
BM-243.4	3	3	3	3
Average	**3**	**3**	**3**	**3**

BM-351: Real Analysis

Course objective: The objective of this course is to provide knowledge of Riemann integration, improper integrals and metric space concepts.

Course Outcomes: This course will enable the students to:

BM-351.1 Understand the concept of Riemann integration theory, conditions of integrability. Learn Fundamental theorem and Mean Value theorems of integral calculus.

BM-351.2   Study convergence and divergence behavior of Improper integrals using basic definitions and various tests.

BM-351.3   Learn the concepts of metric spaces, subspaces, limit points, interior points, open and closed sets, sequences and theorems related to these concepts.

BM-351.4 Study the concepts of continuity, uniform continuity, compactness and connectedness in metric spaces.

CO-PO matrix for the course BM-351: Real Analysis

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BM-351.1	3	3	3	3	3	2	2	3	2	2	2
BM-351.2	3	3	3	3	3	3	3	2	2	2	3
BM-351.3	3	3	3	3	3	2	2	2	2	2	2
BM-351.4	3	3	3	2	3	2	2	3	2	2	2
Average	**3**	**3**	**3**	**2.75**	**3**	**2.25**	**2.25**	**2.5**	**2**	**2**	**2.25**

CO-PSO matrix for the course BM-351: Real Analysis

Cos	PSO1	PSO2	PSO3	PSO4
BM-351.1	3	3	2	2
BM-351.2	3	3	2	2
BM-351.3	3	3	2	2
BM-351.4	3	3	2	2
Average	**3**	**3**	**2**	**2**

BM-352: GROUPS AND RINGS

Course Objective : The aim of this course is to study concepts of Groups and Rings.

Course Outcomes: The course will enable the students to:

BM-352.1 Recognize the mathematical objects called groups, their elementary properties, order of a group, subgroup, cyclic groups and their properties, normal subgroup,Quotient groups.

BM-352.2 Understand the concepts of homomorphisms, isomorphisms to prove related Theorems.

BM-352.3 Familiarize about ring, subring, integral domain, field , ideal , Quotient ring and related results.

BM-352.4 Study Euclidean rings, Polynomial rings, Polynomials over the rational field and Unique Factorization Domain.

CO-PO matrix for the course BM-352:Groups and Rings

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BM-352.1	3	3	3	2	3	3	2	3	2	2	2
BM-352.2	3	3	3	3	2	2	3	3	2	2	3
BM-352.3	3	3	3	3	2	2	2	3	2	2	2
BM-352.4	3	3	3	2	3	3	3	3	2	2	3
Average	**3**	**3**	**3**	**2.5**	**2.5**	**2.5**	**2.5**	**3**	**2**	2	**2.5**

CO-PSO matrix for the course BM-352: Groups and Rings

Cos	PSO1	PSO2	PSO3	PSO4
BM-352.1	3	3	2	2
BM-352.2	3	3	3	3
BM-352.3	3	3	2	3
BM-352.4	3	3	3	3
Average	**3**	**3**	**2.5**	**2.75**

BM-353: Numerical Analysis (Theory)

Course objective: The objective of this course is to provide the skills to students to solve the real life practical problems using numerical methods.

Course Outcomes: This course will enable the students to:

BM-353.1 Learn the effects of errors in a tabular values, finite difference operators, numerical methods to study practical problems related to concepts of interpolation and extrapolation.

BM-353.2 Attain numerical skills to find solutions of system of linear equations by different methods.

BM-353.3 Study different Central difference interpolation methods to find values of functions and their derivatives and their use in solving practical problems.

BM-353.4 Learn numerical methods for evaluating integrals and solving differential equations and to develop skills of applying these methods for further use in scientific problems.

CO-PO matrix for the course BM-353 : Numerical Analysis(Theory)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BM-353.1	3	3	3	3	3	3	3	3	2	2	3
BM-353.2	3	3	3	3	3	3	3	3	2	2	3
BM-353.3	3	3	3	3	3	3	3	3	2	2	3
BM-353.4	3	3	3	3	3	3	3	3	2	2	3
Average	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**2**	**3**

CO-PSO matrix for the course BM-353 : Numerical Analysis (Theory)

	PSO1	PSO2	PSO3	PSO4
BM-353.1	3	3	3	3
BM-353.2	3	3	3	3
BM-353.3	3	3	3	3
BM-353.4	3	3	3	3
Average	**3**	**3**	**3**	**3**

<center>**Course BM-353: Numerical Analysis (Practicals)**</center>

Course objective: The objective of this course is to demonstrate numerical methods using C language.

Course Outcomes: This course will enable the students to:

BM-353.1 Learn to write codes in C language efficiently and skillfully to demonstrate numerical methods.

BM-353.2 Apply numerical methods to obtain solution to mathematical problems.

BM-353.3 Solve scientific problems by applying numerical techniques in C programming language.

BM-353.4 Write and execute programs of numerical methods in C.

<center>**CO-PO matrix for the course BM-353 : Numerical Analysis(PRACTICAL)**</center>

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BM-353.1	3	3	3	3	3	3	3	3	2	2	3
BM-353.2	3	3	3	3	3	3	3	3	2	2	3
BM-353.3	3	3	3	3	3	3	3	3	2	2	3
BM-353.4	3	3	3	3	3	3	3	3	2	2	3
Average	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**2**	**3**

<center>**CO-PSO matrix for the course BM-353 : Numerical Analysis (PRACTICAL)**</center>

Cos	PSO1	PSO2	PSO3	PSO4
BM-353.1	3	3	3	3
BM-353.2	3	3	3	3
BM-353.3	3	3	3	3
BM-353.4	3	3	3	3
Average	**3**	**3**	**3**	**3**

<center>**BM- 361: REAL AND COMPLEX ANALYSIS**</center>

COURSE OBJECTIVE: The aim of this course is to study the concepts of real and complex analysis.

Course Outcomes: At the end of this course, the students will be able to:

BM-361.1 : Familiarize with the concepts of Jacobians, Beta and Gamma functions, double and triple integrals, Dirichlet's integral, change the order of integration and solve related problems.

BM-361.2 : Learn the concepts of fourier series, properties of fourier coefficients, parseval's identity.

BM-361.3: Know about stereographic projection of complex numbers, continuity and differentiability of complex functions, analytic functions, Cauchy-Riemann equations and harmonic functions.

BM-361.4 Understand the concepts of elementary functions, mobius transformations and critical mappings.

CO-PO Mapping Matrix for Course Code: BM-361: REAL AND COMPLEX ANALYSIS

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BM-361.1	3	3	3	3	3	2	2	3	2	2	2
BM-361.2	3	3	3	3	3	2	2	3	2	2	2
BM-361.3	3	3	3	3	3	2	2	3	2	2	2
BM-361.4	3	3	3	3	3	2	2	3	2	2	2
Average	3	3	3	3	3	2	2	3	2	2	2

CO-PSO Mapping Matrix for Course Code: BM-361: REAL AND COMPLEX ANALYSIS

Cos	PSO1	PSO2	PSO3	PSO4
BM-361.1	3	3	3	3
BM-361.2	3	3	3	3
BM-361.3	3	3	3	3
BM-361.4	3	3	3	3
Average	3	3	3	3

BM-362: LINEAR ALGEBRA

COURSE OBJECTIVE: The aim of this course is to study the concepts of Linear Algebra .

Course Outcomes: At the end of this course, the student will be able to:

BM-362.1 Understand the concepts of vector spaces, subspaces, linear span and dimension of a vector space, bases and their properties, quotient space, use of these concepts in problem solving.

BM-362.2 Learn the concepts of linear transformations on vector spaces to find out rank and Nullity, dual-spaces and to use these concepts for problems solving.

BM-362.3 Know about the matrix representation of a linear transformation and change of basis; Determine eigen values, eigen vectors, characteristic polynomial and minimal polynomial of a linear transformation and their further use in solutions of problems.

BM-362.4 Understand the concepts of inner product spaces, related theorems and orthogonalization process.

CO-PO Mapping Matrix for Course Code: BM-362: LINEAR ALGEBRA

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BM-362.1	3	3	3	3	2	2	2	2	2	2	2
BM-362.2	3	3	3	3	3	2	2	3	2	2	2
BM-362.3	3	3	3	2	3	2	2	2	2	2	2
BM-362.4	3	3	3	2	2	2	2	3	2	2	2
Average	3	3	3	2.5	2.5	2	2	2.5	2	2	2

CO-PSO Mapping Matrix for Course Code: BM- 362: LINEAR ALGEBRA

COs	PSO1	PSO2	PSO3	PSO4
BM-362.1	3	3	3	2
BM-362.2	3	3	3	3
BM-362.3	3	3	3	2
BM-362.4	3	3	3	3
Average	3	3	3	2.5

Course: BM-363 : Dynamics

Course Objective: Develop the kinematics of displacement, velocity and acceleration for systems of particles and rigid bodies.

Course Outcomes: At the end of this course, students will be able to learn:

BM-363.1 Velocity and acceleration along radial, transverse, tangential and normal directions. Relative velocity and acceleration.
BM-363.2 Mass, Momentum and Force. Newton's laws of motion. Work, Power and Energy.
BM-363.3 Motion on smooth and rough plane curves. Projectile motion of a particle in a plane. Vector angular velocity.
BM-363.4 General motion of a rigid body. Central Orbits, Kepler's laws of motion.

CO-PO matrix: BM-363 : Dynamics

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BM -363.1	3	3	3	3	3	3	3	3	2	2	3
BM -363.2	3	3	3	3	3	3	3	3	2	2	3
BM -363.3	3	3	3	3	3	3	3	3	2	2	3
BM -363.4	3	3	3	3	3	3	3	3	2	2	3
Average	3	3	3	3	3	3	3	3	2	2	3

CO-PSO matrix : BM -363: Dynamics

Cos	PSO1	PSO2	PSO3	PSO4
BM -363.**1**	3	3	3	3
BM -363.**2**	3	3	3	3
BM -363.**3**	3	3	3	3
BM -363.**4**	3	3	3	3
Average	**3**	**3**	**3**	**3**

Principal
Dyal Singh College
KARNAL

Department of Computer Science

Course Specific Outcomes
&
Programme Specific Outcomes

For B.Sc. (NM) Course

DYAL SINGH COLLEGE, KARNAL

NAME OF THE PROGRAMME : BACHELOR OF COMPUTER SCIENCE (BSC)
DURATION : THREE YEARS

	PROGRAMME OUTCOMES (POs)	
PO1	Knowledge	Capable of demonstrating comprehensive disciplinary knowledge gained during course of study.
PO2	Communication	Ability to communicate effectively on general and scientific topics with the scientific community and with society at large.
PO3	Problem Solving	Capability of applying knowledge to solve scientific and other problems.
PO4	Individual and Team Work	Capable to learn and work effectively as an individual, and as a member or leader in diverse teams, in multidisciplinary settings.
PO5	Investigation of Problems	Ability of critical thinking, analytical reasoning and research based knowledge including design of experiments, analysis and interpretation of data to provide conclusions.
PO6	Modern Tool Usage	Ability to use and learn techniques, skills and modern tools for scientific practise.
PO7	Science and Society	Ability to apply reasoning to access the different issues related to society and the consequent responsibilities relevant to the professional scientific practices.
PO8	Life-Long Learning	Aptitude to apply knowledge and skills that are necessary for participating in learning activities throughout the life.
PO9	Environment and Sustainability	Ability to design and develop modern systems which are environmentally sensitive and to understand the importance of sustainable development.
PO10	Ethics	Apply ethical principles and professional responsibilities in scientific practices.
PO11	Project Management	Ability to demonstrate knowledge and understanding of the scientific principles and apply these to manage projects.

	PROGRAMME SPECIFIC OUTCOMES (PSOs)
	The objective of the curriculum designed for BSC course is to nurture the technical aptitude of students for professional competency in the IT industry.
PSO1	Develop proficiency for solving real world problems with the application of programming and supplementary computing skills.
PSO2	Promote exposure to hardware as well as software knowledge with the inclusion of course content targeted to administer technical expertise for employment in the IT industry.
PSO3	Explicit course content is targeted to inculcate programming skills using both conventional and contemporary programming languages as well as to develop potential for realizing web oriented and other commercial/non-commercial applications.
PSO4	Judicious structuring of the course curriculum has been aimed in order to strengthen competitive ability as per the trending industry requirements.
PSO5	Encourage skillful expertise for employment in Commercial/ Government sectors or pursuance of higher studies aimed towards innovational research leading to the progressive growth of the society and the nation.

BSC-101: COMPUTER FUNDAMENTALS

Course Objectives: The aim of this course is to introduce the basic terminology of a computer system and fundamentals of problem solving on a computer.

Course Outcomes: At the end of this course, the student will be able to:
BSC-101.1 Learn the basic terminology of hardware and software components of a computer system.
BSC-101.2.Understand basics of memory system and working of storage devices.
BSC-101.3.Understand the working of input/output devices commonly used in a computer system.
BSC-101.4 Understand the concept of operating system and use Windows OS.
BSC-101.5 Develop program logic using algorithms, flowchart, and decision tables, DFDs, etc.
BSC-101.6 Develop sorting, searching, merging and other basic algorithms to solve problems.

CO-PO Mapping Matrix for Course Code: BSC-101

COs#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BSC-101.1	3	3	2	3	3	2	2	2	2	3	2
BSC-101.2	3	2	3	3	2	3	2	2	2	2	2
BSC-101.3	2	3	3	3	2	2	2	2	1	1	1
BSC-101.4	3	2	2	2	3	3	3	3	3	2	2
BSC-101.5	3	3	2	3	3	2	2	2	2	3	2
BSC-101.6	3	2	3	3	3	2	2	2	2	2	2
Average	2.83	2.5	2.5	2.83	2.33	2.33	2.16	2.16	2	2.16	1.83

CO-PSO Mapping Matrix for Course Code: BSC-101

COs#	PSO1	PSO2	PSO3	PSO4	PSO5
BSC-101.1	3	3	2	3	3
BSC-101.2	3	2	3	3	3
BSC-101.3	2	3	3	3	2
BSC-101.4	3	2	2	2	3
BSC-101.5	3	3	2	3	3
BSC-101.6	3	2	3	3	3
Average	2.83	2.5	2.5	2.83	2.83

BSC-102: PC Software

Course Objectives: The aim of this course is to provide knowledge of basic requirements that are needed for establishing an automated Office. All office components have been introduced and students will be able to automate the office.

Course Outcomes: At the end of this course, the student will be able to:
BSC-102.1. Develop, format, setup and print Word documents.
BSC-102.2. Learn advance features of Word Processing and use tables, comments and mail merge.
BSC-102.3. Create & format worksheets.
BSC-102.4. Create worksheets and handle databases using advanced features such as filters, pivot tables and cell locking.
BSC-102.5. Develop PowerPoint presentations using basic features of PowerPoint application software.
BSC-102.6. Develop PowerPoint presentations using advanced features of PowerPoint application software.

CO-PO Mapping Matrix for Course Code: BSC-102

COs#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BSC-102.1	3	3	2	3	3	2	2	2	2	3	2
BSC-102.2	3	2	3	3	3	2	2	2	2	2	2
BSC-102.3	2	3	3	3	2	2	2	2	1	1	2
BSC-102.4	3	2	2	2	3	3	2	3	3	3	2
BSC-102.5	3	3	2	3	3	2	2	2	2	2	2
BSC-102.6	3	2	3	3	3	2	2	2	2	2	2
Average	2.83	2.5	2.5	2.83	2.83	2.16	2	2.16	2	2.16	2

CO-PSO Mapping Matrix for Course Code: BSC-102

COs#	PSO1	PSO2	PSO3	PSO4	PSO5
BSC-102.1	3	3	2	3	3
BSC-102.2	3	2	3	3	3
BSC-102.3	2	3	3	3	2
BSC-102.4	3	2	2	2	3
BSC-102.5	3	3	2	3	3
BSC-102.6	3	2	3	3	3
Average	2.83	2.5	2.5	2.83	2.83

BSC-201: LOGICAL ORGANIZATION

Course Objectives: The aim of the course is to provide knowledge of computer as a system and making students aware of internal mechanism of computer hardware and its working.

Course Outcomes: At the end of this course, the student will be able to:
BSC-201.1. Understand number systems, error detecting & correcting code and character representations.
BSC-201.2. Learn number systems and representations of numbers in a computer system.
BSC-201.3. Understand computer arithmetic and Boolean algebra and simplification of Boolean expressions.
BSC-201.4. Understand working of logic gates and design various combinational circuits using these logic gates.
BSC-201.5. Understand working of different types of flip-flops.
BSC-201.6. Design different types of registers and counters.

CO-PO Mapping Matrix for Course Code: BSC-201

COs#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BSC- 201.1	3	3	2	3	3	2	2	2	2	3	2
BSC- 201.2	3	2	3	3	1	2	2	3	2	2	2
BSC- 203.3	2	3	3	3	2	2	3	2	1	3	2
BSC- 204.4	3	2	2	2	3	3	2	3	3	2	3
BSC-201.5	3	3	2	3	3	2	2	2	2	3	2
BSC-201.6	3	2	3	3	3	2	2	2	2	2	2
Average	2.75	2.5	2.5	2.75	2.25	2.25	2.25	2.5	2	2.5	2.16

CO-PSO Mapping Matrix for Course Code: BSC-201

COs#	PSO1	PSO2	PSO3	PSO4	PSO5
BSC- 201.1	3	3	2	1	3
BSC- 201.2	2	2	3	2	1
BSC- 201.3	3	3	1	3	2
BSC- 201.4	3	2	2	2	3
BSC-201.5	3	3	2	3	3
BSC-201.6	3	2	3	3	3
Average	2.83	2.5	2.16	2.33	2.5

BSC-202: C PROGRAMMING

Course Objectives: The aim of the course is to provide basic knowledge of C. a High level language as one of the programming tool and generating logical development skills using programming.

Course Outcomes: At the end of this course, the student will be able to:
BSC-202.1. Learn the basics of C program, data types and input/output statements.
BSC-202.2. Understand different types of operators, their hierarchies and also control statements of C.
BSC-202.3. Develop programs using functions.
BSC-202.4. Implement programs using arrays and strings.
BSC-202.5. Get familiar with advanced concepts like structures, union etc. in C language.

CO-PO Mapping Matrix for Course Code: BSC-202

COs#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BSC-202.1	3	3	2	3	3	2	2	2	2	3	2
BSC-202.2	3	2	3	3	3	2	2	2	2	2	2
BSC-202.3	2	3	3	3	2	2	2	2	1	1	2
BSC-202.4	3	2	2	2	3	3	2	3	3	2	2
BSC-202.5	3	3	2	3	3	2	2	2	2	3	2
Average	2.75	2.5	2.5	2.75	2.75	2.25	2	2.25	2	2	2

CO-PSO Mapping Matrix for Course Code: BSC-202

COs#	PSO1	PSO2	PSO3	PSO4	PSO5
BSC-202.1	3	3	2	3	3
BSC-202.2	3	2	3	3	3
BSC-202.3	2	3	3	3	2
BSC-202.4	3	2	2	2	3
BSC-202.5	3	3	2	3	3
Average	2.75	2.5	2.5	2.75	2.75

BSC-203: PRACTICAL BASED ON OC SOFTWARE AND C PROGRAMMING

Course Objectives: The aim of this course is to provide practical knowledge of basic requirements that are needed for establishing an automated Office and to provide basic knowledge of C. All office components have been introduced and students will be able to automate the office and generating logical development skills using programming in C.

Course Outcomes: At the end of this course, the student will be able to:
BSC-203.1. Learn basic and advance features of Word Processing and use tables, comments and mail merge.
BSC-203.2. Create worksheets and handle databases using advanced features such as filters, pivot tables and cell locking.
BSC-203.3. Develop PowerPoint presentations using basic features and advanced features of PowerPoint application software.
BSC-203.4. Implement programs using control statements, functions, arrays and strings of C.
BSC-203.5. Get familiar with advanced concepts like structures, union etc. in C language.

CO-PO Mapping Matrix for Course Code: BSC-203

COs#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BSC-203.1	3	3	2	3	3	2	2	2	2	3	2
BSC-203.2	3	2	3	3	3	2	2	2	2	2	2
BSC-203.3	2	3	3	3	2	2	2	2	1	1	2
BSC-203.4	3	2	2	2	3	3	2	3	3	2	2
BSC-203.5	3	3	2	3	3	2	2	2	2	3	2
Average	2.8	2.6	2.4	2.8	2.8	2.2	2	2.2	2	2.2	2

CO-PSO Mapping Matrix for Course Code: BSC-203

COs#	PSO1	PSO2	PSO3	PSO4	PSO5
BSC-203.1	3	3	2	3	3
BSC-203.2	3	2	3	3	3
BSC-203.3	2	3	3	3	2
BSC-203.4	3	2	2	2	3
BSC-203.5	3	3	2	3	3
Average	2.8	2.6	2.4	2.8	2.8

BSC-301: DATA STRUCTURES

Course Objectives: Learning of data structure is like learning alphabets to learn any proper language. In this course students will be aware of memory management and use of data structure in computer programming.

Course Outcomes: At the end of this course, the student will be able to:

BSC-301.1. Learn basics of data structure and algorithm complexities.
BSC-301.2. Acquire knowledge of arrays and strings.
BSC-301.3. Understand the idea of implementation for linked lists and stacks.
BSC-301.4. Learn implementation of queues.
BSC-301.5. Learn tree structure and implementation of its different types.
BSC-301.6. Learn various operations on graphs in data structure.

CO-PO Mapping Matrix for Course Code: BSC-301

COs#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BSC-301.1	3	3	2	3	3	2	2	2	2	3	2
BSC-301.2	3	2	3	3	3	2	2	2	2	2	2
BSC-301.3	2	3	3	3	2	2	2	2	1	1	2
BSC-301.4	3	2	2	2	3	3	2	3	3	2	2
BSC-301.5	3	3	2	3	3	2	2	2	2	3	2
BSC-301.6	3	2	3	3	3	2	2	2	2	2	2
Average	2.83	2.5	2.5	2.83	2.83	2.16	2	2.16	2	2	2

CO-PSO Mapping Matrix for Course Code: BSC-301

COs#	PSO1	PSO2	PO3	PSO4	PSO5
BSC-301.1	3	3	2	3	3
BSC-301.2	3	2	3	3	3
BSC-301.3	2	3	3	3	2
BSC-301.4	3	2	2	2	3
BSC-301.5	3	3	2	3	3
BSC-301.6	3	2	3	3	3
Average	2.83	2.5	2.5	2.83	2.83

BSC-302: SOFTWARE ENGINEERING

Course Objectives: The aim of the course is to provide knowledge of Software Engineering as a paradigm in Computer Science. This course will enable students to be the computer engineer or system analysts for an enterprise.

Course Outcomes: At the end of this course, the student will be able to:
BSC-302.1. Understand concept of Software Engineering and types of System.
BSC-302.2. Plan the software project for an Enterprise.
BSC-302.3. Analyze the requirement of a client to design software.
BSC-302.3. Understand software maintenance and various testing techniques.

CO-PO Mapping Matrix for Course Code: BSC-302

COs#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BSC-302.1	3	3	2	3	3	2	2	2	2	3	2
BSC-302.2	2	3	3	3	2	2	2	2	1	1	2
BSC-302.3	3	2	3	3	3	2	2	2	2	2	2
BSC-302.4	2	3	3	3	2	2	2	2	2	2	2
Average	2.5	2.75	2.75	3	2.5	2	2	2	1.75	2	2

CO-PSO Mapping Matrix for Course Code: BSC-302

COs#	PSO1	PSO2	PSO3	PSO4	PSO5
BSC-302.1	3	3	2	3	3
BSC-302.2	2	3	3	3	2
BSC-302.3	3	2	3	3	3
BSC-302.4	2	3	3	3	2
Average	2.5	2.75	2.75	3	2.5

BSC- 401: C++ PROGRAMMING

Course Objectives: The aim of the course is to provide knowledge of C++ (high level language) as one of the programming tool and generating logical development using programming. This course will help students to learn about OOPS concepts and linking C++ as a powerful OOPS language.

Course Outcomes: At the end of this course, the student will be able to:
BSC-401.1. Understand basic concepts of C++.
BSC-401.2. Develop programs using arrays, strings and functions.
BSC-401.3. Implement OOPS concepts with C++.
BSC-401.4. Understand constructor and destructors in C++.
BSC-401.5. Acquire the detailed knowledge of polymorphism.

CO-PO Mapping Matrix for Course Code: BSC-401

COs#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BSC-401.1	3	3	2	3	3	2	2	2	2	3	2
BSC-401.2	2	3	3	3	2	2	2	2	1	1	1
BSC-401.3	3	2	2	2	3	3	3	3	3	2	2
BSC-401.4	3	3	2	3	3	2	2	2	2	3	2
BSC-401.5	3	2	3	3	3	2	2	2	2	2	2
Average	2.8	2.6	2.4	2.8	2.8	2.2	2.2	2.2	2	2.2	1.8

CO-PSO Mapping Matrix for Course Code: BSC-401

COs#	PSO1	PSO2	PSO3	PSO4	PSO5
BSC-401.1	3	3	2	3	3
BSC-401.2	2	3	3	3	2
BSC-401.3	3	2	2	2	3
BSC-401.4	3	3	2	3	3
BSC-401.5	3	2	3	3	3
Average	2.8	2.6	2.4	2.8	2.8

BSC-402: OPERATING SYSTEM

Course Objectives: The aim of the course is to provide knowledge of Operating System (OS) as a system program. Making students to learn about OS and linking OS as a powerful tool to make system work. Students will be able to learn types of OS and learn about system operations using OS.

Course Outcomes: At the end of this course, the student will be able to:
BCA-402.1. Understand the basic concepts of operating systems and its services.
BCA-402.2. Understand concept of process management and scheduling.
BCA-402.3. Acquire knowledge of process synchronization along with deadlock handling.
BCA-402.4. Learn about memory management and virtual memory concepts.
BCA-404.1.Learn about device scheduling and directory structure.

CO-PO Mapping Matrix for Course Code: BSC-402

COs#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BSC-402.1	3	3	2	3	3	2	2	2	2	3	2
BSC-402.2	3	2	3	3	3	2	2	2	2	2	2
BSC-402.3	2	3	3	3	2	2	2	2	2	1	2
BSC-402.4	3	2	2	2	3	3	2	3	2	2	2
BSC-402.5	3	3	2	3	3	2	2	2	2	3	2
Average	2.8	2.6	2.4	2.8	2.8	2.2	2	2.2	2	2.2	2

CO-PSO Mapping Matrix for Course Code: BSC-402

COs#	PSO1	PSO2	PSO3	PSO4	PSO5
BSC-402.1	3	3	2	3	3
BSC-402.2	3	2	3	3	3
BSC-402.3	2	3	3	3	2
BSC-402.4	3	2	2	2	3
BSC-402.5	3	3	2	3	3
Average	2.8	2.6	2.4	2.8	2.8

BSC- 403: PRACTICAL BASED ON DATA STRUCTURE AND C++ PROGRAMMING

Course Objectives: The aim of the course is to provide knowledge of Data Structure and C++ (high level language). In this course students will be aware of memory management and use of data structure in computer programming. This course will also help students to learn about OOPS concepts and linking C++ as a powerful OOPS language.

Course Outcomes: At the end of this course, the student will be able to:
BSC-403.1. Understand the idea of implementation for arrays and sorting algorithm With C.
BSC-403.2. Learn implementation of Stacks and queues With C.
BSC-403.3. Understand the idea of implementation for linked lists with C.
BSC-403.4. Develop programs using basic concepts of C++ like arrays, strings and functions.
BSC-403.5. Implement OOPS concepts like Class and objects, Constructor and destructors, and polymorphism. With C++.

CO-PO Mapping Matrix for Course Code: BSC-403											
COs#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BSC-403.1	3	3	2	3	3	2	2	2	2	3	2
BSC-403.2	2	3	3	3	2	2	2	2	1	1	1
BSC-403.3	3	2	2	2	3	3	3	3	3	2	2
BSC-403.4	3	3	2	3	3	2	2	2	2	3	2
BSC-403.5	3	2	3	3	3	2	2	2	2	2	2
Average	2.8	2.6	2.4	2.8	2.8	2.2	2.2	2.2	2	2.2	1.8

CO-PSO Mapping Matrix for Course Code: BSC-403					
COs#	PSO1	PSO2	PSO3	PSO4	PSO5
BSC-403.1	3	3	2	3	3
BSC-403.2	2	3	3	3	2
BSC-403.3	3	2	2	2	3
BSC-403.4	3	3	2	3	3
BSC-403.5	3	2	3	3	3
Average	2.8	2.6	2.4	2.8	2.8

BSC-501: DATA BASE MANAGEMENT SYSTEM- I

Course Objectives: Today almost all real life problems include data. The objective of this course to get students aware about the basic concept of Data. In this paper students will learn database management and its implementation.

Course Outcomes: At the end of this course, the student will be able to:
BSC-501.1. Learn basic concepts of data base along with its functions and components.
BSC-501.2. Understand data base architecture and different data models.
BSC-501.3. Learn basic concepts of data base designing strategy of ER diagram.
BSC-501.4. Design an ER diagram of an enterprise.

CO-PO Mapping Matrix for Course Code: BSC-501

COs#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BSC-501.1	3	3	2	3	3	2	2	2	3	3	2
BSC-501.2	3	2	3	3	3	1	2	2	2	2	2
BSC-501.3	3	3	2	3	3	2	2	2	2	3	2
BSC-501.4	3	3	3	3	2	2	1	2	1	1	2
Average	3	2.75	2.5	3	2.75	1.75	1.75	2	2	2.25	2

CO-PSO Mapping Matrix for Course Code: BSC-501

COs#	PSO1	PSO2	PSO3	PSO4	PSO5
BSC-501.1	3	3	2	3	3
BSC-501.2	3	2	3	3	3
BSC-501.3	3	3	2	3	2
BSC-501.4	2	3	3	3	2
Average	2.75	2.75	2.5	3	2.5

BSC-502: WEB DESIGNING

Course Objectives: The aim of the course is to provide knowledge of web as a tool in presenting information. Each and every product in e-world now needs a website, this course will make student knowing about the concept of web design in general.

Course Outcomes: At the end of this course, the student will be able to:
BSC-502.1. Learn about WWW and search engines.
BSC-502.2. Understand domain and assigning name to them.
BSC-502.3. Understand basic web languages and its components.
BSC-502.4. Perform simple web page designing for practical exposure.

CO-PO Mapping Matrix for Course Code: BSC- 502

COs#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BSC-502.1	3	3	2	3	3	2	2	2	2	3	2
BSC-502.2	3	2	3	3	3	2	2	2	2	2	2
BSC-502.3	2	3	3	3	2	2	2	2	1	1	2
BSC-502.4	3	2	2	2	3	3	2	3	3	2	2
Average	2.75	2.5	2.5	2.75	2.75	2.25	2	2.25	2	2	2

CO-PSO Mapping Matrix for Course Code: BSC- 502

COs#	PSO1	PSO2	PSO3	PSO4	PSO5
BSC-502.1	3	3	2	3	3
BSC-502.2	3	2	3	3	3
BSC-502.3	2	3	3	3	2
BSC-502.4	3	2	2	2	3
Average	2.75	2.5	2.5	2.75	2.75

BSC- 601: DATA BASE MANAGEMENT SYSTEM

Course Objectives: Today almost all real life problems include data. The objective of this paper to get students aware about the basic concept of Data. In this paper students will learn database management and its implementation.

Course Outcomes: At the end of this course, the student will be able to:
BSC-601.1. Learn the concept of relational algebra and calculus.
BSC-601.2. Understand functional dependency and normalization.
BSC-601.3. Write SQL statements to retrieve information and
BSC-601.4. Implement SQL and PL/SQL in any software industry for database handling.

CO-PO Mapping Matrix for Course Code: BSC-601											
COs#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BSC-601.1	3	3	2	3	3	2	2	2	2	3	2
BSC-601.2	3	2	3	3	3	2	2	2	2	2	2
BSC-601.3	2	3	3	3	2	2	2	2	1	1	2
BSC-601.4	3	2	2	2	3	3	2	3	3	2	2
Average	2.75	2.5	2.5	2.75	2.75	2.25	2	2.25	2	2	2

CO-PSO Mapping Matrix for Course Code: BSC-601					
COs#	PSO1	PSO2	PSO3	PSO4	PSO5
BSC-601.1	3	3	2	3	3
BSC-601.2	3	2	3	3	3
BSC-601.3	2	3	3	3	2
BSC-601.4	3	2	2	2	3
Average	2.75	2.5	2.5	2.75	2.75

BSC-602: COMPUTER NETWORKS

Course Objectives: Provide a comprehensive introduction to Computer Networks and its associated concepts and terminology along with the knowledge of Network architecture, design issues, and hardware components. Give exposure to the contemporary networking technologies

Course Outcomes: At the end of this course, the student will be able to:

BSC-602.1: Provide a comprehensive understanding of networking concepts and basic terminology along with its hardware components.

BSC-602.2: Understand and characterize various types of computer networks.

BSC-602.3: Conceptualize the various design issues related to Network Architecture and have an overview of the standard OSI reference model that illustrates the network architecture.

BSC-602.4: Gain knowledge of Local Area Network technologies and components that will provide the competency for setting up of network environments in local areas.

CO-PO Mapping Matrix for Course Code: BSC-602

COs#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BSC-602.1	3	3	2	3	3	1	2	3	1	1	2
BSC-602.2	3	2	2	3	3	1	2	3	1	1	2
BSC-602.3	2	3	2	3	2	2	2	3	1	1	2
BSC-602.4	3	3	2	2	3	2	2	3	2	1	2
Average	2.75	2.75	2	2.75	2.75	1.5	2	3	1.25	1	2

CO-PSO Mapping Matrix for Course Code: BSC-602

COs#	PSO1	PSO2	PSO3	PSO4	PSO5
BSC-602.1	2	3	2	3	3
BSC-602.2	2	3	2	3	3
BSC-602.3	2	3	2	3	3
BSC-602.4	2	3	2	3	3
Average	2	3	2	3	3

BSC- 603: PRACTICAL BASED ON WEB DESIGNING AND DATA BASE MANAGEMENT SYSTEM

Course Objectives: The aim of the course is to provide knowledge of web as a tool in presenting information and about the basic concept of Data. This course will make student knowing about the concept of web design in general and enable them to develop their own website also can implement database management concepts.

Course Outcomes: At the end of this course, the student will be able to:
BSC-603.1. Understand basic web languages and its components Frame, Form, and Button.
BSC-603.2. Perform simple web sites designing for practical exposure.
BSC-603.3. Write SQL statements to retrieve information and
BSC-603.4. Implement SQL and PL/SQL in any software industry for database handling.

CO-PO Mapping Matrix for Course Code: BSC-603											
COs#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BSC-603.1	3	3	3	3	3	2	2	2	2	3	2
BSC-603.2	3	2	3	3	3	2	2	2	2	2	2
BSC-603.3	2	3	3	3	2	2	3	2	1	2	2
BSC-603.4	3	2	2	2	3	3	2	3	3	2	2
Average	2.75	2.5	2.75	2.75	2.75	2.25	2.25	2.25	2	2.25	2

CO-PSO Mapping Matrix for Course Code: BSC-603					
COs#	PSO1	PSO2	PSO3	PSO4	PSO5
BSC-603.1	3	3	2	3	3
BSC-603.2	3	2	3	3	2
BSC-603.3	2	3	3	2	2
BSC-603.4	3	2	3	2	3
Average	2.75	2.5	2.75	2.5	2.5

Bakhar

Principal
Dyal Singh College
Karnal

Department of Computer Science

Course Specific Outcomes
&
Programme Specific Outcomes

For BCA Course

DYAL SINGH COLLEGE, KARNAL

NAME OF THE PROGRAMME : **BACHELOR OF COMPUTER APPLICATIONS (BCA)**
DURATION : **THREE YEARS**

PROGRAMME OUTCOMES (POs)		
PO1	Knowledge	Capable of demonstrating comprehensive disciplinary knowledge gained during course of study.
PO2	Communication	Ability to communicate effectively on general and scientific topics with the scientific community and with society at large.
PO3	Problem Solving	Capability of applying knowledge to solve scientific and other problems.
PO4	Individual and Team Work	Capable to learn and work effectively as an individual, and as a member or leader in diverse teams, in multidisciplinary settings.
PO5	Investigation of Problems	Ability of critical thinking, analytical reasoning and research based knowledge including design of experiments, analysis and interpretation of data to provide conclusions.
PO6	Modern Tool Usage	Ability to use and learn techniques, skills and modern tools for scientific practise.
PO7	Science and Society	Ability to apply reasoning to access the different issues related to society and the consequent responsibilities relevant to the professional scientific practices.
PO8	Life-Long Learning	Aptitude to apply knowledge and skills that are necessary for participating in learning activities throughout the life.
PO9	Environment and Sustainability	Ability to design and develop modern systems which are environmentally sensitive and to understand the importance of sustainable development.
PO10	Ethics	Apply ethical principles and professional responsibilities in scientific practices.
PO11	Project Management	Ability to demonstrate knowledge and understanding of the scientific principles and apply these to manage projects.

PROGRAMME SPECIFIC OUTCOMES (PSOs)

The objective of the curriculum designed for BCA course is to nurture the technical aptitude of students for professional competency in the IT industry.

PSO1	Develop proficiency for solving real world problems with the application of programming and supplementary computing skills.
PSO2	Promote exposure to hardware as well as software knowledge with the inclusion of course content targeted to administer technical expertise for employment in the IT industry.
PSO3	Explicit course content is targeted to inculcate programming skills using both conventional and contemporary programming languages as well as to develop potential for realizing web oriented and other commercial/non-commercial applications.
PSO4	Judicious structuring of the course curriculum has been aimed in order to strengthen competitive ability as per the trending industry requirements.
PSO5	Encourage skillful expertise for employment in Commercial/ Government sectors or pursuance of higher studies aimed towards innovational research leading to the progressive growth of the society and the nation.

BCA-111: COMPUTER AND PROGRAMMING FUNDAMENTALS

Course Objectives: The aim of this course is to introduce the basic terminology of a computer system and fundamentals of problem solving on a computer.

Course Outcomes: At the end of this course, the student will be able to:

BCA-111.1 learn the basic terminology of hardware and software components of a computer system.
BCA-111.2.understand basics of memory system and working of storage devices.
BCA-111.3.understand the working of input/output devices commonly used in a computer system.
BCA-111.4.understand the concept of operating system and use Windows OS.

CO-PO Mapping Matrix for Course Code: BCA-111

COs#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BCA-111.1	3	3	2	3	3	2	2	2	2	3	2
BCA-111.2	3	3	3	3	2	3	2	2	2	2	2
BCA-111.3	2	3	3	3	2	2	2	2	1	1	1
BCA-111.4	3	3	2	2	3	3	3	3	3	2	2
Average	2.75	3	2.5	2.75	2.5	2.5	2.25	2.25	2	2	1.75

CO-PSO Mapping Matrix for Course Code: BCA-111

COs#	PSO1	PSO2	PSO3	PSO4	PSO5
BCA-111.1	3	3	2	3	3
BCA-111.2	3	2	3	3	3
BCA-111.3	2	3	3	3	2
BCA-111.4	3	2	2	2	3
Average	2.75	2.5	2.5	2.75	2.75

BCA-112: WINDOWS AND PC SOFTWARE

Course Objectives: The aim of this course is help students to enhance their concept of computer hardware, software, memory and operating environments along with the concepts of problem solving using programming languages which will lead to code generation in future for computer science job aspirants.

Course Outcomes: At the end of this course, the student will be able to:
BCA-112.1 develop program logic using algorithms, flowchart, decision tables, DFDs, etc.
BCA-112.2.develop sorting, searching, merging and other basic algorithms to solve problems.
BCA-112.3 learn basics of Internet and its services specifically e-mail services.
BCA-112.4 check threats to a computer system and find suitable software to resolve them.

CO-PO Mapping Matrix for Course Code: BCA-112

COs#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BCA-112.1	3	3	2	3	3	2	2	2	2	3	2
BCA-112.2	3	2	3	3	3	2	2	2	2	2	2
BCA-112.3	2	3	3	3	2	2	2	2	1	1	1
BCA-112.4	3	2	2	2	3	3	3	3	3	2	2
Average	2.75	2.5	2.5	2.75	2.75	2.25	2.25	2.25	2	2	1.75

CO-PSO Mapping Matrix for Course Code: BCA-112

COs#	PSO1	PSO2	PSO3	PSO4	PSO5
BCA-112.1	3	3	2	3	3
BCA-112.2	3	2	3	3	3
BCA-112.3	2	3	3	3	2
BCA-112.4	3	2	2	2	3
Average	2.75	2.5	2.5	2.75	2.75

BCA 113: MATHEMATICAL FOUNDATIONS – I

Course Objectives: The aim of this course is to study the concepts of sets, limits, continuity and differential equations.

Course Outcomes: At the end of this course, the student will be able to:

BCA-113.1. Learn Set, subsets and operations on sets, Venn diagram of sets, Power set of a set, , Permutation and combinations, Lattices ,Boolean algebra.

BCA-113.2. Understand Basic properties of limits, Continuous functions and classifications of discontinuities, Derivative of a different function.

BCA-113.3. Know about the Formation of differential equations order and degree, Geometrical approach to the existence of the solution, BCA-113.4. Study linear differential equation of higher order with constant coefficients and linear differential

CO-PO Mapping Matrix for Course Code: BCA-113											
COs#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BCA- 113.1	3	3	3	2	2	2	2	3	2	2	2
BCA- 113.2	3	3	3	3	3	3	3	3	3	2	3
BCA- 113.3	3	3	3	3	3	3	3	3	3	2	2
BCA- 113.4	3	3	3	3	3	3	2	3	3	2	3
Average	3	3	3	2.75	2.75	2.75	2.5	3	2.75	2	2.5

CO-PSO Mapping Matrix for Course Code: BCA-113				
COs#	PSO1	PSO2	PSO3	PSO4
BCA 113 .1	3	3	3	3
BCA 113.2	3	3	3	3
BCA 113.3	3	3	3	3
BCA 113.4	3	3	3	3
Average	3	3	3	3

BCA-114: LOGICAL ORGANIZATION OF COMPUTER– I

Course Objectives: The aim of the course is to provide knowledge of computer as a system and making students aware of internal mechanism of computer hardware and its working.

Course Outcomes: At the end of this course, the student will be able to:

BCA-114.1. understand number systems, error detecting & correcting code and character representations.
BCA-114.2. learn number systems and representations of numbers in a computer system.
BCA-114.3. understand computer arithmetic and Boolean algebra and simplification of Boolean expressions.
BCA-114.4. understand working of logic gates and design various combinational circuits using these logic gates.

COs#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BCA- 114.1	3	3	2	3	3	2	2	2	2	3	2
BCA- 114.2	3	2	3	3	1	2	2	3	2	2	2
BCA- 114.3	2	3	3	3	2	2	3	2	1	3	2
BCA- 114.4	3	2	2	2	3	3	2	3	3	2	3
Average	2.75	2.5	2.5	2.75	2.25	2.25	2.25	2.5	2	2.5	2.25

CO-PO Mapping Matrix for Course Code: BCA-114

COs#	PSO1	PSO2	PSO3	PSO4	PSO5
BCA- 114.1	3	3	2	1	3
BCA- 114.2	2	2	3	2	1
BCA- 114.3	3	3	1	3	2
BCA- 114.4	3	2	2	2	3
Average	2.75	2.5	2	2	2.25

CO-PSO Mapping Matrix for Course Code: BCA-114

BCA-115: Communication Skills

Course Objectives: This course helps the students to know, improve and develop the most important attribute of a person: their personality and communication skills and sensitizes them to literure.

Course Outcomes: At the end of the course, the students will be able to:

Unit I: develop the student's ability to use English language accurately and effectively by enhancing their communication skills.
  stimulate students to the cultural, social and aesthetic aspects of literature.
  develops in the learners an appreciation of the subtle nuances of literary expression.
Unit II: enable the learners to revalue literature as cultural and communicative events.
  improve the learners' use of language in various ways as a means of subjective expression.

CO-PO Mapping Matrix for Course Code:BCA-115

COs#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
Unit I	3	3	3	3	3	3	3	3	3	2
Unit II	3	2	3	2	2	2	3	2	2	3
Average	3	2.5	3	2.5	2.5	2.5	2.5	2.5	2.5	2.5

CO-PSO Mapping Matrix for Course Code:BCA-115

COs#				
Unit I	3	3	3	3
Unit II	3	2	3	3
Average	3	2.5	3	3

BCA-116: PROGRAMMING IN C

Course Objectives: The aim of the course is to provide basic knowledge of C. a High level language as one of the programming tool and generating logical development skills using programming.

Course Outcomes: At the end of this course, the student will be able to:
BCA-116.1. learn the basics of C program, data types and input/output statements.
BCA-116.2. understand different types of operators, their hierarchies and also control statements of C.
BCA-116.3. develop programs using functions.
BCA-116.4. implement programs using arrays and strings.

CO-PO Mapping Matrix for Course Code: BCA-116											
COs#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BCA-116.1	3	3	2	3	3	2	2	2	2	3	2
BCA-116.2	3	2	3	3	3	2	2	2	2	2	2
BCA-116.3	2	3	3	3	2	2	2	2	1	1	2
BCA-116.4	3	2	2	2	3	3	2	3	3	2	2
Average	2.75	2.5	2.5	2.75	2.75	2.25	2	2.25	2	2	2

CO-PSO Mapping Matrix for Course Code: BCA-116					
COs#	PSO1	PSO2	PSO3	PSO4	PSO5
BCA-116.1	3	3	2	3	3
BCA-116.2	3	2	3	3	3
BCA-116.3	2	3	3	3	2
BCA-116.4	3	2	2	2	3
Average	2.75	2.5	2.5	2.75	2.75

BCA-121: ADVANCED PROGRAMMING IN C

Course Objectives: The aim of the course is to provide knowledge of C as a High level language as one of the programming tool and generating logical development using programming.

Course Outcomes: At the end of this course, the student will be able to:
BCA-121.1. get familiar with advanced concepts like structures, union etc. in C language.
BCA-121.2. learn a complete overview of pointers in C and allocation and de-allocation of memory.
BCA-121.3. understand file types and errors in file handling along with its solutions.
BCA-121.4. learn macros and to implement C to acquire job in software industry.

CO-PO Mapping Matrix for Course Code: BCA-121

COs#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BCA-121.1	3	3	2	3	3	2	2	2	2	3	2
BCA-121.2	3	2	3	3	3	2	2	2	2	2	2
BCA-121.3	2	3	3	3	2	2	2	2	1	1	1
BCA-121.4	3	2	2	2	3	3	3	3	3	2	2
Average	2.75	2.5	2.5	2.75	2.75	2.25	2.25	2.25	2	2	1.75

CO-PSO Mapping Matrix for Course Code: BCA-121

COs#	PSO1	PSO2	PSO3	PSO4	PSO5
BCA-121.1	3	3	2	3	3
BCA-121.2	3	2	3	3	3
BCA-121.3	2	3	3	3	2
BCA-121.4	3	2	2	2	3
Average	2.75	2.5	2.5	2.75	2.75

BCA-122: LOGICAL ORGANISATION OF COMPUTERS - II

Course Objectives: The aim of the course is to provide knowledge of computer as a system and making student aware of internal mechanism of computer hardware and its working.

Course Outcomes: At the end of this course, the student will be able to:
BCA-122.1. understand working of different types of flip-flops.
BCA-122.2. design different types of registers and counters.
BCA-122.3. learn CPU organization and its working.
BCA-122.4. understand I/ O interface and various types of interrupt structures.

CO-PO Mapping Matrix for Course Code: BCA-122											
COs#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BCA-122.1	3	3	2	3	3	2	2	2	2	3	2
BCA-122.2	3	2	3	3	3	2	2	2	2	2	2
BCA-122.3	2	3	3	3	2	2	2	2	1	1	2
BCA-122.4	3	2	2	2	3	3	2	3	3	2	2
Average	2.75	2.5	2.5	2.75	2.75	2.25	2	2.25	2	2	2

CO-PSO Mapping Matrix for Course Code: BCA-122				
COs#	PSO1	PSO2	PSO3	PSO4	SPO5
BCA-122.1	3	3	2	3	3
BCA-122.2	3	2	3	3	3
BCA-122.3	2	3	3	3	2
BCA-122.4	3	2	2	2	3
Average	2.75	2.5	2.5	2.75	2.75

BCA-123: MATHEMATICAL FOUNDATIONS – II

Course Objectives: The aim of this course is to study concepts of operators, group and rings and matrix.

Course Outcomes: At the end of this course, the student will be able to:

BCA-123.1. Learn about Propositions and logical operators, Truth tables and propositions generated by a set. Equivalence and implications, Proposition over a universe, Mathematical induction, Quantifiers.

BCA-123.2. Define Binary operations on a non empty set, Groups, Subgroups, Normal Subgroups, Cosets, , Rings, Sub rings, Ideals, Factor rings, Prime ideals, Fields, Isomorphism of groups and rings.

BCA-123.3. Understand Addition and multiplication of matrices, Laws of matrix algebra, Singular and non singular matrices, Inverse of a matrix, Rank of a matrix.

BCA-123.4. Know about Characteristic equations of a square matrix, Cayley-Hamilton Theorem, Eigen values and vectors, Hermitian and skew – Hermitan matrices, Diagonalization of a square matrix.

COs#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BCA 123.1	3	3	3	2	2	2	2	3	2	2	2
BCA 123.2	3	3	3	3	3	3	3	3	3	2	3
BCA 123.3	3	3	3	3	3	3	3	3	3	2	2
BCA 123.4	3	3	3	3	3	3	2	3	3	2	3
Average	3	3	3	2.75	2.75	2.75	2.5	3	2.75	2	2.5

CO-PO Mapping Matrix for Course Code: BCA-123

CO-PSO Mapping Matrix for Course Code: BCA-123				
COs#	PSO1	PSO2	PSO3	PSO4
BCA 123 .1	3	3	3	3
BCA 123.2	3	3	3	3
BCA 123.3	3	3	3	3
BCA 123.4	3	3	3	3
Average	3	3	3	3

BCA-124: OFFICE AUTOMATION TOOLS

Course Objectives: The aim of this course is to provide knowledge of basic requirements that are needed for establishing an automated Office. All office components have been introduced and students will be able to automate the office.

Course Outcomes: At the end of this course, the student will be able to:
BCA-124.1. develop PowerPoint presentations using basic features of PowerPoint application software.
BCA-124.2. develop PowerPoint presentations using advanced features of PowerPoint application software.
BCA-124.3. create tables and manipulate them.
BCA-124.4. acquire knowledge of MS Access advance concepts like writing queries and designing forms.

CO-PO Mapping Matrix for Course Code: BCA-124											
COs#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BCA-124.1	3	3	2	3	3	2	2	2	2	3	2
BCA-124.2	3	2	3	3	3	2	2	2	2	2	2
BCA-124.3	2	3	3	3	2	2	2	2	1	1	2
BCA-124.4	3	2	2	2	3	3	2	3	3	2	2
Average	2.75	2.5	2.5	2.75	2.75	2.25	2	2.25	2	2	2

CO-PSO Mapping Matrix for Course Code: BCA-124					
COs#	PSO1	PSO2	PSO3	PSO4	PSO5
BCA-124.1	3	3	2	3	3
BCA-124.2	3	2	3	3	3
BCA-124.3	2	3	3	3	2
BCA-124.4	3	2	2	2	3
Average	2.75	2.5	2.5	2.75	2.75

BCA-125: STRUCTURED SYSTEM ANALYSIS AND DESIGN

Course Objectives: The aim of the course is to provide knowledge of Software Engineering as a paradigm in Computer Science. This course will enable students to be the computer engineer or system analysts for an enterprise.

Course Outcomes: At the end of this course, the student will be able to:
BCA-125.1. understand concept of Software Engineering and types of System.
BCA-125.2. plan the software project for an Enterprise.
BCA-125.3. analyze the requirement of a client to design a software.
BCA-125.4. design a software using structured and object-oriented approach.

CO-PO Mapping Matrix for Course Code: BCA-125

COs#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
BCA-125.1	3	3	2	3	3	2	2	2	2
BCA-125.2	3	2	3	3	3	2	2	2	2
BCA-125.3	2	3	3	3	2	2	2	2	1
BCA-125.4	3	2	2	2	3	3	2	3	3
Average	2.75	2.5	2.5	2.75	2.75	2.25	2	2.25	2

CO-PSO Mapping Matrix for Course Code: BCA-125

COs#	PSO1	PSO2	PSO3	PSO4	PSO5
BCA-125.1	3	3	2	3	3
BCA-125.2	3	2	3	3	3
BCA-125.3	2	3	3	3	2
BCA-125.4	3	2	2	2	3
Average	2.75	2.5	2.5	2.75	2.75

BCA-126: Personality Development

Course Objectives: This course is to impart to the students the meaning of personality, essence of hygiene, developing self, developing communication competence, presentation skills related to group discussion, interviews & workplace success.

Course Outcomes: At the end of the course, the students will be able to:

Unit I
Understand the concept of effective communication in a corporate world
Acquaint with more effective written communication
Unit II
Master in the art of a professional business presentation
Distinguish different communication process and its practical application

CO-PO Mapping Matrix for Course Code:BCA-126

COs#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
Unit I.1	2	3	2	3	3	3	3	3	3	2
Unit I.2	3	2	3	3	2	3	3	3	3	3
Unit II.1	2	2	3	2	2	3	2	2	2	3
Unit II.2	3	3	2	3	3	3	3	3	3	3
Average	2.5	2.5	2.5	2.75	2.5	3	2.75	2.75	2.75	2.75

CO-PSO Mapping Matrix for Course Code:BCA-126

COs#	PSO1	PSO2	PSO3	PSO4
Unit I.1	3	3	3	3
Unit I.2	3	3	3	3
Unit II.1	3	2	3	2
Unit II.2	3	3	3	3
Average	3	2.75	3	2.75

BCA-131: Lab-I Based on BCA-112 & BCA-124

Course Objectives: The aim of this course is help students to enhance their concept of computer hardware, software, memory and operating environments along with the concepts of problem solving using programming languages which will lead to code generation in future for computer science job aspirants.

Course Outcomes: At the end of this course, the student will be able to:
BCA-131.1 develop program logic using algorithms, flowchart, decision tables, DFDs, etc.
BCA-131.2.develop sorting, searching, merging and other basic algorithms to solve problems.
BCA-131.3 acquire knowledge of MS Access advance concepts like writing queries and designing forms.
BCA-131.4 create tables and manipulate them.

CO-PO Mapping Matrix for Course Code: BCA-131											
COs#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BCA-131.1	3	3	2	3	3	2	2	2	2	3	2
BCA-131.2	3	2	3	3	3	2	2	2	2	2	2
BCA-131.3	2	3	3	3	2	2	2	2	1	1	1
BCA-131.4	3	2	2	2	3	3	3	3	3	2	2
Average	2.75	2.5	2.5	2.75	2.75	2.25	2.25	2.25	2	2	1.75

CO-PSO Mapping Matrix for Course Code: BCA-131					
COs#	PSO1	PSO2	PSO3	PSO4	PSO5
BCA-131.1	3	3	2	3	3
BCA-131.2	3	2	3	3	3
BCA-131.3	2	3	3	3	2
BCA-131.4	3	2	2	2	3
Average	2.75	2.5	2.5	2.75	2.75

BCA-132: Lab-II Based on BCA-116 & BCA-121

Course Objectives: The aim of the course is to provide basic knowledge of C. a High level language as one of the programming tool and generating logical development skills using programming.

Course Outcomes: At the end of this course, the student will be able to:

BCA-132.1. learn the basics of C program, data types and input/output statements.
BCA-132.2. understand different types of operators, their hierarchies and also control statements of C.
BCA-132.3. get familiar with advanced concepts like structures, union etc. in C language
BCA-132.4. learn macros and to implement C to acquire job in software industry.

CO-PO Mapping Matrix for Course Code: BCA-132											
COs#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BCA-132.1	3	3	2	3	3	2	2	2	2	3	2
BCA-132.2	3	2	3	3	3	2	2	2	2	2	2
BCA-132.3	2	3	3	3	2	2	2	2	1	1	2
BCA-132.4	3	2	2	2	3	3	2	3	3	2	2
Average	2.75	2.5	2.5	2.75	2.75	2.25	2	2.25	2	2	2

CO-PSO Mapping Matrix for Course Code: BCA-132					
COs#	PSO1	PSO2	PSO3	PSO4	PSO5
BCA-132.1	3	3	2	3	3
BCA-132.2	3	2	3	3	3
BCA-132.3	2	3	3	3	2
BCA-132.4	3	2	2	2	3
Average	2.75	2.5	2.5	2.75	2.75

BCA- 231: Object Oriented PROGRAMMING Using C++

Course Objectives: The aim of the course is to provide knowledge of C++ (high level language) as one of the programming tool and generating logical development using programming. This course will help students to learn about OOPS concepts and linking C++ as a powerful OOPS language.

Course Outcomes: At the end of this course, the student will be able to:

BCA-231.1. understand basic concepts of C++.
BCA-231.2. learn operators, hierarchy and their precedence and different control structures of C++.
BCA-231.3. develop programs using arrays, strings and functions.
BCA-231.4. implement OOPS concepts with C++.

CO-PO Mapping Matrix for Course Code: BCA-231

COs#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BCA-231.1	3	3	2	3	3	2	2	2	2	3	2
BCA-231.2	3	2	3	3	3	2	2	2	2	2	2
BCA-231.3	2	3	3	3	2	2	2	2	1	1	1
BCA-231.4	3	2	2	2	3	3	3	3	3	2	2
Average	2.75	2.5	2.5	2.75	2.75	2.25	2.25	2.25	2	2	1.75

CO-PSO Mapping Matrix for Course Code: BCA-231

COs#	PSO1	PSO2	PSO3	PSO4	PSO5
BCA-231.1	3	3	2	3	3
BCA-231.2	3	2	3	3	3
BCA-231.3	2	3	3	3	2
BCA-231.4	3	2	2	2	3
Average	2.75	2.5	2.5	2.75	2.75

BCA-232: DATA STRUCTURES

Course Objectives: Learning of data structure is like learning alphabets to learn any proper language. In this course students will be aware of memory management and use of data structure in computer programming.

Course Outcomes: At the end of this course, the student will be able to:
BCA-232.1. learn basics of data structure and algorithm complexities.
BCA-232.2. acquire knowledge of arrays and strings.
BCA-232.3. understand the idea of implementation for linked lists and stacks.
BCA-232.4. learn various searching and sorting techniques along with implementation of queues.

CO-PO Mapping Matrix for Course Code: BCA-232

COs#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BCA-232.1	3	3	2	3	3	2	2	2	2	3	2
BCA-232.2	3	2	3	3	3	2	2	2	2	2	2
BCA-232.3	2	3	3	3	2	2	2	2	1	1	2
BCA-232.4	3	2	2	2	3	3	2	3	3	2	2
Average	2.75	2.5	2.5	2.75	2.75	2.25	2	2.25	2	2	2

CO-PSO Mapping Matrix for Course Code: BCA-232

COs#	PSO1	PSO2	PO3	PSO4	PSO5
BCA-232.1	3	3	2	3	3
BCA-232.2	3	2	3	3	3
BCA-232.3	2	3	3	3	2
BCA-232.4	3	2	2	2	3
Average	2.75	2.5	2.5	2.75	2.75

BCA-233: COMPUTER ARCHITECTURE

Course Objectives: The aim of this course is to provide knowledge of computer as a system and making students aware of internal mechanism of computer hardware and its working.

Course Outcomes: At the end of this course, the student will be able to:

BCA-233.1 learn various trends in computer architectures.
BCA-233.2 learn RTL and working of microprogrammed control unit.
BCA-233.3 learn hardware algorithms for basic arithmetic operations.
BCA-233.4 understand role of memory hierarchy and working of various types of memory.

CO-PO Mapping Matrix for Course Code: BCA-233

COs#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BCA-233.1	3	3	2	3	3	2	2	2	2	3	2
BCA-233.2	3	2	3	3	3	2	2	2	2	2	2
BCA-233.3	2	3	3	3	2	2	2	2	1	1	2
BCA-233.4	3	2	2	2	3	3	2	3	3	2	2
Average	2.75	2.5	2.5	2.75	2.75	2.25	2	2.25	2	2	2

CO-PSO Mapping Matrix for Course Code: BCA-233

COs#	PSO1	PSO2	PSO3	PSO4	PSO5
BCA-233.1	3	3	2	3	3
BCA-233.2	3	2	3	3	3
BCA-233.3	2	3	3	3	2
BCA-233.4	3	2	2	2	3
Average	2.75	2.5	2.5	2.75	2.75

BCA-234: SOFTWARE ENGINEERING

Course Objectives: The aim of the course is to provide knowledge of Software Engineering as a paradigm in Computer Science. This course will enable students to be the computer engineer or system analysts for an enterprise.

Course Outcomes: At the end of this course, the student will be able to:
BCA-234.1. understand concept of Software Engineering and types of System.
BCA-234.2. plan the software project for an Enterprise.
BCA-234.3. analyze the requirement of a client to design a software.
BCA-234.4. design a software using structured and object-oriented approach.

CO-PO Mapping Matrix for Course Code: BCA-234											
COs#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BCA-234.1	3	3	2	3	3	2	2	2	2	3	2
BCA-234.2	3	2	3	3	3	2	2	2	2	2	2
BCA-234.3	2	3	3	3	2	2	2	2	1	1	2
BCA-234.4	3	2	2	2	3	3	2	3	3	2	2
Average	2.75	2.5	2.5	2.75	2.75	2.25	2	2.25	2	2	2

CO-PSO Mapping Matrix for Course Code: BCA-234					
COs#	PSO1	PSO2	PSO3	PSO4	PSO5
BCA-234.1	3	3	2	3	3
BCA-234.2	3	2	3	3	3
BCA-234.3	2	3	3	3	2
BCA-234.4	3	2	2	2	3
Average	2.75	2.5	2.5	2.75	2.75

BCA-235: Fundamentals of Data Base System

Course Objectives: Today almost all real life problems include data. The objective of this course to get students aware about the basic concept of Data. In this paper students will learn database management and its implementation.

Course Outcomes: At the end of this course, the student will be able to:
BCA-235.1. learn basic concepts of data base along with its functions and components.
BCA-235.2. understand data base architecture and different data models.
BCA-235.3. design an ER diagram of an enterprise.
BCA-235.4. write SQL statements to retrieve information and learn the concept of relational algebra and calculus.

CO-PO Mapping Matrix for Course Code: BCA-235

COs#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BCA-235.1	3	3	2	3	3	2	2	2	3	3	2
BCA-235.2	3	2	3	3	3	1	2	2	2	2	2
BCA-235.3	3	3	3	3	2	2	1	2	1	1	2
BCA-235.4	3	3	2	2	3	3	2	3	3	2	2
Average	3	2.75	2.5	2.75	2.75	2	1.75	2.25	2.25	2	2

CO-PSO Mapping Matrix for Course Code: BCA-235

COs#	PSO1	PSO2	PSO3	PSO4	PSO5
BCA-235.1	3	3	2	3	3
BCA-235.2	3	2	3	3	3
BCA-235.3	2	3	3	3	2
BCA-235.4	3	2	2	2	3
Average	2.75	2.5	2.5	2.75	2.75

BCA-236: COMPUTER ORIENTED NUMERICAL METHODS

Course Objectives: The aim of the course is to have a proper understanding of statistical and graphical techniques in statistical applications. This course will make students knowing about the concept of fundamentals of sampling.

Course Outcomes: At the end of this course, the student will be able to:
BCA- 236.1 learn the concepts of algebraic methods and find solutions of polynomial equation.
BCA- 236.2 apply numerical methods to obtain approximate solutions to mathematical problems.
BCA- 236.3 fit curves and find correlations.
BCA- 236.4 solve statistical problems using probability distributions.

CO-PO Mapping Matrix for Course Code: BCA- 236

COs#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BCA- 236.1	3	2	2	3	2	3	2	3	2	-	1
BCA- 236.2	3	2	2	3	2	3	2	3	2	-	1
BCA- 236.3	3	1	2	3	2	1	2	2	2	-	1
BCA- 236.4	3	3	2	1	2	2	2	3	2	-	1
Average	3	2	2	2.5	2	2.25	2	2.75	2	-	1

CO-PSO Mapping Matrix for Course Code: BCA- 236

COs#	PSO1	PSO2	PSO3	PSO4	PSO5
BCA- 236.1	3	2	2	3	3
BCA- 236.2	3	2	3	3	3
BCA- 236.3	2	2	2	3	2
BCA- 236.4	3	2	1	2	3
Average	2.75	2	2	2.75	2.75

BCA-241: Advanced Data Structures

Course Objectives: Learning of data structure is like learning alphabets to learn any proper language. This becomes even more important as it is main tool to learn computer storage and implementing problem solutions related to various aspects. After this course student will be aware of memory management and use of data structure in computer programming.

Course Outcomes: At the end of this course, the student will be able to:
BCA-241.1. learn tree structure and implementation of its different types.
BCA-241.2. implement various operations on graphs in data structure.
BCA-241.3. understand the idea file organization and hashing functions.
BCA-241.4. learn the idea of priority queues in data structures along with some advanced sorting techniques.

CO-PO Mapping Matrix for Course Code: BCA-241

COs#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BCA-241.1	3	3	2	3	3	2	2	2	2	3	2
BCA-241.2	3	2	3	3	3	2	2	2	2	2	2
BCA-241.3	2	3	3	3	2	2	2	2	2	1	2
BCA-241.4	3	2	2	2	3	3	2	3	2	2	2
Average	2.75	2.5	2.5	2.75	2.75	2.25	2	2.25	2	2	2

CO-PSO Mapping Matrix for Course Code: BCA-241

COs#	PSO1	PSO2	PSO3	PSO4	PSO5
BCA-241.1	3	3	2	3	3
BCA-241.2	3	2	3	3	3
BCA-241.3	2	3	3	3	2
BCA-241.4	3	2	2	2	3
Average	2.75	2.5	2.5	2.75	2.75

BCA-242: Advanced Programming using C++

Course Objectives: The aim of the course is to provide knowledge of C++ (high level language) as one of the programming tool and generating logical development using programming. This course will help students to learn about OOPS concepts and linking C++ as a powerful OOPS language.

Course Outcomes: At the end of this course, the student will be able to:
BCA-242.1. understand pointers, constructor and destructors in C++.
BCA-242.2. acquire the detailed knowledge of polymorphism.
BCA-242.3. learn to implement exception handling and template.
BCA-242.4. learn File handling in C++.

CO-PO Mapping Matrix for Course Code: BCA-242

COs#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BCA-242.1	3	3	2	3	3	2	2	2	2	3	2
BCA-242.2	3	2	3	3	3	2	2	2	2	2	2
BCA-242.3	3	2	3	3	2	2	2	2	1	1	2
BCA-242.4	3	2	2	2	2	3	3	3	3	2	2
Average	3	2.2	2.5	2.75	2.5	2.25	2.25	2.25	2	2	2

CO-PSO Mapping Matrix for Course Code: BCA-242

COs#	PSO1	PSO2	PSO3	PSO4	PSO5
BCA-242.1	3	3	2	3	3
BCA-242.2	3	2	3	3	3
BCA-242.3	2	3	3	3	2
BCA-242.4	3	2	2	2	3
Average	2.75	2.5	2.5	2.75	2.75

BCA-243: E-COMMERCE

Course Objectives: The aim of the course is to make students aware of e-commerce in general and use of sites in particular. E-commerce is latest trend in modern era and this paper will help students establish relation to real life.

Course Outcomes: At the end of this course, the student will be able to:
BCA-243.1. learn the main components of e-commerce and its prerequisites.
BCA-243.2. understand the architecture of EDI and learn the different mode of electronic payment.
BCA-243.3. learn the implementation of b2c type of e-commerce in real life applications.
BCA-243.4. understand the idea of commerce over mobile phones, security prospectus and legal aspects of e-commerce.

COs#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BCA-243.1	3	3	2	3	2	3	2	2	3	3	2
BCA-243.2	3	2	3	2	3	2	2	3	2	2	3
BCA-243.3	2	3	3	3	2	2	2	2	2	3	2
BCA-243.4	3	2	2	2	2	3	3	3	3	2	2
Average	2.75	2.5	2.5	2.5	2.25	2.5	2.25	2.5	2.5	2.5	2.25

CO-PO Mapping Matrix for Course Code: BCA-243

COs#	PSO1	PSO2	PSO3	PSO4	PSO5
BCA-243.1	3	3	2	2	3
BCA-243.2	3	2	3	3	2
BCA-243.3	3	3	2	3	3
BCA-243.4	3	2	2	2	3
Average	3	2.5	2.25	2.5	2.75

CO-PSO Mapping Matrix for Course Code: BCA-243

BCA- 244:Relational Data Base Management System

Course Objectives: Today almost all real life problems include data. The objective of this paper to get students aware about the basic concept of Data. In this paper students will learn database management and its implementation.

Course Outcomes: At the end of this course, the student will be able to:
BCA-244.1. learn basic concepts of data base designing strategy of ER diagram.
BCA-244.2. understand functional dependency and normalization.
BCA-244.3. learn advance concept of DBMS.
BCA-244.4. implement SQL and PL/SQL in any software industry for database handling.

CO-PO Mapping Matrix for Course Code: BCA-244

COs#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BCA-244.1	3	3	2	3	3	2	2	2	2	3	2
BCA-244.2	3	2	3	3	3	2	2	2	2	2	2
BCA-244.3	2	3	3	3	2	2	2	2	1	1	2
BCA-244.4	3	2	2	2	3	3	2	3	3	2	2
Average	2.75	2.5	2.5	2.75	2.75	2.25	2	2.25	2	2	2

CO-PSO Mapping Matrix for Course Code: BCA-244

COs#	PSO1	PSO2	PSO3	PSO4	PSO5
BCA-244.1	3	3	2	3	3
BCA-244.2	3	2	3	3	3
BCA-244.3	2	3	3	3	2
BCA-244.4	3	2	2	2	3
Average	2.75	2.5	2.5	2.75	2.75

BCA-245: COMPUTER ORIENTED STATISTICAL METHODS

Course Objectives: The aim of the course is to have a proper understanding of statistical and graphical techniques in statistical applications. This course will make students knowing about the concept of fundamentals of sampling.

Course Outcomes: At the end of this course, the student will be able to:
BCA- 245.1 learn the concepts of algebraic methods and find solutions of polynomial equation.
BCA- 245.2 apply numerical methods to obtain approximate solutions to mathematical problems.
BCA- 245.3 fit curves and find correlations.
BCA- 245.4 solve statistical problems using probability distributions.

CO-PO Mapping Matrix for Course Code: BCA- 245

COs#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BCA- 245.1	3	2	2	3	2	3	2	3	2	-	1
BCA- 245.2	3	2	2	3	2	3	2	3	2	-	1
BCA- 245.3	3	1	2	3	2	1	2	2	2	-	1
BCA- 245.4	3	3	2	1	2	2	2	3	2	-	1
Average	3	2	2	2.5	2	2.25	2	2.75	2	-	1

CO-PSO Mapping Matrix for Course Code: BCA- 245

COs#	PSO1	PSO2	PSO3	PSO4	PSO5
BCA- 245.1	3	2	2	3	3
BCA- 245.2	3	2	3	3	3
BCA- 245.3	2	2	2	3	2
BCA- 245.4	3	2	1	2	3
Average	2.75	2	2	2.75	2.75

BCA- 246: MANAGEMENT INFORMATION SYSTEM

Course Objectives: The aim of this course is to help students to understand the role of information technology and decision support systems in business. Student will learn to design, implement, evaluate and maintain the system for an enterprise.

Course Outcomes: At the end of this course, the student will be able to:
BCA- 246.1 relate the basic concepts and technologies used in the field of Management Information Systems.
BCA- 246.2 apply the understanding that how MIS is helpful in decision making.
BCA- 246.3 learn the process of system detailed designing.
BCA- 246.4 understand the processes of developing and implementing information systems.

CO-PO Mapping Matrix for Course Code: BCA- 246

COs#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BCA- 246.1	3	3	2	3	3	2	2	2	3	3	2
BCA- 246.2	3	3	3	2	3	3	3	2	3	2	2
BCA- 246.3	2	3	3	2	2	2	3	2	3	1	3
BCA- 246.4	3	3	2	3	3	3	2	3	2	2	2
Average	2.75	3	2.5	2.5	2.75	2.5	2.5	2.25	2.75	2	2.25

CO-PSO Mapping Matrix for Course Code: BCA-246

COs#	PSO1	PSO2	PSO3	PSO4	PSO5
BCA- 246.1	3	3	2	3	3
BCA- 246.2	2	3	3	2	2
BCA- 246.3	2	3	3	3	2
BCA- 246.4	3	2	2	2	3
Average	2.5	2.75	2.5	2.5	2.5

BCA- 251: Lab-I Based on BCA-231 & BCA-242

Course Objectives: The aim of the course is to provide knowledge of C++ (high level language) as one of the programming tool and generating logical development using programming. This course will help students to learn about OOPS concepts and linking C++ as a powerful OOPS language.

Course Outcomes: At the end of this course, the student will be able to:

BCA-251.1. understand basic concepts of C++.
BCA-251.2. learn operators, hierarchy and their precedence and different control structures of C++.
BCA-251.3. learn to implement exception handling and template.
BCA-251.4. learn File handling in C++.

CO-PO Mapping Matrix for Course Code: BCA-251

COs#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BCA-251.1	3	3	2	3	3	2	2	2	2	3	2
BCA-251.2	3	2	3	3	3	2	2	2	2	2	2
BCA-251.3	2	3	3	3	2	2	2	2	1	1	1
BCA-251.4	3	2	2	2	3	3	3	3	3	2	2
Average	2.75	2.5	2.5	2.75	2.75	2.25	2.25	2.25	2	2	1.75

CO-PSO Mapping Matrix for Course Code: BCA-251

COs#	PSO1	PSO2	PSO3	PSO4	PSO5
BCA-251.1	3	3	2	3	3
BCA-251.2	3	2	3	3	3
BCA-251.3	2	3	3	3	2
BCA-251.4	3	2	2	2	3
Average	2.75	2.5	2.5	2.75	2.75

BCA- 252: Lab-II Based on BCA-232 & BCA-241

Course Objectives: Learning of data structure is like learning alphabets to learn any proper language. In this course students will be aware of memory management and use of data structure in computer programming.

Course Outcomes: At the end of this course, the student will be able to:
BCA-252.1. learn basics of data structure and algorithm complexities.
BCA-252.2. learn the idea of priority queues in data structures along with some advanced sorting techniques.
BCA-252.3. understand the idea of implementation for linked lists and stacks.
BCA-252.4. learn various searching and sorting techniques along with implementation of queues.

CO-PO Mapping Matrix for Course Code: BCA-252											
COs#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BCA-252.1	3	3	2	3	3	2	2	2	2	3	2
BCA-252.2	3	2	3	3	3	2	2	2	2	2	2
BCA-252.3	2	3	3	3	2	2	2	2	1	1	2
BCA-252.4	3	2	2	2	3	3	2	3	3	2	2
Average	2.75	2.5	2.5	2.75	2.75	2.25	2	2.25	2	2	2

CO-PSO Mapping Matrix for Course Code: BCA-252					
COs#	PSO1	PSO2	PO3	PSO4	PSO5
BCA-252.1	3	3	2	3	3
BCA-252.2	3	2	3	3	3
BCA-252.3	2	3	3	3	2
BCA-252.4	3	2	2	2	3
Average	2.75	2.5	2.5	2.75	2.75

BCA-351: WEB DESIGNING FUNDAMENTALS

Course Objectives: The aim of the course is to provide knowledge of web as a tool in presenting information. Each and every product in e-world now needs a website, this course will make student knowing about the concept of web design in general.

Course Outcomes: At the end of this course, the student will be able to:
BCA-351.1. learn about WWW and search engines.
BCA-351.2. understand domain and assigning name to them.
BCA-351.3. understand basic web languages and its components.
BCA-351.4. perform simple web page designing for practical exposure.

CO-PO Mapping Matrix for Course Code: BCA- 351

COs#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BCA-351.1	3	3	2	3	3	2	2	2	2	3	2
BCA-351.2	3	2	3	3	3	2	2	2	2	2	2
BCA-351.3	2	3	3	3	2	2	2	2	1	1	2
BCA-351.4	3	2	2	2	3	3	2	3	3	2	2
Average	2.75	2.5	2.5	2.75	2.75	2.25	2	2.25	2	2	2

CO-PSO Mapping Matrix for Course Code: BCA- 351

COs#	PSO1	PSO2	PSO3	PSO4	PSO5
BCA-351.1	3	3	2	3	3
BCA-351.2	3	2	3	3	3
BCA-351.3	2	3	3	3	2
BCA-351.4	3	2	2	2	3
Average	2.75	2.5	2.5	2.75	2.75

BCA-352: OPERATING SYSTEM– I

Course Objectives: The aim of the course is to provide knowledge of Operating System (OS) as a system program. Making students to learn about OS and linking OS as a powerful tool to make system work. Students will be able to learn types of OS and learn about system operations using OS.

Course Outcomes: At the end of this course, the student will be able to:
BCA-352.1. understand the basic concepts of operating systems and its services.
BCA-352.2. understand concept of process management and scheduling.
BCA-352.3. acquire knowledge of process synchronization along with deadlock handling.
BCA-352.4. learn about memory management and virtual memory concepts.

CO-PO Mapping Matrix for Course Code: BCA-352

COs#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BCA-352.1	3	3	2	3	3	2	2	2	2	3	2
BCA-352.2	3	2	3	3	3	2	2	2	2	2	2
BCA-352.3	2	3	3	3	2	2	2	2	2	1	2
BCA-352.4	3	2	2	2	3	3	2	3	2	2	2
Average	2.75	2.5	2.5	2.75	2.75	2.25	2	2.25	2	2	2

CO-PSO Mapping Matrix for Course Code: BCA-352

COs#	PSO1	PSO2	PSO3	PSO4	PSO5
BCA-352.1	3	3	2	3	3
BCA-352.2	3	2	3	3	3
BCA-352.3	2	3	3	3	2
BCA-352.4	3	2	2	2	3
Average	2.75	2.5	2.5	2.75	2.75

BCA- 353: ARTIFICIAL INTELLIGENCE

Course Objectives: The aim of this course is to help students to understand the concept of Artificial Intelligence, Knowledge Representation, Logic, NLP and Learning.

Course Outcomes: At the end of this course, the student will be able to:
BCA- 353.1 learn the basic concept of Artificial Intelligence (AI) and its application areas.
BCA- 353.2.acquire the knowledge of heuristic search and approaches for knowledge representations.
BCA-353.3.understand the idea of natural language processing and predicate logic.
BCA- 353.4.gain the knowledge of learning technologies & build expert systems.

CO-PO Mapping Matrix for Course Code: BCA- 353

COs#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BCA- 353.1	3	3	2	2	3	2	2	2	3	3	2
BCA- 353.2	3	2	3	2	3	2	2	2	3	2	2
BCA- 353.3	3	3	3	2	2	2	2	2	3	1	1
BCA- 353.4	3	2	2	3	3	3	3	3	2	2	2
Average	3	2.5	2.5	2.25	2.75	2.25	2.25	2.25	2.75	2	1.75

CO-PSO Mapping Matrix for Course Code: BCA- 353

COs#	PSO1	PSO2	PSO3	PSO4	PSO5
BCA- 353.1	3	3	2	3	3
BCA- 353.2	3	2	3	3	3
BCA- 353.3	2	3	3	3	2
BCA- 353.4	3	2	2	2	3
Average	2.75	2.5	2.5	2.75	2.75

BCA-354: COMPUTER NETWORKS
Course Objectives: Provide a comprehensive introduction to Computer Networks and its associated concepts and terminology along with the knowledge of Network architecture, design issues, and hardware components. Give exposure to the contemporary networking technologies
Course Outcomes: At the end of this course, the student will be able to: BCA-354.1: have a comprehensive understanding of networking concepts and basic terminology along with its hardware components. BCA-354.2: understand and characterize various types of computer networks. BCA-354.3: conceptualize the various design issues related to Network Architecture and have an overview of the standard OSI reference model that illustrates the network architecture. BCA-354.4: gain knowledge of Local Area Network technologies and components that will provide the competency for setting up of network environments in local areas.

CO-PO Mapping Matrix for Course Code: BCA-354

COs#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BCA-354.1	3	3	2	3	3	1	2	3	1	1	2
BCA-354.2	3	2	2	3	3	1	2	3	1	1	2
BCA-354.3	2	3	2	3	2	2	2	3	1	1	2
BCA-354.4	3	3	2	2	3	2	2	3	2	1	2
Average	2.75	2.75	2	2.75	2.75	1.5	2	3	1.25	1	2

CO-PSO Mapping Matrix for Course Code: BCA-354

COs#	PSO1	PSO2	PSO3	PSO4	PSO5
BCA-354.1	3	3	2	3	3
BCA-354.2	3	2	3	3	3
BCA-354.3	2	3	3	3	2
BCA-354.4	3	2	2	2	3
Average	2.75	2.5	2.5	2.75	2.75

BCA-355: PROGRAMMING USING VISUAL BASICS

Course Objectives: The aim of the course is to get expertise in visual programming and understand the functionalities of middleware platform.

Course Outcomes: At the end of this course, the student will be able to:
BCA- 355.1 get the knowledge of the structure and model of the programming language C #.
BCA- 355.2 develop various applications in C # classes and objects.
BCA- 355.3 understand and implement object oriented features in C # programming language to solve the given problem.
BCA- 355.4 learn LINQ that binds the gap between relational and object-oriented approaches.

CO-PO Mapping Matrix for Course Code: BCA-355

COs#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BCA- 355.1	3	2	2	3	1	2	1	2	1	--	2
BCA- 355.2	3	2	3	3	1	2	2	2	1	1	2
BCA- 355.3	3	2	3	3	1	3	2	2	1	1	2
BCA- 355.4	3	2	2	2	1	2	1	1	--	--	2
Average	3	2	2.5	2.75	1	2.25	1.5	1.75	1	1	2

CO-PSO Mapping Matrix for Course Code: BCA-355

COs#	PSO1	PSO2	PSO3	PSO4	PSO5
BCA- 355.1	3	3	3	3	3
BCA- 355.2	2	3	3	3	3
BCA- 355.3	2	3	3	3	2
BCA- 355.4	1	3	3	2	3
Average	2	3	3	2.75	2.75

BCA-356: MULTIMEDIA TOOLS

Course Objectives: The aim of this course is to list out appropriate hardware, software and different applications of multimedia, evaluate the appropriate multimedia systems and develop effective multimedia applications.

Course Outcomes: At the end of this course, the student will be able to:
BCA-356.1 learn multimedia applications, tools and products.
BCA-356.2 understand multimedia building blocks and compression techniques.
BCA-356.3 acquire knowledge of internet role in multimedia.
BCA-356.4 identify the future prospectus of multimedia.

CO-PO Mapping Matrix for the Course Code: BCA-356										
COs#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BCA-356.1	3	3	2	2	3	2	2	2	3	3	2
BCA-356.2	2	2	3	2	1	2	2	2	3	2	2
BCA-356.3	2	3	3	2	2	2	2	2	3	1	1
BCA-356.4	3	2	2	3	3	3	3	3	2	2	2
Average	2.5	2.5	2.5	2.25	1.75	2.25	2.25	2.25	2.75	2	1.75

CO-PSO Mapping Matrix for the Course Code: BCA-356					
COs#	PSO1	PSO2	PSO3	PSO4	PSO5
BCA-356.1	3	3	2	3	3
BCA-356.2	3	2	3	3	3
BCA-356.3	3	2	3	3	2
BCA-356.4	3	2	2	2	3
Average	3	2.25	2.5	2.75	2.75

BCA-361: WEB DESIGNING USING ADVANCED TOOLS

Course Objectives: The aim of the course is to provide knowledge of web designing. Each and every product in e-world now needs a website, this course will make student ready to represent a website and also student will learn to host a site.

Course Outcomes: At the end of this course, the student will be able to:
BCA- 361.1. learn JavaScript and VBScript.
BCA- 361.2. make use of control statement and objects of ASP.
BCA- 361.3. learn advanced web languages like DHTML and CSS along with its components.
BCA- 361.4. implement dynamic web page designing to acquire job as web developer.

CO-PO Mapping Matrix for Course Code: BCA-361										
COs#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BCA-361.1	3	3	2	3	3	2	2	2	2	3	2
BCA-361.2	3	2	3	3	3	2	2	2	2	2	2
BCA-361.3	3	3	3	3	2	3	3	2	2	3	1
BCA-361.4	2	3	2	3	2	2	2	2	2	2	2
Average	2.75	2.75	2.5	3	2.5	2.25	2.25	2	2	2.5	1.75

CO-PSO Mapping Matrix for Course Code: BCA- 361					
COs#	PSO1	PSO2	PSO3	PSO4	PSO5
BCA-361.1	3	3	2	3	3
BCA-361.2	3	2	3	3	3
BCA-361.3	2	3	3	3	2
BCA-361.4	3	2	2	2	3
Average	2.75	2.5	2.5	2.75	2.75

BCA-362: OPERATING SYSTEM– II

Course Objectives: The aim of the course is to provide knowledge of Operating System (OS) as a system program. Making students to learn about OS and linking OS as a powerful tool to make system work. Students will be able to learn types of OS and learn about system operations using OS.

Course Outcomes: At the end of this course, the student will be able to:
BCA-362.1. understand the basic concepts of operating systems and its services.
BCA-362.2. understand concept of process management and scheduling.
BCA-362.3. acquire knowledge of process synchronization along with deadlock handling.
BCA-362.4. learn about memory management and virtual memory concepts.

CO-PO Mapping Matrix for Course Code: BCA-362										
COs#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BCA-362.1	3	3	2	3	3	2	2	2	2	3	2
BCA-362.2	3	2	3	3	3	2	2	2	2	2	2
BCA-362.3	2	3	3	3	2	2	2	2	2	1	2
BCA-362.4	3	2	2	2	3	3	2	3	2	2	2
Average	2.75	2.5	2.5	2.75	2.75	2.25	2	2.25	2	2	2

CO-PSO Mapping Matrix for Course Code: BCA-362					
COs#	PSO1	PSO2	PSO3	PSO4	PSO5
BCA-362.1	3	3	2	3	3
BCA-362.2	3	2	3	3	3
BCA-362.3	2	3	3	3	2
BCA-362.4	3	2	2	2	3
Average	2.75	2.5	2.5	2.75	2.75

BCA- 363: COMPUTER GRAPHICS

Course Objectives: The aim of this course is to help students gain experience in interactive computer graphics using 2D, 3D, point and line drawing algorithms.

Course Outcomes: At the end of this course, the student will be able to:
BCA- 363.1 understand the core concepts of computer graphics.
BCA- 363.2 learn and implement point, line and circle drawing algorithms.
BCA- 363.3 acquire knowledge two dimensional transformations and line clipping algorithms.
BCA- 363.4 understand 3-D graphics concept and acquire skills for designing 3-D graphics.

CO-PO Mapping Matrix for Course Code: BCA- 363										
COs#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BCA- 363.1	3	3	2	3	3	2	2	2	3	3	3
BCA- 363.2	2	3	3	2	3	2	2	2	3	2	2
BCA- 363.3	2	2	3	3	2	2	2	2	3	3	3
BCA- 363.4	3	2	2	3	3	3	3	3	2	2	2
Average	2.5	2.5	2.5	2.75	2.75	2.25	2.25	2.25	2.75	2.5	2.5

CO-PSO Mapping Matrix for Course Code: BCA- 363					
COs#	PSO1	PSO2	PSO3	PSO4	PSO5
BCA- 363.1	3	3	3	3	3
BCA- 363.2	3	2	3	3	1
BCA- 363.3	3	2	3	2	2
BCA- 363.4	3	3	2	2	3
Average	3.0	2.5	2.75	2.5	2.25

BCA-364: INTERNET TECHNOLOGIES

Course Objectives: The aim of this course is to make students aware to the interconnection and integration of the physical world and the cyber space. They are also able to design & develop IOT Device.

Course Outcomes: At the end of this course, the student will be able to:
BCA- 364.1 Learn IoT techniques and deployment templates.
BCA- 364.2 Acquire knowledge of domain specific IoT.
BCA- 364.3 Learn IoT platform design methodology.
BCA- 364.4 Understand design and development challenges in IoT.

COs#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BCA- 364.1	3	3	2	2	3	2	2	2	3	1	2
BCA- 364.2	2	2	2	3	2	2	3	2	2	2	2
BCA- 364.3	2	1	2	2	3	2	2	2	3	1	2
BCA- 364.4	3	2	2	3	3	2	3	2	2	2	2
Average	2.5	2	2	2.5	2.75	2	2.5	2	2.5	1.5	2

CO-PO Mapping Matrix for Course Code: BCA-364

CO-PSO Mapping Matrix for Course Code: BCA-364					
COs#	PSO1	PSO2	PSO3	PSO4	PSO5
BCA- 364.1	3	2	2	3	3
BCA- 364.2	2	2	1	2	2
BCA- 364.3	2	3	3	3	2
BCA- 364.4	3	2	2	2	3
Average	2.5	2.25	2	2.5	2.5

BCA-365:ADVANCED PROGRAMMING WITH VISUAL BASICS

Course Objectives: The aim of the course is to get expertise in visual programming and understand the functionalities of middleware platform.

Course Outcomes: At the end of this course, the student will be able to:
BCA- 365.1 get the knowledge of the structure and model of the programming language C #.
BCA- 365.2 develop various applications in C # classes and objects.
BCA- 365.3 understand and implement object oriented features in C # programming language to solve the given problem.
BCA- 365.4 learn LINQ that binds the gap between relational and object-oriented approaches.

CO-PO Mapping Matrix for Course Code: BCA-365

COs#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BCA- 365.1	3	2	2	3	1	2	1	2	1	--	2
BCA- 365.2	3	2	3	3	1	2	2	2	1	1	2
BCA- 365.3	3	2	3	3	1	3	2	2	1	1	2
BCA- 365.4	3	2	2	2	1	2	1	1	--	--	2
Average	3	2	2.5	2.75	1	2.25	1.5	1.75	1	1	2

CO-PSO Mapping Matrix for Course Code: BCA-365

COs#	PSO1	PSO2	PSO3	PSO4	PSO5
BCA- 365.1	3	3	3	3	3
BCA- 365.2	2	3	3	3	3
BCA- 365.3	2	3	3	3	2
BCA- 365.4	1	3	3	2	3
Average	2	3	3	2.75	2.75

BCA- 366: PROGRAMMING IN CORE JAVA

Course Objectives: The aim of the course is to provide knowledge of JAVA as a High level language as one of the programming tool and generating logical development using programming. Making student to learn about OOPS and linking JAVA as a powerful OOPs language. Also making student aware of property of JAVA as Platform independent.

Course Outcomes: At the end of this course, the student will be able to:

BCA- 366.1 demonstrate the basic programming constructs of Java and OOPs to develop Java programs.

BCA- 366.2 learn and develop various controls and branching of logics under various cases using language control structures.

BCA- 366.3 exemplify the usage to implement polymorphism and Inheritance in java programs.

BCA- 366.4 acquire knowledge of Packages, Interfaces, Exceptions and Multithreading in building efficient applications.

CO-PO Mapping Matrix for Course Code: BCA- 366											
COs#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BCA- 366.1	3	2	3	1	3	2	2	3	2	1	2
BCA- 366.2	3	2	3	1	2	3	2	3	2	1	3
BCA- 366.3	3	2	3	1	2	2	2	3	2	--	2
BCA- 366.4	3	2	3	1	3	3	2	3	3	1	3
Average	3	2	3	1	2.5	2.5	2	3	2.25	0.75	2.5

CO-PSO Mapping Matrix for Course Code: BCA- 366					
COs#	PSO1	PSO2	PSO3	PSO4	PSO5
BCA- 366.1	3	1	2	3	3
BCA- 366.2	3	1	3	3	3
BCA- 366.3	2	1	2	3	2
BCA- 366.4	3	1	3	3	3
Average	2.75	1	2.5	3	2.75

BCA-371: Lab-I Based on BCA-351 & BCA-361

Course Objectives: The aim of the course is to provide knowledge of web as a tool in presenting information. Each and every product in e-world now needs a website, this course will make student knowing about the concept of web design in general.

Course Outcomes: At the end of this course, the student will be able to:
BCA-371.1. learn about WWW and search engines.
BCA-371.2. understand domain and assigning name to them.
BCA-371.3. learn advanced web languages like DHTML and CSS along with its components.
BCA-371.4. make use of control statement and objects of ASP.

CO-PO Mapping Matrix for Course Code: BCA- 371

COs#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BCA-371.1	3	3	2	3	3	2	2	2	2	3	2
BCA-371.2	3	2	3	3	3	2	2	2	2	2	2
BCA-371.3	2	3	3	3	2	2	2	2	1	1	2
BCA-371.4	3	2	2	2	3	3	2	3	3	2	2
Average	2.75	2.5	2.5	2.75	2.75	2.25	2	2.25	2	2	2

CO-PSO Mapping Matrix for Course Code: BCA- 371

COs#	PSO1	PSO2	PSO3	PSO4	PSO5
BCA-371.1	3	3	2	3	3
BCA-371.2	3	2	3	3	3
BCA-371.3	2	3	3	3	2
BCA-371.4	3	2	2	2	3
Average	2.75	2.5	2.5	2.75	2.75

BCA-372: Lab-II Based on BCA-355 & BCA-365

Course Objectives: The aim of the course is to get expertise in visual programming and understand the functionalities of middleware platform.

Course Outcomes: At the end of this course, the student will be able to:
BCA- 372.1 get the knowledge of the structure and model of the programming language C #.
BCA- 372.2 develop various applications in C # classes and objects.
BCA- 372.3 understand and implement object oriented features in C # programming language to solve the given problem.
BCA- 372.4 learn LINQ that binds the gap between relational and object-oriented approaches.

CO-PO Mapping Matrix for Course Code: BCA-372

COs#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BCA- 372.1	3	2	2	3	1	2	1	2	1	--	2
BCA- 372.2	3	2	3	3	1	2	2	2	1	1	2
BCA- 372.3	3	2	3	3	1	3	2	2	1	1	2
BCA- 372.4	3	2	2	2	1	2	1	1	--	--	2
Average	3	2	2.5	2.75	1	2.25	1.5	1.75	1	1	2

CO-PSO Mapping Matrix for Course Code: BCA-372

COs#	PSO1	PSO2	PSO3	PSO4	PSO5
BCA- 372.1	3	3	3	3	3
BCA- 372.2	2	3	3	3	3
BCA- 372.3	2	3	3	3	2
BCA- 372.4	1	3	3	2	3
Average	2	3	3	2.75	2.75

Principal
Dyal Singh College
KARNAL

Department of Mathematics

Course Specific Outcomes
&
Programme Specific Outcomes

For BCA Course

Program Outcomes (PO) for Under Graduate Programme in the Faculty of Sciences, Dyal Singh College, Karnal

PO1	Knowledge	Capable of acquiring comprehensive subject knowledge to compete globally
PO2	Communication	To have effective communication skills with their peers , society around them and the scientific community
PO3	Problem Solving	To be able to solve scientific and other Mathematical problems
PO4	Individual and Team Work	Capable of working effectively and efficiently as an individual, as a member or a leader in diverse teams in multidisciplinary areas
PO5	Investigation of Problems	To be able to develop critical thinking, logical and analytical reasoning and research based knowledge, design of experiments, analysis and data interpretation to reach logical conclusions
PO6	Modern Tool usage	Ability to learn techniques, skills and modern tools and apply them in various areas of Science and Mathematics
PO7	Science and Society	Ability to apply reasoning and critical thinking to assess the different issues related to world and discharging their responsibilities towards the society
PO8	Life-Long Learning	To gain natural liking to apply knowledge and skills required to keep learning process on throughout the life
PO9	Environment and Sustainability	Aptitude towards green energy ,design and develop systems which are environmentally sensitive, understand the importance of sustainable development and contribute in sustainable environment
PO10	Ethics	Apply and adhere to ethical principles, professional responsibilities in scientific practices and discharging duties in serving the world
PO11	Project Management	Ability to apply knowledge and understanding of the scientific principles and apply these to manage various projects in Science and Mathematics

Program Specific Outcomes (PSO)

After successful completion of the programme, a student will be able to:

PSO1	Have basic understanding and knowledge of Set theory, logic, Algebra, Calculus, Differential Equations, Abstract Algebra. Develop thinking in a critical way. Demonstrate and to be able to effectively use that information to find the solution of problems at hand.
PSO2	Gain a good knowledge of Mathematical concepts and develop the mathematical reasoning, knowledge, critical thinking, skills and aptitude for different career options. Understand, formulate and use quantitative models
PSO3	Have good and effective communication by presentation, written, computational and graphical means.
PSO4	Enhance their employability in government/private sectors, jobs in banking/insurance and investment sectors

BCA 115: MATHEMATICAL FOUNDATIONS – I

COURSE OBJECTIVE: The aim of this course is to study the concepts of sets, limits, continuity and differential equations.

Course Outcomes: This course will enable the students to:

1) Learn Set, subsets and operations on sets, Venn diagram of sets, Power set of a set, Equivalence relation on a set and partition of a set, Permutation and combinations, Partially ordered sets, Lattices ,Boolean algebra.
2) Understand Basic properties of limits, Continuous functions and classifications of discontinuities, Derivative of a different function and their higher order derivatives.
3) Know about the Formation of differential equations order and degree, Geometrical approach to the existence of the solution, exact differential equations.
4) Study linear differential equation of higher order with constant coefficients and linear differential equations reducible to homogenous differential equations.

CO-PO matrix for the course BCA 115: MATHEMATICAL FOUNDATIONS – I

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BCA 115.1	3	3	3	2	2	2	2	3	2	2	2
BCA 115.2	3	3	3	3	3	3	3	3	3	2	3
BCA 115.3	3	3	3	3	3	3	3	3	3	2	2
BCA 115.4	3	3	3	3	3	3	2	3	3	2	3
Average	3	3	3	2.75	2.75	2.75	2.5	3	2.75	2	2.5

CO-PSO matrix for the course BCA 115: MATHEMATICAL FOUNDATIONS – I

Cos	PSO1	PSO2	PSO3	PSO4
BCA 115 .1	3	3	3	3
BCA 115.2	3	3	3	3
BCA 115.3	3	3	3	3
BCA 115.4	3	3	3	3
Average	3	3	3	3

BCA 124: MATHEMATICAL FOUNDATIONS – II

Course Objectives : The aim of this course is to study concepts of operators ,group and rings and matrix.

Course Outcomes: This course will enable the students to:

1) Learn about Propositions and logical operators, Truth tables and propositions generated by a set. Equivalence and implications, Laws of logic, Mathematical system, Proposition over a universe, Mathematical induction, Quantifiers
2) Define Binary operations on a non empty set, Groups, Subgroups, Normal Subgroups, Cosets, Factor groups, Rings, Sub rings, Ideals, Factor rings, Prime ideals, Minimal ideal, Fields, direct product of groups, Isomorphism of groups and rings.
3) Understand Addition and multiplication of matrices, Laws of matrix algebra, Singular

and non singular matrices, Inverse of a matrix, Rank of a matrix.
4) Know about Characteristic equations of a square matrix, Cayley-Hamilton Theorem, Eigen values and eigen vectors, Eigen values and eigen vectors of symmetric skew symmetric, Hermitian and skew – Hermitan matrices, Diagonalization of a square matrix.

CO-PO matrix for the course BCA 124: MATHEMATICAL FOUNDATIONS – II

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BCA 124.1	3	3	3	2	2	2	2	3	2	2	2
BCA 124.2	3	3	3	3	3	3	3	3	3	2	3
BCA 124.3	3	3	3	3	3	3	3	3	3	2	2
BCA 124.4	3	3	3	3	3	3	2	3	3	2	3
Average	3	3	3	2.75	2.75	2.75	2.5	3	2.75	2	2.5

CO-PSO matrix for the course BCA 124: MATHEMATICAL FOUNDATIONS – II

Cos	PSO1	PSO2	PSO3	PSO4
BCA 124 .1	3	3	3	3
BCA 124.2	3	3	3	3
BCA 124.3	3	3	3	3
BCA 124.4	3	3	3	3
Average	3	3	3	3

Department of Computer Science

Course Specific Outcomes
&
Programme Specific Outcomes

For Basic Computer Education Course

DYAL SINGH COLLEGE KARNAL
(KURUKSHETRA UNIVERSITY, KURUKSHETRA)

NAME OF THE PROGRAMME   : BASIC COMPUTER EDUCATION
DURATION   : ONE YEAR

		PROGRAMME OUTCOMES (POs)
PO1	Knowledge	Capable of demonstrating comprehensive disciplinary knowledge gained during course of study.
PO2	Communication	Ability to communicate effectively on general and scientific topics with the scientific community and with society at large.
PO3	Problem Solving	Capability of applying knowledge to solve scientific and other problems.
PO4	Individual and Team Work	Capable to learn and work effectively as an individual, and as a member or leader in diverse teams, in multidisciplinary settings.
PO5	Investigation of Problems	Ability of critical thinking, analytical reasoning and research based knowledge including design of experiments, analysis and interpretation of data to provide conclusions.
PO6	Modern Tool Usage	Ability to use and learn techniques, skills and modern tools for scientific practise.
PO7	Science and Society	Ability to apply reasoning to access the different issues related to society and the consequent responsibilities relevant to the professional scientific practices.
PO8	Life-Long Learning	Aptitude to apply knowledge and skills that are necessary for participating in learning activities throughout the life.
PO9	Environment and Sustainability	Ability to design and develop modern systems which are environmentally sensitive and to understand the importance of sustainable development.
PO10	Ethics	Apply ethical principles and professional responsibilities in scientific practices.
PO11	Project Management	Ability to demonstrate knowledge and understanding of the scientific principles and apply these to manage projects.

	PROGRAMME SPECIFIC OUTCOMES (PSOs)
The objective of the curriculum designed for BCA course is to nurture the technical aptitude of students for professional competency in the IT industry.	
PSO1	Develop proficiency for solving real world problems with the application of programming and supplementary computing skills.
PSO2	Promote exposure to hardware as well as software knowledge with the inclusion of course content targeted to administer technical expertise for employment in the IT industry.
PSO3	Explicit course content is targeted to inculcate programming skills using both conventional and contemporary programming languages as well as to develop potential for realizing web oriented and other commercial/non-commercial applications.
PSO4	Judicious structuring of the course curriculum has been aimed in order to strengthen competitive ability as per the trending industry requirements.
PSO5	Encourage skillful expertise for employment in Commercial/ Government sectors or pursuance of higher studies aimed towards innovational research leading to the progressive growth of the society and the nation.

UG : BASIC COMPUTER EDUCATION

Course Objectives: The aim of this course is to give students a in-depth understanding of why computers are essential components in business, education and society.

Course Outcomes: At the end of this course, the student will be able to:
UG.1 learn the basic terminology of hardware and software components of a computer system.
UG.2. understand the concept to Identify the Windows screen elements and parts of a window.
UG.3. Indicate the names and functions of the Word interface components.
UG.4. understand basic computer network technology

CO-PO Mapping Matrix for Course Code: UG

COs#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
UG.1	3	3	2	3	3	2	2	2	2	3	2
UG.2	3	2	3	3	2	3	2	2	2	2	2
UG.3	2	3	3	3	2	2	2	2	1	1	1
UG.4	3	2	2	2	3	3	3	3	3	2	2
Average	2.75	2.5	2.5	2.75	2.5	2.5	2.25	2.25	2	2	1.75

CO-PSO Mapping Matrix for Course Code: UG

COs#	PSO1	PSO2	PSO3	PSO4	PSO5
UG.1	3	3	2	3	3
UG.2	3	2	3	3	3
UG.3	2	3	3	3	2
UG.4	3	2	2	2	3
Average	2.75	2.5	2.5	2.75	2.75

UG (A): LAB BASED ON BASIC COMPUTER EDUCATION

Course Objectives: The aim of this course is to introduce the fundamentals of computing devices and reinforce computer vocabulary, particularly with respect to personal use of computer hardware and software, the Internet, networking and mobile computing.

Course Outcomes: At the end of this course, the student will be able to:
UG (A).1 develop program logic using algorithms, flowchart, decision tables, DFDs, etc.
UG (A).2.develop sorting, searching, merging and other basic algorithms to solve problems.
UG (A).3 learn basics of Internet and its services specifically e-mail services.
UG (A).4 check threats to a computer system and find suitable software to resolve them.

COs#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
UG (A).1	3	3	2	3	3	2	2	2	2	3	2
UG (A).2	3	2	3	3	3	2	2	2	2	2	2
UG (A).3	2	3	3	3	2	2	2	2	1	1	1
UG (A).4	3	2	2	2	3	3	3	3	3	2	2
Average	2.75	2.5	2.5	2.75	2.75	2.25	2.25	2.25	2	2	1.75

CO-PO Mapping Matrix for Course Code: UG (A)

COs#	PSO1	PSO2	PSO3	PSO4	PSO5
UG (A).1	3	3	2	3	3
UG (A).2	3	2	3	3	3
UG (A).3	2	3	3	3	2
UG (A).4	3	2	2	2	3
Average	2.75	2.5	2.5	2.75	2.75

CO-PSO Mapping Matrix for Course Code: UG (A)

Principal
Dyal Singh College
KARNAL

Department of Physics

Course Specific Outcomes
&
Programme Specific Outcomes

For Computational Physics Course

DYAL SINGH COLEEGE, KARNAL

CERTIFICATE COURSE IN COMPUTATIONAL PHYSICS

NAME OF THE PROGRAMME : BASIC PF COMPUTER AND C++ PROGRAMING
DURATION : ONE YEAR

PROGRAMME OUTCOMES (POs)		
PO1	Knowledge	Capable of demonstrating comprehensive disciplinary knowledge gained during course of study.
PO2	Communication	Ability to communicate effectively on general and scientific topics with the scientific community and with society at large.
PO3	Problem Solving	Capability of applying knowledge to solve scientific and other problems.
PO4	Individual and Team Work	Capable to learn and work effectively as an individual, and as a member or leader in diverse teams, in multidisciplinary settings.
PO5	Investigation of Problems	Ability of critical thinking, analytical reasoning and research-based knowledge including design of experiments, analysis and interpretation of data to provide conclusions.
PO6	Modern Tool Usage	Ability to use and learn techniques, skills and modern tools for scientific practise.
PO7	Science and Society	Ability to apply reasoning to access the different issues related to society and the Consequent responsibilities relevant to the professional scientific practices.
PO8	Life-Long Learning	Aptitude to apply knowledge and skills that are necessary for participating in learning activities throughout the life.
PO9	Environment and Sustainability	Ability to design and develop modern systems which are environmentally sensitive and to understand the importance of sustainable development.
PO10	Ethics	Apply ethical principles and professional responsibilities in scientific practices.
PO11	Project Management	Ability to demonstrate knowledge and understanding of the scientific principles and apply these to manage projects.

PROGRAMME SPECIFIC OUTCOMES (PSOs)

The objective of the program designed for BSc course is to foster the scientific talent of students for proficient skill in the field of education and research.

PSO1	Acquire a thorough acquaintance, understanding and knowledge of the basic perceptions of computational Physics.
PSO2	Be accomplished with the understanding of the operating system, hardware, software, managing files and folders.
PSO3	Gain hands-on skills for carrying out certain basic and various programming language, problem mapping and solving using fundamental principles of Physics, analysis and interpretation of results.
PSO4	Have a new vision to look at the world with scientific temperament that empowers them to pursue studies at higher and research level.
PSO5	Have awareness of the impact of computational Physics on community and various commercial and environmental issues.

CO-PO Mapping Matrix for Course Code: PH-101

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
PH-101.1	3	3	3	2	2	1	2	3	1	2	2
PH-101.2	3	3	3	2	2	1	2	3	1	2	2
PH-101.3	3	3	3	2	2	1	2	2	1	2	2
PH-101.4	3	3	3	2	2	1	2	2	1	2	2
Average	3	3	3	2	2	1	2	2.5	1	2	2

CO-PSO Mapping Matrix for Course Code: PH-101

CO	PSO1	PSO2	PSO3	PSO4	PSO5
PH-101.1	3	3	2	2	2
PH-101.2	3	3	2	2	2
PH-101.3	3	3	2	3	2
PH-101.4	3	3	2	2	3
Average	3	3	2	2.25	2.25

B.SC Computational Lab (Add-on course)

Course Objectives: The aim of this course is to introduce students to computational methods for solving problems in physics.

Course Outcomes: At the end of this course:

    CO.1 Students are able to understand the different basic concepts of computational Physics.

    CO.2 Verify some fundamental principles of physics and maths using C++.

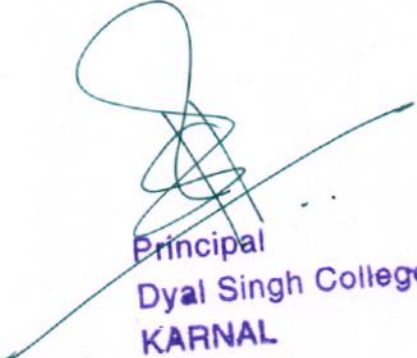   CO.3 Verified various program: even/odd, HCF, LCM, prime numbers etc .

    CO.4 Learn to present results and analysis in suitable form.

CO-PO Mapping Matrix for Course Code:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO.1	3	3	3	2	2	2	2	3	1	2	3
CO.2	3	3	3	2	2	2	2	2	1	2	2
CO.3	3	3	3	2	2	1	2	2	1	2	1
CO.4	3	3	3	2	2	1	3	3	2	2	3
Average	3	3	3	2	2	1.5	2.25	2.5	1.25	2	2.25

CO-PSO Mapping Matrix for Course Code: B.SC -1 Lab Practical

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO.1	3	3	2	2	3
CO.2	3	3	2	2	2
CO.3	3	3	2	2	3
CO.4	3	3	2	3	3
Average	3	3	2	2.25	2.75

Principal
Dyal Singh College
KARNAL

Department of Computer Science

Course Specific Outcomes
&
Programme Specific Outcomes

For Web Designing Course

DYAL SINGH COLLEGE KARNAL
(KURUKSHETRA UNIVERSITY, KURUKSHETRA)

CERTIFICATE COURSE IN WEB DESIGNING

NAME OF THE PROGRAMME : WEB DESIGNING
DURATION : ONE YEAR

	PROGRAMME OUTCOMES (POs)	
PO1	Knowledge	Capable of demonstrating comprehensive disciplinary knowledge gained during course of study.
PO2	Communication	Ability to communicate effectively on general and scientific topics with the scientific community and with society at large.
PO3	Problem Solving	Capability of applying knowledge to solve scientific and other problems.
PO4	Individual and Team Work	Capable to learn and work effectively as an individual, and as a member or leader in diverse teams, in multidisciplinary settings.
PO5	Investigation of Problems	Ability of critical thinking, analytical reasoning and research based knowledge including design of experiments, analysis and interpretation of data to provide conclusions.
PO6	Modern Tool Usage	Ability to use and learn techniques, skills and modern tools for scientific practise.
PO7	Science and Society	Ability to apply reasoning to access the different issues related to society and the consequent responsibilities relevant to the professional scientific practices.
PO8	Life-Long Learning	Aptitude to apply knowledge and skills that are necessary for participating in learning activities throughout the life.
PO9	Environment and Sustainability	Ability to design and develop modern systems which are environmentally sensitive and to understand the importance of sustainable development.
PO10	Ethics	Apply ethical principles and professional responsibilities in scientific practices.
PO11	Project Management	Ability to demonstrate knowledge and understanding of the scientific principles and apply these to manage projects.

PROGRAMME SPECIFIC OUTCOMES (PSOs)	
The objective of the curriculum designed for BCA course is to nurture the technical aptitude of students for professional competency in the IT industry.	
PSO1	Develop proficiency for solving real world problems with the application of programming and supplementary computing skills.
PSO2	Promote exposure to hardware as well as software knowledge with the inclusion of course content targeted to administer technical expertise for employment in the IT industry.
PSO3	Explicit course content is targeted to inculcate programming skills using both conventional and contemporary programming languages as well as to develop potential for realizing web oriented and other commercial/non-commercial applications.
PSO4	Judicious structuring of the course curriculum has been aimed in order to strengthen competitive ability as per the trending industry requirements.
PSO5	Encourage skillful expertise for employment in Commercial/ Government sectors or pursuance of higher studies aimed towards innovational research leading to the progressive growth of the society and the nation.

WD-101: WEB DESIGNING (ADD – ON – COURSE)

Course Objectives: The purpose of the course is to develop skills in analyzing the usability of a web site. Understand how to plan and conduct user research related to web usability. Learn the language of the web: HTML and CSS.

Course Outcomes: At the end of this course, the student will be able to:
WD-101.1 learn about WWW and search engines.
WD-101.2. understand domain and assigning name to them.
WD-101.3. understand basic web languages and its components.
WD-101.4. perform simple web page designing for practical exposure.

CO-PO Mapping Matrix for Course Code: WD-101

COs#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
WD-101.1	3	3	2	3	3	2	2	2	2	3	2
WD-101.2	3	2	3	3	3	2	2	2	2	2	2
WD-101.3	2	3	3	3	2	2	2	2	1	1	2
WD-101.4	3	2	2	2	3	3	2	3	3	2	2
Average	2.75	2.5	2.5	2.75	2.75	2.25	2	2.25	2	2	2

CO-PSO Mapping Matrix for Course Code: WD-101

COs#	PSO1	PSO2	PSO3	PSO4	PSO5
WD-101.1	3	3	2	3	3
WD-101.2	3	2	3	3	3
WD-101..3	2	3	3	3	2
WD-101.4	3	2	2	2	3
Average	2.75	2.5	2.5	2.75	2.75

WD-102: WEB DESIGNING

Project Objectives: Knowing what we need a website to achieve right from the start is crucially important to the entire project. It helps us maximize our conversion rates. It helps us develop a unified design direction.

Project Outcomes: At the end of this course, the student will be able to:

WD-102.1. you will be able to quickly identify areas of strength and weakness in your program

WD-102.2. you can better plan what you will assess and how those assessments will help your students learn and achieve the outcomes.

WD-102.3. You can better meet your responsibilities to account for student learning by reviewing and knowing the outcomes and how the assessments in your course(s) inform decisions regarding student learning.

WD-102.4. By reviewing your outcomes and corresponding assessments, you can identify outcomes that need revising in order to be clearer in defining student achievement.

CO-PO Mapping Matrix for Course Code: WD-102

COs#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
WD-102.1	3	3	2	3	3	2	2	2	2	3	2
WD-102.2	3	2	3	3	3	2	2	2	2	2	2
WD-102.3	2	3	3	3	2	2	2	2	1	1	2
WD-102.4	3	2	2	2	3	3	2	3	3	2	2
Average	2.75	2.5	2.5	2.75	2.75	2.25	2	2.25	2	2	2

CO-PSO Mapping Matrix for Course Code: WD-102

COs#	PSO1	PSO2	PSO3	PSO4	PSO5
WD-102.1	3	3	2	3	3
WD-102.2	3	2	3	3	3
WD-102.3	2	3	3	3	2
WD-102.4	3	2	2	2	3
Average	2.75	2.5	2.5	2.75	2.75

WD-103: WEB DESIGNING

Practical Objectives: Become familiar with graphic design principles that relate to web design and learn how to implement theories into practice. Develop skills in analyzing the usability of a web site.

Practical Outcomes: At the end of this course, the student will be able to:

WD-103.1. You will discover how does web works really, what makes web sites work

WD-103.2. Simple and impressive design techniques, from basics till advanced to focus on goal oriented and user centric designs.

WD-103.3. How to and where to start research, planning for website & actually build excellent web sites.

WD-103.4. To create web elements like buttons, banners & Bars and of course complete UI designs.

CO-PO Mapping Matrix for Course Code: WD-103

COs#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
WD-103.1	3	3	2	3	3	2	2	2	2	3	2
WD-103.2	3	2	3	3	3	2	2	2	2	2	2
WD-103.3	2	3	3	3	2	2	2	2	1	1	2
WD-103.4	3	2	2	2	3	3	2	3	3	2	2
Average	2.75	2.5	2.5	2.75	2.75	2.25	2	2.25	2	2	2

CO-PSO Mapping Matrix for Course Code: WD-103

COs#	PSO1	PSO2	PSO3	PSO4	PSO5
WD-103.1	3	3	2	3	3
WD-103.2	3	2	3	3	3
WD-103.3	2	3	3	3	2
WD-103.4	3	2	2	2	3
Average	2.75	2.5	2.5	2.75	2.75

Principal
Dyal Singh College
KARNAL

Department of Chemistry

Course Specific Outcomes
&
Programme Specific Outcomes

For B.Sc. Course

Dyal Singh College, Karnal

Name of the Programme: BACHELOR OF SCIENCE (BSc)

Duration: Three Years

Programme Outcomes (POs) for UG courses of Faculty of Medical/Non Medical		
PO1	Knowledge	Capable to apply the full scale and the thorough knowledge in social practices gained during multidisciplinary course of study.
PO2	Communication	Proficiency in communicating with effective scientific aptitude on general and scientific topic with society.
PO3	Problem Solving	Ability of critical thinking to solve general and scientific problems by applying the knowledge gained during the course of study.
PO4	Individual and Team Work	Competency to learn and work as an individual and as a team in multidisciplinary options.
PO5	Investigation of Problems	Capable of analysing the different aspects of a problem, designing of experiments, developing new techniques, analysing and interpreting the data to reach a conclusion.
PO6	Modern Tool Usage	Capability to learn and use modern skills, tools and technologies for social and scientific practices.
PO7	Science and Society	Capable to assess different kinds of social issues by applying reasoning and scientific aptitude developed during the course.
PO8	Life-Long Learning	Developed Learning attitude for newer skills and activities throughout their life.
PO9	Environment and Sustainability	Capable to use the acquired knowledge and developed thinking to design new ideas and systems that are helpful for environment and its sustainability.
PO10	Ethics	Apply ethics and principles in different professional and social practices.
PO11	Project Management	Competency to handle and manage projects with comprehensive knowledge and understanding of diverse scientific principles.

Programme Specific Outcomes (PSOs) for Chemistry subject of B.Sc. Medical/Non Medical	
The aim of the curriculum designed for BSc course in to nurture the technical aptitude of students for professional competency in the area of Chemical industries/ Research programmes.	
PSO1	All branches of Science and Technology are basically associated with Chemistry.
PSO2	Acquire good knowledge about the fundamentals and applications of chemical substances for daily use purposes.
PSO3	Teaching of this subject will inculcate the ability in youth to have understanding of basic knowledge about medical science.
PSO4	Knowledge of chemistry plays an important role in the area of Fertilizer industry, Food adulteration and Fats/Oil industries.
PSO5	This programme will build up the ability to synthesize, separate, characterize and analyse compounds using laboratory and instrumentation techniques.

B. Sc. 1ˢᵗ Year (Ist Semester) CHEMISTRY		

Course Outcomes of Paper-I (CHEM-101) Inorganic Chemistry

Course Objectives:

CHEM-101.1	Elaborate the de-broglie relation and principle, wave function and solved numericals of slater's rule.
CHEM-101.2	To understand the periodic properties of s, p, d, f block elements and analysed the different methods of electronegativity calculation of different compounds.
CHEM-101.3	To learn about valence bond theory and hybridisation concept evaluation in different molecules as well as ions.
CHEM-101.4	To describe the structure of ionic solids in 3D and defects in geometry of these ionic solids.

Mapping of CO with PO's

Cos#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CHEM-101.1	3	3	3	3	3	3	2	3	2	3	2
CHEM-101.2	2	3	3	3	3	3	2	3	3	3	3
CHEM-101.3	3	3	3	2	3	3	2	3	2	2	3
CHEM-101.4	2	3	3	2	3	2	3	2	3	3	2
Average	2.5	3	3	2.5	3	2.75	2.5	2.5	2.5	2.75	2.5

Mapping of CO with PSO's

Cos#	PSO1	PSO2	PSO3	PSO4	PSO5
CHEM-101.1	3	3	3	3	2
CHEM-101.2	3	3	3	3	3
CHEM-101.3	3	3	3	3	3
CHEM-101.4	3	3	3	3	2
Average	3	3	3	3	2.50

	B. Sc. 1st Year (Ist Semester) CHEMISTRY	

Course Outcomes of Paper-II (CHEM-102) Physical Chemistry

Course Objectives:

CHEM-102.1	To learn and describe Maxwell's distribution of velocities and collision theory and derivation of parameters related to collision theory.
CHEM-102.2	To learn about critical temperature, pressure and volume, isothermal relations and critical compressibility factor.
CHEM-102.3	To understand the structure and properties of liquids.
CHEM-102.4	To give idea of symmetry and symmetry elements, Bragg's equation and powder pattern method.

Mapping of CO with PO's

Cos#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CHEM-102.1	3	3	3	3	3	3	2	3	2	2	3
CHEM-102.2	2	3	2	3	3	3	3	2	2	3	2
CHEM-102.3	2	3	3	2	3	3	2	3	3	2	3
CHEM-102.4	3	2	2	2	3	2	3	2	2	3	2
Average	2.5	2.75	3	2.5	3	2.75	2.5	2.5	2.25	2.5	2.5

Mapping of CO with PSO's

Cos#	PSO1	PSO2	PSO3	PSO4	PSO5
CHEM-102.1	3	3	3	3	2
CHEM-102.2	3	2	3	3	3
CHEM-102.3	3	3	3	3	3
CHEM-101.4	3	2	2	3	2
Average	3	2.5	2.75	3	2.5

B. Sc. 1st Year (Ist Semester) CHEMISTRY	
Course Outcomes of Paper-III (CHEM-103) Organic Chemistry	

Course Objectives:

CHEM-103.1	To learn and describe localised, delocalised chemical bond, Hyperconjugation and Electromeric effect.
CHEM-103.2	To learn about isomerism, types of isomerism and stereochemistry of organic compounds.
CHEM-103.3	To understand the mechanism of organic reactions and reaction intermediates.
CHEM-103.4	To give idea about alkanes and cycloalkanes along with their nomenclature and physical and chemical properties.

Mapping of CO with PO's

Cos#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CHEM-103.1	3	3	3	3	3	3	2	2	3	2	3
CHEM-103.2	2	3	2	2	3	3	2	3	2	3	3
CHEM-103.3	2	3	3	3	3	3	2	2	3	3	2
CHEM-103.4	3	3	3	2	3	2	2	3	2	2	2
Average	2.5	3	2.75	2.5	3	2.75	2	2.5	2.5	2.5	2.5

Mapping of CO with PSO's

Cos#	PSO1	PSO2	PSO3	PSO4	PSO5
CHEM-103.1	3	3	3	3	2
CHEM-103.2	3	3	3	3	3
CHEM-103.3	2	3	3	3	3
CHEM-103.4	2	3	2	3	2
Average	2.5	3	2.75	3	2.5

B. Sc. 1st Year (2nd Semester) CHEMISTRY										
Course Outcomes of Paper-IV (CHEM-104) Inorganic Chemistry										

Course Objectives:

CHEM-104.1	Elaborate the Hydrogen bonding and van der-waal's forces and their types.
CHEM-104.2	To understand the metallic bonding and semiconductors along with characterisation and applications.
CHEM-104.3	To learn about s Block elements and its chemical properties of different elements, noble gases and study of xenon compounds.
CHEM-104.4	To describe the p Block elements and detailed study of Boron, Carbon Oxygen and Halogen families.

Mapping of CO with PO's

Cos#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CHEM-104.1	3	3	3	3	3	3	3	2	2	3	2
CHEM-104.2	2	2	2	3	3	3	2	3	2	2	3
CHEM-104.3	3	2	3	2	3	3	3	3	3	3	2
CHEM-104.4	3	3	2	2	3	2	2	2	3	2	3
Average	2.75	2.5	3	2.5	3	2.75	2.5	2.5	2.5	2.5	2.5

Mapping of CO with PSO's

Cos#	PSO1	PSO2	PSO3	PSO4	PSO5
CHEM-104.1	3	3	3	3	2
CHEM-104.2	3	3	3	3	3
CHEM-104.3	3	2	3	3	3
CHEM-104.4	3	3	3	3	2
Average	3	2.75	3	3	2.5

B. Sc. 1st Year (2nd Semester) CHEMISTRY										
Course Outcomes of Paper-V (CHEM-105) Physical Chemistry										

Course Objectives:

CHEM-105.1	To learn and describe rate of reaction and all the chemical kinetic parameters of chemical reaction.
CHEM-105.2	To learn about theories of Electrochemistry and factors affecting electrolytic conduction.
CHEM-105.3	To understand application of Kohlrausch's law, Debye-Huckle law and calculation of conductance.
CHEM-105.4	To give idea about Buffer solution and Henderson- Hassel equation.

Mapping of CO with PO's

Cos#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CHEM-105.1	3	3	3	3	3	3	2	2	3	2	3
CHEM-105.2	2	3	2	2	3	3	3	2	2	3	2
CHEM-105.3	3	3	3	3	3	3	2	3	3	2	3
CHEM-105.4	2	3	2	2	3	2	3	3	2	3	2
Average	2.5	3	3	2.5	3	2.75	2.5	2.5	2.5	2.5	2.5

Mapping of CO with PSO's

Cos#	PSO1	PSO2	PSO3	PSO4	PSO5
CHEM-105.1	3	3	3	3	2
CHEM-105.2	3	3	3	3	3
CHEM-105.3	3	3	3	3	3
CHEM-105.4	3	3	3	3	2
Average	3	3	3	3	2.5

B. Sc. 1st Year (2nd Semester) CHEMISTRY	
Course Outcomes of Paper-VI (CHEM-106) Organic Chemistry	
Course Objectives:	
CHEM-106.1	To describe nomenclature of alkenes, mechanism of hydration and dehydration of alcohols.
CHEM-106.2	To learn about chemical reactions of alkene based organic compounds.
CHEM-106.3	To understand the aromaticity, non aromaticity and anti aromaticity.
CHEM-106.4	To give detailed analysis about aromatic electrophilic substitution reactions and energy profile diagrams.

Mapping of CO with PO's

Cos#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CHEM-106.1	3	3	3	3	3	3	2	2	2	2	3
CHEM-106.2	2	3	2	2	3	3	3	2	3	3	2
CHEM-106.3	3	2	3	3	3	3	2	3	2	2	3
CHEM-106.4	2	2	2	2	3	2	3	3	3	3	2
Average	2.5	2.50	3	2.5	3	2.75	2.5	2.5	2.5	2.5	2.5

Mapping of CO with PSO's

Cos#	PSO1	PSO2	PSO3	PSO4	PSO5
CHEM-106.1	3	3	3	3	2
CHEM-106.2	3	3	3	3	3
CHEM-106.3	3	3	3	3	3
CHEM-106.4	3	3	2	3	2
Average	3	3	2.75	3	2.5

B. Sc. 1ˢᵗ Year (2ⁿᵈ Semester) CHEMISTRY	
Course Outcomes of Paper-VII (CHEM-107) Chemistry Practical	

Course Objectives:

CHEM-107.1	To learn experimentally about Redox titrations of Fe^{2+}, $C_2O_4^{2-}$, using $KMnO_4$ and made calculations also.
CHEM-107.2	To perform Paper chromatography of qualitative analysis of metal ions and anions.
CHEM-107.3	To perform experiment for determination of surface tension by different methods and specific refractivity.
CHEM-107.4	To prepare crystals of different organic compounds and determine melting points. Also perform sublimation of organic compounds

Mapping of CO with PO's

Cos#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CHEM-107.1	3	3	3	3	3	3	2	2	2	2	3
CHEM-107.2	2	3	2	2	3	3	3	3	3	3	2
CHEM-107.3	2	3	3	2	3	3	2	3	2	2	3
CHEM-107.4	3	3	2	2	3	2	3	2	3	3	2
Average	2.5	3	3	2.5	3	2.75	2.5	2.5	2.5	2.5	2.5

Mapping of CO with PSO's

Cos#	PSO1	PSO2	PSO3	PSO4	PSO5
CHEM-107.1	3	3	3	3	2
CHEM-107.2	3	2	3	3	3
CHEM-107.3	3	2	3	3	3
CHEM-107.4	3	3	3	3	2
Average	3	2.5	3	3	2.5

B. Sc. 2nd Year (3rd Semester) CHEMISTRY										
Course Outcomes of Paper- VIII (CHEM-201) Inorganic Chemistry										

Course Objectives: After studying this paper, the student will:

CHEM- 201.1	Gets insights into d-block elements particularly of transition elements.
CHEM - 201.2	Have an idea of Stability of various oxidation states and e.m.f (Latimer and Frost diagrams), Structure and properties of some compounds of transition elements.
CHEM - 201.3	Be able to know about the basic concepts of coordination chemistry like EAN, Werner theory of coordination and isomerism in coordination complexes.
CHEM - 201.4	Learn the Physical properties of solvents, reactions in non aqueous solvents.

Mapping of CO with PO's

Cos#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CHEM-201.1	3	3	3	2	3	2	3	2	2	2	3
CHEM-201.2	3	3	3	3	3	3	3	3	3	3	2
CHEM-201.3	3	3	3	2	3	2	3	2	3	2	3
CHEM-201.4	3	2	3	3	3	3	3	3	3	3	2
Average	3	2.75	3	2.5	3	2.5	3	2.5	2.75	2.5	2.5

Mapping of CO with PSO's

Cos#	PSO1	PSO2	PSO3	PSO4	PSO5
CHEM-201.1	2	3	2	2	3
CHEM-201.2	2	2	3	2	2
CHEM-201.3	3	3	3	3	3
CHEM-201.4	3	3	3	3	3
Average	2.5	2.75	2.75	2.5	2.75

B. Sc. 2nd Year (3rd Semester) CHEMISTRY

B. Sc. 2nd Year (3rd Semester) CHEMISTRY

Course Outcomes of Paper- IX (CHEM-202) Physical Chemistry

Course Objectives: After studying this paper, the student will:

CHEM- 202.1	Get knowledge of basic terms of thermodynamics, various processes, and concept of heat and work.
CHEM - 202.2	Be able to Calculate w,q, dU & dH for isothermal and adiabatic conditions.
CHEM - 202.3	Understand the basic terms related to chemical equilibrium and derive the law thermodynamically and will be able to deduce relation between various equilibrium constants.
CHEM - 202.4	Have an idea of partition coefficient for a solvent dissolved in two immiscible solvents and apply it for calculating degree of hydrolysis and hydrolysis constant, equilibrium constant, Process of extraction.

Mapping of CO with PO's

Cos#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CHEM-202.1	3	2	3	2	3	2	3	3	2	2	2
CHEM-202.2	3	3	3	3	3	3	3	2	3	3	3
CHEM-202.3	3	3	3	2	3	2	3	2	3	2	2
CHEM-202.4	3	2	3	3	3	3	3	3	3	3	3
Average	3	2.5	3	2.5	3	2.5	3	2.5	3	2.5	2.5

Mapping of CO with PSO's

Cos#	PSO1	PSO2	PSO3	PSO4	PSO5
CHEM-202.1	2	3	2	2	3
CHEM-202.2	2	2	3	2	2
CHEM-202.3	3	3	3	3	3
CHEM-202.4	3	3	3	3	3
Average	2.5	2.75	2.75	2.5	2.75

B. Sc. 2nd Year (3rd Semester) CHEMISTRY

Course Outcomes of Paper- X (CHEM-203) Organic Chemistry

Course Objectives: After studying this paper, the student will:

CHEM- 203.1	Learn the nomenclature, methods of formation, chemical reactions of monohydric and dihydric alcohols.
CHEM - 203.2	Come to know about Preparation of phenols and Epoxides, their physical properties, chemical properties and reactions.
CHEM - 203.3	Understand Ultraviolet (UV) absorption spectroscopy basics, various shifts and finally its applications in structure elucidation.
CHEM - 203.4	Have Knowledge about various methods for the preparation of carboxylic acid, carboxylic derivatives (ester, amide, acid chlorides, anhydrides) and their chemical reactions.

Mapping of CO with PO's

Cos#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CHEM-203.1	3	2	3	3	3	3	3	2	3	2	2
CHEM-203.2	3	3	3	2	3	3	3	3	2	2	3
CHEM-203.3	3	3	3	3	3	2	3	2	2	3	3
CHEM-203.4	3	2	3	2	3	3	3	3	3	3	2
Average	3	2.5	3	2.5	3	2.75	3	2.5	2.5	2.5	2.5

Mapping of CO with PSO's

Cos#	PSO1	PSO2	PSO3	PSO4	PSO5
CHEM-203.1	3	3	2	2	3
CHEM-203.2	3	3	2	3	3
CHEM-203.3	3	3	3	3	3
CHEM-203.4	3	3	3	3	3
Average	3	3	2.5	2.75	3

Course Outcomes of Paper- XI (CHEM-204) Inorganic Chemistry

Course Objectives: After studying this paper, the student will:

CHEM- 204.1	Gets insight into the position of f block elements in periodic table and their general characteristics.
CHEM - 204.2	Be able to compare the properties of Lanthanides and actinides with transition elements.
CHEM - 204.3	Gain knowledge of analysis of various groups of basic and acidic radicals, chemistry of interference.
CHEM - 204.4	Learn the common ion effect, solubility product, theory of precipitation, co-precipitation, post precipitation, purification of precipitates.

Mapping of CO with PO's

Cos#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CHEM-204.1	3	2	3	2	3	2	3	3	2	2	2
CHEM - 204.2	3	2	3	3	3	3	3	2	3	3	3
CHEM - 204.3	3	3	3	2	3	2	3	3	3	2	2
CHEM - 204.4	3	3	3	3	3	3	3	3	3	3	3
Average	3	2.5	3	2.5	3	2.5	3	2.75	2.75	2.5	2.5

Mapping of CO with PSO's

Cos#	PSO1	PSO2	PSO3	PSO4	PSO5
CHEM - 204.1	2	3	2	2	3
CHEM - 204.2	2	2	3	2	2
CHEM - 204.3	3	3	3	3	3
CHEM - 204.4	3	3	3	3	3
Average	2.5	2.75	2.75	2.5	2.75

	B. Sc. 2nd Year (4th Semester) CHEMISTRY	
	Course Outcomes of Paper- XII (CHEM-205) Physical Chemistry	
	Course Objectives: After studying this paper, the student will:	

CHEM- 205.1	Get knowledge about the laws and concepts of chemical thermodynamics and their applications in thermochemical calculations.
CHEM - 205.2	Be able to describe Gibbs function (G) and Helmholtz function (A), spontaneity, Variation of G and S with P, V and T.
CHEM - 205.3	Understand basics of cells, their EMF determination by use of Nernst equation and thermodynamic properties.
CHEM - 205.4	Learn derivation of cell EMF and its application.

Mapping of CO with PO's

Cos#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CHEM-205.1	3	2	3	2	3	2	3	2	2	2	3
CHEM - 205.2	3	3	3	3	3	3	3	3	3	3	3
CHEM - 205.3	3	3	3	2	3	2	3	2	3	2	2
CHEM - 205.4	3	2	3	3	3	3	3	3	3	3	2
Average	3	2.5	3	2.5	3	2.5	3	2.5	2.75	2.5	2.5

Mapping of CO with PSO's

Cos#	PSO1	PSO2	PSO3	PSO4	PSO5
CHEM - 205.1	2	3	2	2	3
CHEM - 205.2	2	2	3	2	2
CHEM - 205.3	3	3	3	3	3
CHEM - 205.4	3	3	3	3	3
Average	2.5	2.75	2.75	2.5	2.75

B. Sc. 2nd Year (4th Semester) CHEMISTRY										
Course Outcomes of Paper- XIII (CHEM-206) Organic Chemistry										
Course Objectives: After studying this paper, the student will:										

CHEM- 206.1	Understand Infrared (IR) absorption spectroscopy basics, characterstic peak for functional groups, its applications in structure elucidation.
CHEM - 206.2	Learn Structure, nomenclature, physical properties of amines, factors affecting basicity of amines.
CHEM - 206.3	Be able to discuss synthetic application of diazonium salt
CHEM - 206.4	Know about the preparation, the acidity of α-hydrogens of aliphatic, aromatic aldehydes and ketones and various important name reactions of aldehydes and ketones.

Mapping of CO with PO's

Cos#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CHEM - 206.1	3	2	3	2	3	3	3	2	3	2	2
CHEM - 206.2	3	3	3	2	3	3	3	3	2	3	3
CHEM - 206.3	3	3	3	3	3	2	3	2	2	3	3
CHEM - 206.4	3	2	3	3	3	3	3	3	3	2	2
Average	3	2.5	3	2.5	3	2.75	3	2.5	2.5	2.5	2.5

Mapping of CO with PSO's

Cos#	PSO1	PSO2	PSO3	PSO4	PSO5
CHEM- 206.1	3	3	2	2	3
CHEM - 206.2	3	3	2	3	3
CHEM - 206.3	3	3	3	3	3
CHEM - 206.4	3	3	3	3	3
Average	3	3	2.5	2.75	3

	B. Sc. 2nd Year (4th Semester) CHEMISTRY	

Course Outcomes of Paper- XIV (CHEM-207) Practical Chemistry

Course Objectives: After performing the experiments, the student will:

CHEM- 207.1	Acquire skill for quantitative estimations of Cu^{2+}, Al^{3+} and Ni^{2+}, verifying Beer – Lamberts' law.
CHEM - 207.2	Learn the Preparation of various inorganic complexes.
CHEM - 207.3	Be able to determine various enthalpies, rate constant and distribution coefficient.
CHEM - 207.4	Detect extra elements, functional groups, melting point along with preparation of one pure solid derivative.

Mapping of CO with PO's

Cos#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CHEM-207.1	3	3	3	3	3	3	3	3	3	3	3
CHEM - 207.2	3	3	3	2	3	3	2	3	2	3	3
CHEM - 207.3	3	3	3	2	2	3	2	3	2	3	3
CHEM - 207.4	3	2	3	3	3	3	3	3	3	3	3
Average	3	2.75	3	2.5	2.75	3	2.5	3	2.5	3	3

Mapping of CO with PSO's

Cos#	PSO1	PSO2	PSO3	PSO4	PSO5
CHEM- 207.1	3	3	3	2	3
CHEM - 207.2	3	3	2	3	3
CHEM - 207.3	3	3	2	2	3
CHEM - 207.4	3	3	3	3	3
Average	3	3	2.5	2.5	3

	B. Sc. 3rd Year (5th Semester) CHEMISTRY
	Course Outcomes of Paper-XV (CHEM-301) Inorganic Chemistry

Course Objectives:

CHEM-301.1	Understanding about metal ligand bonding in transition metal complexes and elementary idea of crystal field theory, factor affecting crystal field parameters.
CHEM-301.2	Familiarize with thermodynamic and kinetic aspects of metal complexes
CHEM-301.3	Understanding about magnetic properties of Transition metal complexes, types of magnetic materials. Magnetic susceptibility, methods of determining magnetic susceptibility.
CHEM-301.4	Understanding about Electronic spectra of transition metal complexes.

Mapping of CO with PO's

Cos#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CHEM-301.1	3	3	3	3	3	3	3	2	3	3	3
CHEM-301.2	3	3	3	3	3	3	3	3	2	3	3
CHEM-301.3	3	3	3	3	3	3	3	2	3	3	3
CHEM-301.4	3	3	3	3	3	3	3	3	2	3	3
Average	3	3	3	3	3	3	3	2.5	2.5	3	3

Mapping of CO with PSO's

Cos#	PSO1	PSO2	PSO3	PSO4	PSO5
CHEM-301.1	3	3	3	3	3
CHEM-301.2	3	3	3	3	3
CHEM-301.3	3	3	3	3	3
CHEM-301.4	3	3	3	3	3
Average	3	3	3	3	3

B. Sc. 3rd Year (5th Semester) CHEMISTRY										
Course Outcomes of Paper-XVI (CHEM-302) Physical Chemistry										

Course Objectives:

CHEM-302.1	Understanding about quantum mechanics – Black body radiation, planck's radiation law, photoelectric effect, postulates of quantum mechanics, quantum operator, role of operator in quantum mechanics.
CHEM-302.2	Brief idea about physical property and molecular structure – clausius mossotti equation, dipole moment.
CHEM-302.3	Application of magnetic susceptibility.
CHEM-302.4	Discussion about spectroscopy-rotational, vibrational and raman spectrum.

Mapping of CO with PO's

Cos#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CHEM-302.1	3	3	3	3	3	3	3	3	3	2	3
CHEM-302.2	3	3	3	3	3	3	3	3	3	3	3
CHEM-302.3	3	3	3	3	3	3	3	3	3	2	3
CHEM-302.4	3	3	3	3	3	3	3	3	3	3	3
Average	3	3	3	3	3	3	3	3	3	2.5	3

Mapping of CO with PSO's

Cos#	PSO1	PSO2	PSO3	PSO4	PSO5
CHEM-302.1	3	3	3	3	3
CHEM-302.2	3	3	3	3	3
CHEM-302.3	3	3	3	3	3
CHEM-302.4	3	3	3	3	3
Average	3	3	3	3	3

B. Sc. 3rd Year (5th Semester) CHEMISTRY
Course Outcomes of Paper-XVII (CHEM-303) Organic Chemistry

Course Objectives:

CHEM-303.1	Discussion about Principal of NMR spectroscopy – simple problem on PMR spectroscopy for structure determination of organic compound.
CHEM-303.2	Understanding about classification of carbohydrates.
CHEM-303.3	An introduction of disaccharides and polysaccharides.
CHEM-303.4	Understanding about organometallic compounds such as Mg, Zn, Li.

Mapping of CO with PO's

Cos#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CHEM-303.1	3	3	3	3	3	3	3	3	3	3	3
CHEM-303.2	3	3	3	3	3	3	3	3	3	2	3
CHEM-303.3	3	3	3	3	3	3	2	3	3	3	3
CHEM-303.4	3	3	3	3	3	3	3	3	3	2	3
Average	3	3	3	3	3	3	2.75	3	3	2.5	3

Mapping of CO with PSO's

Cos#	PSO1	PSO2	PSO3	PSO4	PSO5
CHEM-303.1	3	3	3	3	3
CHEM-303.2	3	3	3	3	3
CHEM-303.3	3	3	3	3	3
CHEM-303.4	3	3	2	3	3
Average	3	3	2.75	3	3

B. Sc. 3rd Year (6th Semester) CHEMISTRY

Course Outcomes of Paper-XVIII (CHEM-304) Inorganic Chemistry

Course Objectives:

CHEM-304.1	A brief discussion of organometallic chemistry-its preparation, properties and bonding of alkyls of Li, Al, Hg and Sn.
CHEM-304.2	Understanding about acids and bases, HSAB concept.
CHEM-304.3	Discussion about Bioinorganic chemistry, Nitrogen fixation.
CHEM-304.4	Understanding about Silicones and phosphazenes; their prepration, properties, structure and uses.

Mapping of CO with PO's

Cos#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CHEM-304.1	3	3	3	3	3	3	3	3	3	3	3
CHEM-304.2	3	3	3	3	3	3	3	3	2	3	3
CHEM-304.3	3	3	3	3	3	3	3	3	3	2	3
CHEM-304.4	3	3	3	3	3	3	3	3	2	3	3
Average	3	3	3	3	3	3	3	3	2.5	2.75	3

Mapping of CO with PSO's

Cos#	PSO1	PSO2	PSO3	PSO4	PSO5
CHEM-304.1	3	3	3	3	3
CHEM-304.2	3	3	3	3	3
CHEM-304.3	3	3	3	2	3
CHEM-304.4	3	3	3	3	3
Average	3	3	3	2.75	3

	B. Sc. 3rd Year (6th Semester) CHEMISTRY
	Course Outcomes of Paper-XIX (CHEM-305) Physical Chemistry

Course Objectives:

CHEM-305.1	Discussion about the concept of electronic spectrum, qualitative description of selection rules and Franck-Condon principle.
CHEM-305.2	Understanding about photochemical processes, loss of photochemistry, Jablonski diagram.
CHEM-305.3	Discussion about dilute solutions and colligative properties.
CHEM-305.4	Understanding about Phase equilibrium – Derivation of Gibbs phase rule, Phase equilibria of one and two component system.

Mapping of CO with PO's

Cos#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CHEM-305.1	3	3	3	3	3	3	3	3	3	3	3
CHEM-305.2	3	3	3	3	3	3	3	3	2	3	3
CHEM-305.3	3	3	3	3	3	3	3	3	3	2	3
CHEM-305.4	3	3	3	3	3	3	3	3	3	3	3
Average	3	3	3	3	3	3	3	3	2.75	2.75	3

Mapping of CO with PSO's

Cos#	PSO1	PSO2	PSO3	PSO4	PSO5
CHEM-305.1	3	3	3	3	3
CHEM-305.2	3	3	2	3	3
CHEM-305.3	3	3	3	3	3
CHEM-305.4	3	3	3	3	3
Average	3	3	2.75	3	3

B. Sc. 3rd Year (6th Semester) CHEMISTRY			
Course Outcomes of Paper-XX (CHEM-306) Organic Chemistry			

Course Objectives:

CHEM-306.1	Understanding about Heterocylic Coumponds – I, aromatic characters of pyrole, furan , Thiophene and pyridine.
CHEM-306.2	Introduction to Heterocylic Coumpounds – II, Introduction to condensed five and six membered heterocyles, Prepration and reactions of indole, quinolone and isoquinoline, organosulphur compounds.
CHEM-306.3	A brief discussion of organic synthesis via enolates.
CHEM-306.4	Understanding about synthetic polymers.

Mapping of CO with PO's

Cos#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CHEM-306.1	3	3	3	3	3	3	3	3	3	3	3
CHEM-306.2	3	2	3	3	3	3	3	3	2	3	3
CHEM-306.3	3	3	3	3	3	3	3	3	3	2	3
CHEM-306.4	3	3	3	3	3	3	3	3	2	3	3
Average	3	2.75	3	3	3	3	3	3	2.5	2.75	3

Mapping of CO with PSO's

Cos#	PSO1	PSO2	PSO3	PSO4	PSO5
CHEM-306.1	3	3	3	3	3
CHEM-306.2	3	2	3	3	3
CHEM-306.3	3	3	3	3	3
CHEM-306.4	3	3	3	3	3
Average	3	2.75	3	3	3

B. Sc. 3rd Year (6th Semester) CHEMISTRY
Course Outcomes of Paper-XXI (CHEM-307) Practicals

Course Objectives:

CHEM-307.1	Inorganic-qualitative inorganic analysis, macro-analysis, analysis of acid radicals, interference among acid radicals, analysis of basic radicals.
CHEM-307.2	Physical-to determine the strength of given acid solution (conductometrically, potentiometrically), to standardize the given acid solution pH metrically.
CHEM-307.3	Organic-Steam distillation, column chromatography, thin layer chromatography.
CHEM-307.4	Synthesis of Organic compounds.

Mapping of CO with PO's

Cos#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CHEM-307.1	3	3	3	3	3	3	3	3	2	2	3
CHEM-307.2	3	3	3	2	3	3	3	3	3	3	3
CHEM-307.3	3	3	3	3	3	3	3	3	3	3	3
CHEM-307.4	3	3	3	3	3	3	3	3	2	2	3
Average	3	3	3	2.75	3	3	3	3	2.5	2.5	3

Mapping of CO with PSO's

Cos#	PSO1	PSO2	PSO3	PSO4	PSO5
CHEM-307.1	3	3	3	3	3
CHEM-307.2	3	2	3	2	2
CHEM-307.3	3	3	2	3	3
CHEM-307.4	3	3	3	3	3
Average	3	2.75	2.75	2.75	2.75

Bakhar .
Principal
Dyal Singh College
KARNAL

Department of Botany

Course Specific Outcomes
&
Programme Specific Outcomes

For B.Sc. (Med) Course

<div align="center">

Dyal Singh College, Karnal
</div>

Name of the Programme: Bachelor of Science (Medical), Subject: Botany
Duration: Three years

\<center>**PROGRAMME OUTCOMES (POs)**\</center>		
PO1	Knowledge	Enables the students in gaining knowledge and to study in a holistic manner.
PO2	Communication	Ability to effectively communicate their views and present their work with confidence to the scientific community and society
PO3	Problem Solving	Enables the student to apply the knowledge gained to study plants in a holistic manner and to solve scientific problems in a directional way
PO4	Individual and Team Work	Capable to learn and work as an individual or team in an effective manner.
PO5	Investigation of Problems	Develop skill to critically think and analyse the knowledge of subject in interpretation of data and addressing practical problems.
PO6	Modern Tool Usage	Capable of learning advanced scientific techniques and tools used in learning plant biology.
PO7	Science and Society	Ability to apply theoretical and practical knowledge to resolve issues related to the society.
PO8	Life-Long Learning	Capable in applying fundamental concepts, principle and processes of botany that are required in learning activities throughout life.
PO9	Environment and Sustainability	Ability to adopt knowledge in plant structure, function and solve the issues related to environment and ecology in a sustainable manner.
PO10	Ethics	Apply moral and ethical principles in both academics and research to become professionally more responsible citizen
PO11	Project Management	Ability to apply knowledge in understanding, designing and managing novel projects related to plant biology

\<center>**PROGRAMME SPECIFIC OUTCOMES (PSOs)**\</center>	
The objective of the curriculum designed for B.Sc Med. course is to nurture the fundamental knowledge and modern concepts of biology in students for developing professional competency to work in institutions and pharmaceutical, biotechnological, healthcare industries.	
PSO1	To develop proficiency for identifying the various plants and compare the characters of lower and higher groups of plants. This comparative approach will help them to explain the evolution and degree of genetic diversity in plants.
PSO2	This course content is targeted to explain the various biological processes in plants and how they occur at the cellular and molecular levels. Students will also be able to understand the ecology, morphology, anatomy and development of different forms of life.
PSO3	Exposure to various experimental techniques and methods in various fields of plant sciences.
PSO4	The structure of course curriculum is aimed to inculcate minimum standards of communication skills expected from a Botany graduate in the country. They will also acquire critical thinking abilities that will enhance their problem-solving capabilities.
PSO5	Encourage students in finding career opportunities in higher education in the field of plant sciences and other entrepreneurship programmes. They will also learn team work in order to serve the Government sector institutions or industry and society.

B-BOT-101: Diversity of Microbes

Course Objective: The aim of this course is to introduce students to the world of basic botany that include primary diversity of living systems.

Course Outcomes: At the end of the course students will be able to

B-BOT-101.1 Learn and understand the general characters, economic importance and life-cycle of different groups of microbes, algae and fungi.

B-BOT-101.2 students will be able to explain their impact on environment, human welfare and role in different industries.

B-BOT-101.3 students will understand the evolutionary significance and lineage of these organisms

CO-PO Mapping Matrix for Course Code: B-BOT-101

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
B-BOT-101.1	3	2	2	1	3	2	2	3	3	1	2
B-BOT-101.2	3	2	3	2	1	2	1	2	3	1	3
B-BOT-101.3	3	1	1	1	2	1	1	2	1	1	1
Average	3	1.6	2	1.3	2	1.6	1.3	2.3	2.3	1	2

CO-PSO Mapping Matrix for Course Code: B-BOT-101

Cos	PSO1	PSO2	PSO3	PSO4	PSO5
B-BOT-101.1	3	3	1	1	2
B-BOT-101.2	3	3	2	2	3
B-BOT-101.3	3	2	1	2	1
Average	3	2.6	1.3	1.6	2

B-BOT-102: CELL BIOLOGY

Course Objective: Aim of this course is to make students aware of structure and functions of a cell

Course Outcomes: At the end of the course students will be able to
B-BOT-102.1 Understand structure and composition of cell wall and cell membrane
B-BOT-102.2 Know the significance of cell organelles
B-BOT-102.3 Explain the structure of chromosomes and acknowledge various chromosomal abnormalities

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
B-BOT-102.1	3	2	2	3	2	2	3	3	2	1	1
B-BOT-102.2	2	3	2	2	3	1	2	3	2	2	1
B-BOT-102.3	3	2	1	3	2	2	1	2	1	2	2
Average	2.6	2.3	1.6	2.6	2.3	1.6	2.0	2.6	1.6	1.6	1.3

CO-PO Mapping Matrix for Course Code: B-BOT-102

Cos	PSO1	PSO2	PSO3	PSO4	PSO5
B-BOT-102.1	2	2	1	2	3
B-BOT-102.2	2	1	3	2	2
B-BOT-102.3	3	2	2	1	1
Average	2.3	1.6	2.0	1.6	2.0

CO-PSO Mapping Matrix for Course Code: B-BOT-102

B-BOT-201: Diversity of Archegoniates

Course Objective: The aim of this course is to introduce students to the world of basic botany that include primary diversity of living systems.

Course Outcomes: At the end of the course students will be able to

B-BOT-201.1 learn and understand the general characters, economic importance and life-cycle of different groups of bryophytes and pteridophytes.

B-BOT-201.2 students will be able to explain their impact on environment, human welfare and role in different industries.

B-BOT-201.3 students will understand the evolutionary significance and lineage of these organisms

CO-PO Mapping Matrix for Course Code: B-BOT-201											
Cos	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**
B-BOT-201.1	3	2	2	1	3	2	2	3	3	1	2
B-BOT-201.2	3	2	3	2	1	2	1	2	3	1	3
B-BOT-201.3	3	1	1	1	2	1	1	2	1	1	1
Average	3	1.67	2	1.33	2	1.67	1.33	2.33	2.33	1	2

CO-PSO Mapping Matrix for Course Code: B-BOT-201					
Cos	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
B-BOT-201.1	3	3	1	1	2
B-BOT-201.2	3	3	2	2	3
B-BOT-201.3	3	2	1	2	1
Average	3	2.67	1.33	1.67	2

B-BOT-202: GENETICS

Course Objective: This course make student aware of genetic material
Course Outcomes: At the end of the course students will be able to   **B-BOT-202.1** Explain the laws of inheritance and structure and functions of DNA and RNA   **B-BOT-202.2** Know the properties of DNA and RNA and mutational effects   **B-BOT-202.3** Understand Transcription, Translation and Gene regulation

CO-PO Mapping Matrix for Course Code: B-BOT-202											
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
B-BOT-202.1	2	3	2	2	3	1	2	3	2	1	1
B-BOT-202.2	3	2	2	3	2	2	1	3	1	2	1
B-BOT-202.3	2	3	3	2	2	1	2	2	1	1	1
Average	2.3	2.6	2.3	2.3	2.3	1.3	1.6	2.6	1.3	1.3	1.0

CO-PSO Mapping Matrix for Course Code: B-BOT-202					
COs	PSO1	PSO2	PSO3	PSO4	PSO5
B-BOT-202.1	3	2	2	1	2
B-BOT-202.2	2	3	1	2	2
B-BOT-202.3	2	3	2	2	1
Average	2.3	2.6	1.6	1.6	1.6

B-BOT-203: Diversity of Microbes, Diversity of Archegoniates, Cell biology and Genetics Practical

Course Objective: The aim of this course is to introduce students to the world of practical knowledge of primary diversity of living systems.
Course Outcomes: At the end of the course students will be able to   **B-BOT-203.1** learn and understand to identify, classify and study morphology of different groups of microbes, algae, fungi, bryophytes and pteridophytes.   **B-BOT-203.2** students will be able to explain different stages of cellular biology and will understand genetic diversity in organisms   **B-BOT-203.3** students will collect specimen of diverse forms of organisms from their neighboring areas and will be able to make projects either individually or in groups.

CO-PO Mapping Matrix for Course Code: B-BOT-203										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
B-BOT-203.1	3	3	2	1	3	3	2	1	2	1	1
B-BOT-203.2	3	2	3	1	3	3	2	2	2	1	1
B-BOT-203.3	3	3	2	3	3	2	3	3	2	3	3
Average	3	2.67	2.33	1.67	3	2.67	2.33	2	2	1.67	1.67

CO-PSO Mapping Matrix for Course Code: B-BOT-203					
COs	PSO1	PSO2	PSO3	PSO4	PSO5
B-BOT-203.1	3	1	3	1	2
B-BOT-203.2	1	3	3	1	2
B-BOT-203.3	2	2	1	3	1
Average	2	2	2.33	1.67	1.67

B-BOT-301: BIOLOGY AND DIVERSITY OF SEED PLANTS-I

Course Objective: The aim of this course is to introduce students to the world of basic botany that include primary diversity of seed plants.

Course Outcomes: At the end of the course students will be able to
B-BOT-301.1 learn and understand the general characters, economic importance and life-cycle of gymnosperms
B-BOT-301.2 students will be able to explain their impact on environment, human welfare and role in different industries.
B-BOT-301.3 students will understand the evolutionary significance and lineage of these seed plants

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
B-BOT-301.1	3	2	2	1	3	2	2	3	3	1	2
B-BOT-301.2	3	2	3	2	1	2	1	2	3	1	3
B-BOT-301.3	3	1	1	1	2	1	1	2	1	1	1
Average	3	1.67	2	1.33	2	1.67	1.33	2.33	2.33	1	2

CO-PO Mapping Matrix for Course Code: B-BOT-301

COs	PSO1	PSO2	PSO3	PSO4	PSO5
B-BOT-301.1	3	3	1	1	2
B-BOT-301.2	3	3	2	2	3
B-BOT-301.3	3	2	1	2	1
Average	3	2.67	1.33	1.67	2

CO-PSO Mapping Matrix for Course Code: B-BOT-301

B-BOT-302: PLANT ANATOMY

Course Objective: The aim of this course is to introduce students to internal organization of plants which is very important in plant biology

Course Outcomes: At the end of the course students will be able to

B-BOT-302.1 identify, describe and differentiate plant cells, cell organelles and their functions which is helpful in botany

B-BOT-302.2 students will be able to apply plant anatomical features for correct identification and it will be useful in taxonomy

B-BOT-302.3 students will understand the wood structure in a better manner

CO-PO Mapping Matrix for Course Code: B-BOT-302											
Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
B-BOT-302.1	3	1	3	1	2	2	2	3	3	1	2
B-BOT-302.2	3	2	3	2	1	2	1	2	3	1	3
B-BOT-302.3	3	1	1	1	2	1	1	2	1	1	1
Average	3	1.33	2.33	1.33	1.67	1.67	1.33	2.33	2.33	1	2

CO-PSO Mapping Matrix for Course Code: B-BOT-302					
Cos	PSO1	PSO2	PSO3	PSO4	PSO5
B-BOT-302.1	3	3	1	1	2
B-BOT-302.2	3	3	2	2	3
B-BOT-302.3	3	2	1	2	1
Average	3	2.67	1.33	1.67	2

B-BOT-401: BIOLOGY AND DIVERSITY OF SEED PLANTS-II

Course Objective: The aim of this course is to introduce students to the different concepts of plant taxonomy that icludes naming, classification and basic knowledge about flowering plants

Course Outcomes: At the end of the course students will be able to

B-BOT-401.1 learn and understand the botanical description of plants, nomenclature and terms related to their identification

B-BOT-401.2 discuss the importance of plant taxonomy and taxonomic hierarchy and will understand the Bentham and Hooker classification system

B-BOT-401.3 students will understand the concepts of numerical taxonomy

CO-PO Mapping Matrix for Course Code: B-BOT-401											
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**
B-BOT-401.1	3	2	1	2	3	1	2	3	2	1	2
B-BOT-401.2	3	2	3	1	2	1	1	3	1	1	1
B-BOT-401.3	3	2	3	3	3	3	3	2	2	3	2
Average	3	2	2.33	2	2.67	1.67	2	2.67	1.67	1.67	1.67

CO-PSO Mapping Matrix for Course Code: B-BOT-401					
COs	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
B-BOT-401.1	3	1	3	2	2
B-BOT-401.2	3	2	1	1	2
B-BOT-401.3	3	2	3	2	2
Average	3	1.67	2.33	1.67	2

B-BOT-402: PLANT EMBRYOLOGY

Course Objective: The aim of this course is to introduce students to the embryological studies that play important role in plant breeding and crop improvements.

Course Outcomes: At the end of the course students will be able to

B-BOT-402.1 explain the developmental patterns of both vegetative and reproductive organs of plants

B-BOT-402.2 apply knowledge about embryological characters in explaining plant reproductive biology

CO-PO Mapping Matrix for Course Code: B-BOT-402										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
B-BOT-402.1	3	1	2	1	1	1	2	2	2	1	1
B-BOT-402.2	3	2	2	1	1	1	2	2	2	1	1
Average	3	1.5	2	1	1	1	2	2	2	1	1

CO-PSO Mapping Matrix for Course Code: B-BOT-402					
Cos	PSO1	PSO2	PSO3	PSO4	PSO5
B-BOT-402.1	3	2	2	2	1
B-BOT-402.2	3	2	2	2	2
Average	3	2	2	2	1.5

B-BOT-403: Biology and diversity of seed plants-I, II, plant taxonomy & plant embryology Practical

Course Objective: The aim of this course is to introduce students to the world of seed plants, taxonomy and embryology

Course Outcomes: At the end of the course students will be able to
B-BOT-403.1 learn and understand the morphology, anatomy, reproductive biology of seed plants
B-BOT-403.2 students will be able to explain important characters and describe flowers in technical terms
B-BOT-403.3 students will understand the embryology of plants

CO-PO Mapping Matrix for Course Code: B-BOT-403											
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
B-BOT-403.1	3	3	2	1	3	3	2	1	2	1	1
B-BOT-403.2	3	2	3	1	3	3	2	2	2	1	1
B-BOT-403.3	3	3	2	3	3	2	3	3	2	3	3
Average	3	2.67	2.33	1.67	3	2.67	2.33	2	2	1.67	1.67

CO-PSO Mapping Matrix for Course Code: B-BOT-403					
Cos	PSO1	PSO2	PSO3	PSO4	PSO5
B-BOT-403.1	3	1	3	1	2
B-BOT-403.2	1	3	3	1	2
B-BOT-403.3	2	2	1	3	1
Average	2	2	2.33	1.67	1.67

B-BOT-501: Plant Physiology

Course Objective: This course will makes students aware of various plant growth parameters
Course Outcomes: At the end of the course students will be able to   **B-BOT-501.1** Understand plant – water relation and mineral requirements of plants   **B-BOT-501.2** Detail of plant movement and photoperiodic responses   **B-BOT-501.3** Acknowledge physiology of Photosynthesis and Respiration

CO-PO Mapping Matrix for Course Code: B-BOT-501

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
B-BOT-501.1	3	2	2	1	2	3	1	2	2	1	1
B-BOT-501.2	2	3	2	2	3	2	2	1	2	1	2
B-BOT-501.3	3	2	2	3	2	1	2	2	1	2	1
Average	2.6	2.3	2.0	2.0	2.3	2.0	1.6	1.6	1.6	1.3	1.3

CO-PSO Mapping Matrix for Course Code: B-BOT-501

Cos	PSO1	PSO2	PSO3	PSO4	PSO5
B-BOT-501.1	3	2	2	1	2
B-BOT-501.2	2	3	2	2	1
B-BOT-501.3	2	3	2	2	1
Average	2.3	2.6	2.0	1.6	1.3

B-BOT-502: Ecology

Course Objective: This course provide importance of ecology for human development
Course Outcomes: At the end of the course students will be able to   **B-BOT-502.1** Explain the introduction of ecology and importance of various environmental factors   **B-BOT-502.2** Know about population growth and ecological adaptations   **B-BOT-502.3** Study various types of pollution and phytogeographic zones of India

CO-PO Mapping Matrix for Course Code: B-BOT-502

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
B-BOT-502.1	2	3	2	2	1	2	3	2	1	1	2
B-BOT-502.2	3	2	1	2	1	3	1	2	2	1	1
B-BOT-502.3	2	3	2	2	2	3	2	2	1	2	1
Average	2.3	2.6	1.6	2.0	1.3	2.6	2.0	2.0	1.3	1.3	1.3

CO-PSO Mapping Matrix for Course Code: B-BOT-502

Cos	PSO1	PSO2	PSO3	PSO4	PSO5
B-BOT-502.1	3	2	1	2	1
B-BOT-502.2	2	3	2	1	2
B-BOT-502.3	1	2	2	1	2
Average	2.0	2.3	1.6	1.3	1.6

B-BOT-601: Biochemistry and Plant Biotechnology

Course Objective: The aim of this course is to make Student aware of growth metabolism and plant tissue culture

Course Outcomes: At the end of the course students will be able to

B-BOT-601.1 Understand basics of enzymology

B-BOT-601.2 Explain the nitrogen and lipid metabolism

B-BOT-601.3 Understand gene cloning and different types of plant tissue culture

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
B-BOT-601.1	3	1	2	2	3	2	3	2	2	2	2
B-BOT-601.2	2	3	2	3	3	1	2	3	2	1	2
B-BOT-601.3	3	2	2	3	2	2	3	2	1	2	2
Average	2.6	2.0	2.0	2.6	2.6	1.6	2.6	2.3	1.6	1.6	2.0

CO-PO Mapping Matrix for Course Code: B-BOT-601

CO-PSO Mapping Matrix for Course Code: B-BOT-601

Cos	PSO1	PSO2	PSO3	PSO4	PSO5
B-BOT-601.1	3	2	2	1	3
B-BOT-601.2	2	3	2	2	1
B-BOT-601.3	3	2	3	2	2
Average	2.6	2.3	2.3	1.6	2.0

B-BOT-602: Economic Botany

Course Objective: The aim of this course is to provide importance of economic plants
Course Outcomes: At the end of the course students will be able to **B-BOT-602.1** Explain description and importance of various types of plants **B-BOT-602.2** Know about various types of timber **B-BOT-602.3** Study cultivation of various important plants

CO-PO Mapping Matrix for Course Code: B-BOT-602

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
B-BOT-602.1	3	3	2	2	3	3	2	3	2	2	2
B-BOT-602.2	2	3	2	2	3	2	2	3	3	2	1
B-BOT-602.3	3	2	2	3	2	2	3	2	2	2	2
Average	2.6	2.6	2.0	2.3	2.6	2.3	2.3	2.6	2.3	2.0	1.6

CO-PSO Mapping Matrix for Course Code: B-BOT-602

Cos	PSO1	PSO2	PSO3	PSO4	PSO5
B-BOT-602.1	3	2	3	2	2
B-BOT-602.2	2	3	2	2	3
B-BOT-602.3	3	3	2	3	2
Average	2.6	2.6	2.3	2.3	2.3

B-BOT-603: Plant Physiology I, Plant Biochemistry&Biotechnology, Ecology and Economic Botany Practical

Course Objective: The aim of this course is to introduce students to the world of physiology, ecology and environment
Course Outcomes: At the end of the course students will be able to **B-BOT-603.1** learn and understand the physiology, biochemistry and biotechnological roles of plants **B-BOT-603.2** students will be able to study ecology and its impact on environment **B-BOT-603.3** students will understand the role of plants in human welfare

CO-PO Mapping Matrix for Course Code: B-BOT-603

COs	PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1
B-BOT-603.1	3	2	3	3	3	3	2	1	2	1	1
B-BOT-603.2	3	2	3	1	3	3	2	2	2	1	1
B-BOT-603.3	3	3	2	3	3	2	3	3	2	3	3
Average	3	2.3 3	2.6 7	2.3 3	3	2.6 7	2.3 3	2	2	1.67	1.67

CO-PSO Mapping Matrix for Course Code: B-BOT-603

Cos	PSO1	PSO2	PSO3	PSO4	PSO5
B-BOT-603.1	3	1	3	1	2
B-BOT-603.2	1	3	3	1	2
B-BOT-603.3	2	2	1	3	1
Average	2	2	2.33	1.67	1.67

Principal
Dyal Singh College
KARNAL

Department of Zoology

Course Specific Outcomes
&
Programme Specific Outcomes

For B.Sc. (Med) Course

DYAL SINGH COLLEGE, KARNAL
B.Sc. Medical
Subject: Zoology

Programme Outcomes (POs) for Three Year B.Sc. Programme of Faculty of Life Sciences

PO1	Knowledge	To inculcate theoretical and practical knowledge in fundamentals of biology.
PO2	Problem Solving	To instil the ability to critically evaluate problems and apply lateral thinking and analytical skills in solving them.
PO3	Ethics	To create awareness ethical principles, professional responsibilities good scientific practices and biosafety.
PO4	Communication	To develop communication skills and be able to communicate effectively on general and scientific topics.
PO5	Employability	To prepare the students for career in teaching, research, industry, government organizations and entrepreneurship.
PO6	Environment and Sustainability	To sensitize the students about the current environmental scenario and promote a mindset of sustainable development.
PO7	Science and Society	To develop an aptitude to apply the knowledge of the scientific principles for the benefit of society.
PO8	Modern Tool usage	To inculcate the ability to use and learn modern techniques, skills and tools for scientific practices
PO9	Life-Long Learning	To develop the capacity to apply knowledge and skills that are essential for participating in learning activities throughout the life

Programme Specific Outcomes (PSOs) for Zoology subject of Three Year B.Sc. Medical/ M.Sc. Forensic Science

PSO1	Understand the various aspects of the life cycles/biology of the animal species around them and their interaction with the environment.
PSO2	Gain knowledge of the physiological processes at the cellular and organismic levels.
PSO3	Use understanding of subject and analytical methods in identifying and solving various complex situations of living forms and environment.
PSO4	Awareness of natural resources and their sustainable utilization.
PSO5	Encourage skillfull expertise for a career as teacher, in industry or as entrepreneur in the realms of the subject.

SEMESTER-I

B-ZOO-101:   Life and Diversity from Protozoa to Porifera and Cell Biology-I

Objective: To understand the taxonomic position, general characteristics, body organization and origin and evolutionary relationship of animals belonging to the invertebrate phyla Protozoa and Porifera and the dynamics of cell.

Course outcomes:

CO101.1   Students will be able to describe unique characters, recognize life functions, diversity and ecological role of invertebrate phyla Protozoa and Porifera

CO101.2   Students will understand the nature and basic concept of cell biology, internal structure of cell and their role in many metabolic function of organism

B-ZOO-102:   Life and Diversity from Coelentrata to Helminthes and Cell Biology-II

Objective: To understand the taxonomic position, general characteristics, body organization and origin and evolutionary relationship of animals belonging to the invertebrate phyla Coelenterate and Helminthes and the dynamics of cell and biology of cancer.

Course outcomes:

CO102.1   Students will be able to describe unique characters, recognize life functions, diversity and ecological role of invertebrate phyla Coelenterate and Helminthes

CO102.2   Students will understand the nature and basic concept of cell biology, internal structure of cell and their role in many metabolic function of organism and biology of cancer

CO-PO and CO-PSO Mapping Matrix for Semester I - Zoology

B-ZOO-101	Life and Diversity from Protozoa to Porifera and Cell Biology-I												
B-ZOO-102	Life and Diversity from Coelentrata to Helminthes and Cell Biology-II												
Programme Outcomes (POs)										**Programme Specific Outcomes (PSOs)**			
COs#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3	PSO4	PSO5
CO101.1	3	2	2	2	2	2	3	1	2	3	3	2	2	2.5
CO101.2	3	2.5	2	2	2	1	3	1	2	3	3	2	2	2
CO102.1	3	2	2	2	2	2	3	1	2	3	3	2	2	3
CO102.2	3	2.5	2	2	2	1	3	1.5	2	3	3	2	2	2.5
Average	3	2.25	2	2	2	1.5	3	1.12	2	3	3	2	2	2.5

SEMESTER-II

B-ZOO-201: **Life and Diversity from Annelida to Arthropoda and Genetics-I**

Objective: To understand the taxonomic position, general characteristics, body organization and origin and evolutionary relationship of animals belonging to the invertebrate phyla Annelida and Arthropoda and various concepts of genetics.

Course outcomes:

CO201.1 Students will be able to describe unique characters, recognize life functions, diversity and ecological role of invertebrate phyla Annelida and Arthropoda

CO201.2 Students will have the understanding of the concept of heredity, gene interactions, sex determination, sex linked and extra-chromosomal inheritance and their role in medical sciences.

B-ZOO-202: **Life and Diversity from Mollusca to Hemichordata and Genetics-II**

Objective: To understand the taxonomic position, general characteristics, body organization and origin and evolutionary relationship of animals belonging to the invertebrate phyla Mollusca to Hemichordata

Course outcomes:

CO202.1 Students will be able to describe unique characters, recognize life functions, diversity and ecological role of invertebrate phyla Mollusca to Hemichordata

CO202.2 Students will be able to explain the basic causes associated with inborn errors and other genetic disorders.

B-ZOO-203: **Practical based on Theory Papers of Semester I & II**

Objective: To have practical knowledge about identification and understanding of the classification of invertebrates phyla from Protozoa up to Hemichordata and develop the laboratory skill of preparing slides of cell divisions

Course outcomes:

CO203.1 Students will be capable of identifying the characters and classify different invertebrate species and explain their ecological and economic importance.

CO203.2 Students will be able to demonstrate cell division

CO-PO and CO-PSO Mapping Matrix for Semester II - Zoology

B-ZOO-201	Life and Diversity from Annelida to Arthropoda and Genetics-I												
B-ZOO-202	Life and Diversity from Mollusca to Hemichordata and Genetics-II												
B-ZOO-203	Practical based on Theory Papers of Semester I & II												
Programme Outcomes (POs)										Programme Specific Outcomes (PSOs)			
COs#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3	PSO4	PSO5
CO201.1.	3	2	2	2	2	2	3	1	2	3	3	2	2	2.5
CO201.2.	3	2.5	2	2	2	1	3	1	2	3	3	2	1	2.5
CO202.1.	3	2	2	2	2	2	3	1	2	3	3	2	2	2.5
CO202.2.	3	2.5	2	2	2	1	3	1	2	3	3	2	1	2.5
CO203.1.	3	1.5	2.5	2	2.5	2	3	2	2	3	3	2	2	2.5
CO203.2.	3	2.5	2.5	2	2.5	1.5	3	2.5	2	3	3	2	1	2.5
Average	3	2.16	2.16	2	2.16	1.58	3	1.41	2	3	3	2	1.5	2.5

B-ZOO-301:   Life and Diversity of Chordates-I

Objective: To make students appreciate the basic characters of Chordates, origin and ancestry of chordates from proto-chordates and about the general characters in class Pisces.

Course outcomes:

CO301.1   Students will be capable of identifying the characters and classify different proto-chordate species and explain their ecological and ecological adaptations and associations.

CO301.2   Students will be able to explain the basic concepts of evolutionary relationship among proto-chordates and fishes.

B-ZOO-302:   Mammalian Physiology-I

Objective: To make students understand the structure and classification of bio-molecules, dynamics of enzymes and concept of physiology of bones and muscles.

Course outcomes:

CO302.1   Students will be able to appreciate and explain the mechanisms of the human body functions.

CO302.2   Students will be able to understand and explain the various physiological and biochemical processes of the human body.

CO-PO and CO-PSO Mapping Matrix for Semester III - Zoology

B-ZOO-301	Life and Diversity of Chordates-I													
B-ZOO-302	Mammalian Physiology-I													
Programme Outcomes (POs)										Programme Specific Outcomes (PSOs)				
COs#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3	PSO4	PSO5
CO301.1.	3	2	2	2	2	1	1	1	2	3	3	2	3	3
CO301.2.	2	1	2	1	2	3	2	1	2	3	2	2	3	2
CO302.1.	3	1	1	2	2.5	2	3	1.5	2	3	3	3	1	3
CO302.2.	2	1	1	2	2.5	2	3	1.5	2	3	3	3	1	3
Average	2.5	1.25	1.5	1.75	2.25	2	2.25	1.25	2	3	2.75	2.5	2	2.75

B-ZOO-401:   Life and Diversity of Chordates-II

Objective: To make students capable of identifying and differentiating between species from different vertebrate classes (amphibians to mammals).

Course outcomes:

CO401.1   Students will be able to explain the evolutionary trends of vertebrate classes from amphibians to mammals.

CO401.2   Students will be able to differentiate between species from different vertebrate classes (amphibians to mammals) and understand their adaptations.

B-ZOO-402:   Mammalian Physiology-II

Objective: To impart the basic knowledge of physiology and endocrine system of animals.

Course outcomes:

CO402.1   Students will understand the functioning of each body system and its mechanism of working.

CO402.2   Students will be able to explain the mechanism of action of hormones and related molecules involved in various physiological processes.

B-ZOO-403:   Practical based on Theory Papers of Semester III & IV

Objective: To help students comprehend the classification of vertebrates phyla and ways of identifying respective species and to develop the practical understanding of various physiological experiments.

Course outcomes:

CO403.1   Students will be able to classify and identify vertebrate species and their skeleton and understand their economic importance.

CO403.2   Students will be able to understand and perform biological and analytical techniques like DLC, Blood group testing etc

CO-PO and CO-PSO Mapping Matrix for Semester IV - Zoology

B-ZOO-401	Life and Diversity of Chordates-II												
B-ZOO-402	Mammalian Physiology-II												
B-ZOO-403	Practical based on Theory Papers of Semester III & IV												
Programme Outcomes (POs)										**Programme Specific Outcomes (PSOs)**				
COs#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3	PSO4	PSO5
CO401.1.	3	2	1	2	2	3	3	1	2	3	2	3	3	3
CO401.2.	2	2	2	1	2	2	2	1	2	3	3	3	3	3
CO402.1.	3	1	1	2	2.5	2	3	1.5	2	3	3	3	1	3
CO402.2.	3	1	1	2	2.5	2	3	1.5	2	3	3	3	1	3
CO403.1.	3	2	3	2	2	2	1	2	2	3	3	3	3	2
CO403.2.	2	2	3	2	3	2	3	2	2	2	2	3	2	3
Average	2.67	1.67	1.83	1.83	2.33	2.16	2.5	1.5	2	2.83	2.67	3	2.16	2.83

B-ZOO-501: **Environmental Biology**

Objective: To acquaint the students about interactions between organisms and environment.

Course outcomes:

CO501.1   Students will understand the different biological interactions and relation between abiotic and biotic factors.

CO501.2   Students will able to explain the causes of different types of pollution and how to manage them.

B-ZOO-502: **Evolution and Developmental Biology**

Objective: To make students aware of evolution of species, population dynamics and the processed of early development of different organisms.

Course outcomes:

CO502.1   Students will understand the concept of evolution of life on earth with emphasis on mam and horse.

CO502.2   Students will be able to explain the processes of gametogenesis, fertilization, its stages and cellular mechanisms for gastrulation, and embryonic development.

CO-PO and CO-PSO Mapping Matrix for Semester V - Zoology

B-ZOO-501	Environmental Biology												
B-ZOO-502	Evolution and Developmental Biology												
Programme Outcomes (POs)									Programme Specific Outcomes (PSOs)				
COs#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3	PSO4	PSO5
CO501.1.	3	3	2.5	2	2.5	3	3	1	2	3	2	2	3	3
CO501.2.	3	3	3	2	3	3	3	2	2	3	2	3	3	2.5
CO502.1.	3	2.5	2.5	2	2.5	2.5	2	1	2	3	2	2	2	2.5
CO502.2.	3	2.5	3	2	3	2.5	3	2	2	2	3	2	2	3
Average	3	2.75	2.75	2	2.75	2.75	2.75	1.5	2	2.75	2.25	2.25	2.5	2.75

B-ZOO-601:   Aquaculture and Pest Management-I

Objective: To impart the students with the basic information about fishery and aquaculture and identification of the different species of insect pests of crops.

Course outcomes:

CO601.1   Students will learn concepts of fisheries, fishing crafts and gears for aquaculture industry

CO601.2   Students will be able to identify important insect pests of common crops and the nature of damage done by them.

B-ZOO-602:   Aquaculture and Pest Management-II

Objective: To acquaint the students with the necessary technical knowledge for aquaculture and pest management.

Course outcomes:

CO602.1   Students will able to explain induced breeding and pre- and post-harvesting techniques.

CO602.2   Students will be able to identify important insect pests of stored grains, the nature of damage done by them along with various pest management techniques.

B-ZOO-603:   Practical based on Theory Papers of Semester V & VI

Objective: To develop observational, analytical and Evaluation skills related to aquaculture and pest management.

Course outcomes:

CO603.1   Students will study the common animals, tools and techniques used in aquaculture industry.

CO603.2   Students will able to identify common insect pests of crops and stored grains and the nature of damage caused by them.

CO-PO and CO-PSO Mapping Matrix for Semester II - Zoology

B-ZOO-601	Aquaculture and Pest Management-I												
B-ZOO-602	Aquaculture and Pest Management-II												
B-ZOO-603	Practical based on Theory Papers of Semester V & VI												
Programme Outcomes (POs)										**Programme Specific Outcomes (PSOs)**			
COs#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3	PSO4	PSO5
CO601.1.	3	2.5	3	2.5	2	2.75	2.75	2	2	3	2	2.75	2.5	2.75
CO601.2.	2.25	2.5	2.75	2.75	2.5	2.75	2.5	1.5	2	2.75	2	2.75	2.5	3
CO602.1.	3	2.25	3	2.5	2	2.5	2.25	2.5	2	3	2.5	3	2	2.5
CO602.2.	3	2	2.75	2.5	2.5	3	2.75	1.5	2	2.75	2	3	2.75	3
CO603.1.	3	2.75	3	2.5	2	2.75	2.5	2.5	2	2.75	2.5	2.75	2.5	2.75
CO603.2.	3	2.5	3	2.75	2.5	3	2.5	1.5	2	3	2.5	3	2.5	3
Average	2.87	2.41	2.91	2.58	2.25	2.79	2.54	1.92	2	2.87	2.25	2.87	2.45	2.83

Principal
Dyal Singh College
KARNAL

Department of Bioinformatics

Course Specific Outcomes
&
Programme Specific Outcomes

For B.Sc. Bioinformatics Course

DYAL SINGH COLLEGE, KARNAL

B.Sc. Medical

Subject: Bioinformatics

Programme Outcomes (POs) for One Year Certificate Programme of Faculty of Life Sciences

PO1	Knowledge	To inculcate theoretical and practical knowledge in fundamentals of bioinformatics.
PO2	Problem Solving	To instil the ability to critically evaluate problems and apply lateral thinking and analytical skills in solving them.
PO3	Ethics	To create awareness about ethical principles, professional responsibilities good scientific practices and biosafety.
PO4	Communication	To develop communication skills and be able to communicate effectively on general and scientific topics.
PO5	Employability	To prepare the students for career in teaching, research, industry, government organizations and entrepreneurship.
PO6	Science and Society	To develop an aptitude to apply the knowledge of the scientific principles for the benefit of society.
PO7	Modern Tool usage	To inculcate the ability to use and learn modern techniques, skills and tools for scientific practices
PO8	Life-Long Learning	To develop the capacity to apply knowledge and skills that are essential for participating in learning activities throughout the life

Programme Specific Outcomes (PSOs) for Zoology subject of Three Year B.Sc. Medical/ M.Sc. Forensic Science

PSO1	Understand the various concepts of cell biology and genetics necessary for bioinformatics.
PSO2	Gain necessary computer and statistical skills necessary for bioinformatics.
PSO3	Use understanding of subject and analytical methods in identifying and solving various complex situations.
PSO4	Encourage skillful expertise for a career as teacher, in industry or as entrepreneur in the realms of the subject.

SEMESTER-I

CC-BIF-101: Basics of Bioinformatics

Objective: To acquaint the students with the understanding of the basics of biology, biostatistics, computer languages, tools and techniques of bioinformatics for their professional development.

Course outcomes: After completing this course the students will:

CO101.1 Understand the basics of cell biology and genetics.

CO101.2 Be able to perform statistical analysis of biological data.

CO101.3 Develop an understanding of the working of computers and different programming languages.

CO101.4 Be able to use the tools and techniques of bioinformatics.

CC-BIF-102: Practical based on the paper - Basics of Bioinformatics

Objective: To provide the students with the practical experience to the tools and techniques of biostatistics, computer and bioinformatics for their professional development.

Course outcomes: After completing this course the students will be able to:

CO102.1 Collect/ retrieve and analyze different kinds of data from various sources.

CO102.2 Download DNA/Protein sequences from internet and analyze them.

CO102.3 Be able to utilize tools of bioinformatics in data mining.

CC-BIF-103: Seminar/Project/Training Report
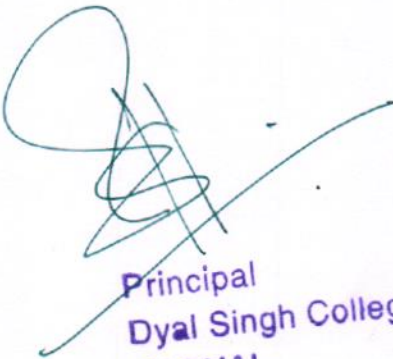
Objective: To inculcate in the students an aptitude for original research.

Course outcomes: After completing this course the students will:

CO203.1 Be capable of in depth analysis of the given subject matter.

CO203.2 Have hands-on experience in various tools of bioinformatics

CO-PO and CO-PSO Mapping Matrix for Semester II - Zoology

CC-BIF-101			Basics of Bioinformatics									
CC-BIF-102			Practical based on the paper - Basics of Bioinformatics									
CC-BIF-103			Seminar/Project/Training Report									
Programme Outcomes (POs)								Programme Specific Outcomes (PSOs)			
COs#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4
CO101.1	3	2	2	2	2	2	2	3	3	0.5	2.5	2
CO101.2	3	3	2	2.5	3	3	2.5	3	0.5	3	3	3
CO101.3	3	3	2	3	3	2.5	3	3	0.5	3	3	3
CO101.4	3	3	2	2	3	2.5	3	3	1.5	1	2.5	2.5
CO102.1	3	3	3	3	3	2.5	3	3	0.5	3	3	3
CO102.2	3	3	3	2.5	3	2.5	3	3	1.5	3	3	3
CO102.3	3	3	3	2.5	3	2.5	3	3	1	3	3	3
CO103.1	3	2.5	2	2.5	3	2	3	3	2	3	2.5	3
CO103.2	3	3	3	2.5	3	2.5	3	3	2	3	3	3
Average	3	2.83	2.44	2.5	2.89	2.44	2.83	3	1.39	2.5	2.83	2.83

Principal
Dyal Singh College
KARNAL

Department of Biotecnology

Course Specific Outcomes
&
Programme Specific Outcomes

For B.Sc Biotech. Course

DYAL SINGH COLLEGE, KARNAL

NAME OF THE PROGRAMME: BACHELOR OF SCIENCE IN BIOTECHNOLOGY
DURATION: THREE YEARS
SUBJECT: BIOTECHNOLOGY

PROGRAMME OUTCOMES (POs)		
PO1	Knowledge	Able to acquire theoretical and practical knowledge in fundamentals of biology in respective disciplines of plants, animals, microbes, environment and biotechnology.
PO2	Communication	Ability to communicate effectively on general and scientific topics with the scientific community.
PO3	Problem Solving	Capability of applying knowledge to solve scientific and other problems.
PO4	Individual and Team Work	To prepare youth for career and work effectively as an individual or as a member or a leader in any interdisciplinary team.
PO5	Investigation of Problems	Impart ability to critically evaluate problems and apply lateral thinking and analytical skills for professional development.
PO6	Modern Tool Usage	Ability to use and learn techniques, skills and modern tools for scientific practice that instill deep interest in biological science for the benefit of society.
PO7	Science and Society	Students will be able to understand various biological aspects and will develop into Biotech savvy integrated personalities with Scientific thinking and this will be beneficial for the society.
PO8	Life-Long Learning	Able to apply basic knowledge in their daily life and participating in learning activities throughout the life.
PO9	Environment and Sustainability	To understand application of biotechnology in health, medicine, food security for human well-being and sustainable development.
PO10	Ethics	To create awareness on ethical issues, good laboratory practices and biosafety.
PO11	Project Management	Undertaking a project with an ability to apply knowledge and understanding of the scientific principles.

PROGRAMME SPECIFIC OUTCOMES (PSOs)
The objective of the curriculum designed for the Biotechnology course is to nurture the scientific aptitude of students for professional competency in the field of applied sciences

PSO1	To acquaint students with Theoretical and Practical knowledge in different areas of Biotechnology.
PSO2	Critically think and correlate the biological knowledge of distribution, morphology and physiology of organisms (animals, plants and microorganisms) to techniques in aseptic procedures, isolation, identification, characterization and modifications to improve quality of life in person as well as community.
PSO3	Demonstrate an understanding of the principles of bio- techniques, and exhibit basic professional skills pertaining to biotechnology, carry out laboratory-orientated numerical calculations and analyze biological data (e.g., in enzyme kinetics, molecular structure analysis, microbiological techniques, immunological inferences)
PSO4	Scientific writing and authentic reporting, effective presentation skills and ability to work in a group with cooperation
PSO5	Pursuance of higher studies aimed towards innovational research leading to the progressive growth of the society and the nation.

B-BTY-101: INTRODUCTION TO BIOTECHNOLOGY- I

Course Objectives: The aim of this course is to introduce the basic techniques of biotechnology as well as applications of these technologies in various fields.

Course Outcomes: At the end of this course, the student will be able to:

B-BTY-101.1Understand and demonstrate the concept of biotechnology as well as its applications in various fields such as agriculture, environment, health, industries, medicine and forensics

B-BTY-101.2Know about the ethics and status of research in the field of biotechnology at India and World level.

CO-PO Mapping Matrix for Course Code: B-BTY-101										
Cos#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
B-BTY-101.1	2	3	3	3	3	3	3	2	3	2	3
B-BTY-101.2	2	3	3	1	3	2	3	2	3	3	2
Average	2	3	3	2	3	2.5	3	2	3	2.5	2.5

CO-PSO Mapping Matrix for Course Code: B-BTY-101					
Cos#	PSO1	PSO2	PSO3	PSO4	PSO5
B-BTY-101.1	2	3	3	1	3
B-BTY-101.2	2	2	1	2	3
Average	2	2.5	2	1.5	3

B-BTY-102: BIOCHEMISTRY- I

Course Objectives: The aim of this course is to introduce about various structures and functions of various biomolecules

Course Outcomes: At the end of this course, the student will be able to:

B-BTY-102.1classify, draw structures and understand the roles of carbohydrates and amino acids in plants and animals

B-BTY-102.2Understand thestructures, properties and importance of proteins, lipids and nucleic acids

CO-PO Mapping Matrix for Course Code: B-BTY-102										
Cos#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
B-BTY-102.1	2	3	3	2	2	2	3	3	3	2	2
B-BTY-102.2	2	3	3	2	2	2	3	3	3	2	2
Average	2	3	3	2	2	2	3	3	3	2	2

CO-PSO Mapping Matrix for Course Code: B-BTY-102					
Cos#	PSO1	PSO2	PSO3	PSO4	PSO5
B-BTY-102.1	2	3	3	2	2
B-BTY-102.2	2	3	3	2	2
Average	4	3	3	2	2

B-BTY-201: GENERAL MICROBIOLOGY
Course Objectives: The aim of this course is the introductionofvarious microorganisms and techniques used for their study.
Course Outcomes: At the end of this course, the student will be able to: B-BTY-201.1Demonstratevarious techniques of microbiology such as microscopy, sterilization and staining B-BTY-201.2Classify as well as understand the structures and concept of various bacteria and viruses also the diseases associated with these.

CO-PO Mapping Matrix for Course Code: B-BTY-201										
Cos#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
B-BTY-201.1	2	3	3	3	3	3	3	3	2	3	3
B-BTY-201.2	2	3	3	3	3	3	3	3	3	3	3
Average	2	3	3	3	3	3	3	3	2.5	3	3

CO-PSO Mapping Matrix for Course Code: B-BTY-201					
Cos#	PSO1	PSO2	PSO3	PSO4	PSO5
B-BTY-201.1	2	3	3	2	3
B-BTY-201.2	2	3	3	2	3
Average	2	3	3	2	3

B-BTY-202: BIOCHEMISTRY-II
Course Objectives: The aim of this course is to understand the basic concept of enzymes, vitamins, hormones and carbohydrate, lipids and amino acid metabolism
Course Outcomes: At the end of this course, the student will be able to: B-BTY-202.1Know about the classification of enzyme, concept of enzyme kinetics as well as structure and functions of various vitamins and hormones. B-BTY-202.2Understand thevarious pathways involved in the metabolism of carbohydrates, lipids and amino acids.

CO-PO Mapping Matrix for Course Code: B-BTY-202										
Cos#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
B-BTY-202.1	2	3	3	3	3	2	3	3	2	2	3
B-BTY-202.2	2	3	3	3	3	2	3	3	2	2	3
Average	2	3	3	3	3	2	3	3	2	2	3

CO-PSO Mapping Matrix for Course Code: B-BTY-202					
Cos#	PSO1	PSO2	PSO3	PSO4	PSO5
B-BTY-202.1	2	3	3	2	3
B-BTY-202.2	2	3	3	2	3
Average	2	3	3	2	3

B-BTY-203: PRACTICAL (SEMESTER I & II)
Course Objectives: The aim of this course is to learn the concepts of biotechnology, biochemistry, microbiology and enzymology by practical experimentation.
Course Outcomes: At the end of this course, the student will be able to: B-BTY-203.1Demonstrate the working of various instruments and techniques used in biotechnology as well as will be able to analyze carbohydrates, proteins, lipids and vitamins from a sample both qualitatively and quantitatively   B-BTY-203.2prepare nutrient media and will be able to estimate the total count of microorganisms from a sample

CO-PO Mapping Matrix for Course Code: B-BTY-203										
Cos#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
B-BTY-203.1	3	3	3	3	3	3	3	3	3	2	3
B-BTY-203.2	3	3	3	3	3	2	3	3	3	3	3
Average	3	3	3	3	3	2.5	3	3	3	2.5	3

CO-PO Mapping Matrix for Course Code: B-BTY-203					
Cos#	PSO1	PSO2	PSO3	PSO4	PSO5
B-BTY-203.1	3	3	3	2	3
B-BTY-203.2	3	3	2	3	3
Average	3	3	2.5	2.5	3

B-BTY- 301: IMMUNOLOGY
Course objectives: To introduce the basic concept of Immunology.
Course outcomes: B-BTY-301.1 Conceptualize how the innate and adaptive immune responses coordinate to fight invading pathogens.   B-BT-301.2 Understand and describe antigen, antibodies interactions, and generation of immune cells responses, and hybridoma technology for the production of monoclonal antibodies, recombinant antibodies, and different types of vaccines.

CO-PO Mapping Matrix for course code: B-BTY-301										
Cos#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
B-BTY-301.1	3	3	2	3	3	2	2	2	2	3	2
B-BTY-301.2	3	2	3	3	2	3	2	2	2	2	2
Average	3	2.5	2.5	3	2.5	2.5	2	2	2	2.5	2

CO-PSO Mapping Matrix for course code: B-BTY-301					
Cos#	PSO1	PSO2	PSO3	PSO4	PSO5
B-BTY-301.1	3	3	2	3	3
B-BTY-301.2	3	2	3	3	3
Average	3	2.5	2.5	3	3

B-BTY- 302: MOLECULAR BIOLOGY
Course objectives: To introduce the basic concept of Molecular Biology
Course outcomes: B-BTY-302.1 Elaborate the central dogma of life, the general principles of gene organization and describe the structure and functions of proteins involved in replication and repair mechanisms B-BT-302.2Give an insight of the process of gene expression, mechanism of transcription, post-transcriptional processing of RNA in prokaryotes; Describe and correlate the concept of genetic code and mechanism of translation in prokaryotes

CO-PO Mapping Matrix for course code: B-BTY-302

Cos#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
B-BTY-302.1	3	3	2	3	3	2	2	2	2	3	2
B-BTY-302.2	3	2	3	3	2	3	2	2	2	2	2
Average	3	2.5	2.5	3	2.5	2.5	2	2	2	2.5	2

CO-PSO Mapping Matrix for course code: B-BTY-302

Cos#	PSO1	PSO2	PSO3	PSO4	PSO5
B-BTY-302.1	3	3	2	3	3
B-BTY-302.2	3	2	3	3	3
Average	3	2.5	2.5	3	3

B-BTY- 401: Recombinant DNA Technology
Course objectives: To introduce the basic concept of Recombinant DNA Technology
Course outcomes: B-BTY-401.1 Give insight of the principles and applications of the molecular tools used in recombinant DNA technology B-BT-401.2Elaborate the process and applications of genetic engineering in animals

CO-PO Mapping Matrix for course code: B-BTY-401										
Cos#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
B-BTY-401.1	3	3	2	3	3	2	2	2	2	3	2
B-BTY-401.2	3	2	3	3	2	3	2	2	2	2	2
Average	3	2.5	2.5	3	2.5	2.5	2	2	2	2.5	2

CO-PSO Mapping Matrix for course code: B-BTY-401					
Cos#	PSO1	PSO2	PSO3	PSO4	PSO5
B-BTY-401.1	3	3	2	3	3
B-BTY-401.2	3	2	3	3	3
Average	3	2.5	2.5	3	3

B-BTY- 402: Bioinformatics
Course objectives: The aim of this course is to introduce the students to the basics of bioinformatics. This includes teaching the basis of the biological system via information and technology.
Course outcomes: B-BTY-402.1 Know about basic tools and concepts of Bioinformatics and their significance in applied and basic Biology. They will also learn application of various bioinformaticstools B-BTY-402.2Develop concept of sequence alignment, matrix, algorithms and tools to generate more accurate predictions of various Biological data.Have overview about molecular level phylogenetics, Proteomics, Genomics and Human Genome Project.

CO-PO Mapping Matrix for course code: B-BTY-402

Cos#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
B-BTY-402.1	3	3	2	3	3	2	2	2	2	3	2
B-BTY-402.2	3	2	3	3	2	3	2	2	2	2	2
Average	3	2.5	2.5	3	2.5	2.5	2	2	2	2.5	2

CO-PSO Mapping Matrix for course code: B-BTY-401

Cos#	PSO1	PSO2	PSO3	PSO4	PSO5
B-BTY-402.1	3	3	2	3	3
B-BTY-402.2	3	2	3	3	3
Average	3	2.5	2.5	3	3

B-BTY- 403: Practical (Sem III +IV)
Course objectives: The aim of this course is to introduce the students how to apply the theoretical knowledge in the practical world.
Course outcomes: B-BTY-403.1 Isolate DNA from plants and bacteria, plasmid DNA. B-BTY-403.2Perform various tests to identify infectious diseases and blood typing immunoassays such as Western Blotting, ELISA for diagnosis of various diseases.

CO-PO Mapping Matrix for course code: B-BTY-403

Cos#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
B-BTY-403.1	3	3	2	3	3	2	2	2	2	3	2
B-BTY-403.2	3	2	3	3	2	3	2	2	2	2	2
Average	3	2.5	2.5	3	2.5	2.5	2	2	2	2.5	2

CO-PSO Mapping Matrix for course code: B-BTY-404

Cos#	PSO1	PSO2	PSO3	PSO4	PSO5
B-BTY-403.1	3	3	2	3	3
B-BTY-403.2	3	2	3	3	3
Average	3	2.5	2.5	3	3

B-BTY- 501: Animal Biotechnology
Course objectives: The aim of this course is to introduce the students to animal Biotechnology
Course outcomes: B-BTY-501.1 exhibit the knowledge of the basic concepts of animal biotechnology; animal cell and tissue culture technology, principles and applications B-BTY-501.2 Elaborate the techniques and applications of invitro fertilization and transgenic animals. Describe thetechniques of transfection and applications in production of vaccines and gene therapy.

CO-PO Mapping Matrix for course code: B-BTY-501

Cos#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
B-BTY-501.1	3	3	2	3	3	2	2	2	2	3	2
B-BTY-501.2	3	2	3	3	2	3	2	2	2	2	2
Average	3	2.5	2.5	3	2.5	2.5	2	2	2	2.5	2

CO-PSO Mapping Matrix for course code: B-BTY-501

Cos#	PSO1	PSO2	PSO3	PSO4	PSO5
B-BTY-501.1	3	3	2	3	3
B-BTY-501.2	3	2	3	3	3
Average	3	2.5	2.5	3	3

B-BTY- 502: Plant Biotechnology
Course objectives: The aim of this course is to introduce the students to Plant Biotechnology Course outcomes: B-BTY-502.1Elaborate the basic concept of plant tissue culture, different aseptic conditions, culture media and their supplements B-BTY-502.2 Describe different types of plant culture (tissue, organ and protoplast) and various techniques such as micropropagation, totipotency, somaclonal variation, their applications and limitations.

CO-PO Mapping Matrix for course code: B-BTY-502

Cos#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
B-BTY-502.1	3	3	2	3	3	2	2	2	2	3	2
B-BTY-502.2	3	2	3	3	2	3	2	2	2	2	2
Average	3	2.5	2.5	3	2.5	2.5	2	2	2	2.5	2

CO-PSO Mapping Matrix for course code: B-BTY-502

Cos#	PSO1	PSO2	PSO3	PSO4	PSO5
B-BTY-502.1	3	3	2	3	3
B-BTY-502.2	3	2	3	3	3
Average	3	2.5	2.5	3	3

B-BTY-601: MICROBIAL BIOTECHNOLOGY

Course Objectives: The aim of this course is to create a general understanding of microbial technology including the role of microbes in biotechnology and their application in various industries.

Course Outcomes: At the end of this course, the student will be able to:

B-BTY-601.1 Understand the basic techniques of isolation and cultivation of microbes, their growth kinetics and microbial bioreactors

B-BTY-601.2 Know the applications of microbes in production of various industrial products, agriculture medicine and bioremediation.

CO-PO Mapping Matrix for Course Code: B-BTY-301

Cos#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
B-BTY-601.1	2	3	3	2	3	3	3	3	3	3	2
B-BTY-601.2	2	3	3	3	3	3	3	3	3	3	2
Average	2	3	3	2.5	3	3	3	3	3	3	2

CO-PO Mapping Matrix for Course Code: B-BTY-301

Cos#	PSO1	PSO2	PSO3	PSO4	PSO5
B-BTY-601.1	2	3	3	2	3
B-BTY-601.2	2	3	3	2	3
Average	2	3	3	2	3

B-BTY-602: PRACTICAL (SEMESTER V & VI)

Course Objectives: The aim of this course is to develop practical skill and acquaint with recent knowledge and techniques in the field of microbial biotechnology and enzymology

Course Outcomes: At the end of this course, the student will be able to:

B-BTY-602.1 learn and perform the basics of microbial culturing, its applications and enzyme action through various experiments

B-BTY-602.2 Imbibe the value of team spirit and as well as work independently to write and manage their research experimentation.

CO-PO Mapping Matrix for Course Code: B-BTY-302

Cos#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
B-BTY-601.1	3	3	3	3	3	3	3	3	3	2	3
B-BTY-601.2	3	3	3	3	3	2	3	3	3	3	3
Average	3	3	3	3	3	2.5	3	3	3	2.5	3

CO-PO Mapping Matrix for Course Code: B-BTY-302

Cos#	PSO1	PSO2	PSO3	PSO4	PSO5
B-BTY-601.1	3	3	3	2	3
B-BTY-601.2	3	2	3	3	3
Average	3	2.5	3	2.5	3

B-BTY-603: PROJECT (IN-HOUSE)
Course Objectives: The aim of this course is to provide practical understanding and hands-on training of various techniques of biotechnology by undertaking a research based problem
Course Outcomes: At the end of this course, the student will be able to: B-BTY-603.1 imbibe the knowledge of practical applications of biotechnology B-BTY-603.2 learn to work in a team and will be able to write a project report scientifically.

CO-PO Mapping Matrix for Course Code: B-BTY-603

Cos#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
B-BTY-603.1	3	2	3	3	3	3	3	3	3	3	3
B-BTY-603.2	3	3	3	3	3	2	3	3	3	3	3
Average	3	2.5	3	3	3	2.5	3	3	3	3	3

CO-PO Mapping Matrix for Course Code: B-BTY-603

Cos#	PSO1	PSO2	PSO3	PSO4	PSO5
B-BTY-603.1	3	3	3	3	3
B-BTY-603.2	2	3	2	3	3
Average	2.5	3	2.5	3	3

Principal
Dyal Singh College
KARNAL

Department of English

Course Specific Outcomes
&
Programme Specific Outcomes

For B.Sc Course

Dyal Singh College, Karnal

Department of English

Name of the Programme: BACHELOR OF SCIENCE

Duration- 3 years

		Programme Outcomes (POs)
PO1	**Knowledge**	Capable to apply the full scale and the thorough knowledge in social practices gained during multidisciplinary course of study.
PO2	**Communication**	Proficiency in communicating with effective scientific aptitude on general and scientific topic with society.
PO3	**Problem Solving**	Ability of critical thinking to solve general and scientific problems by applying the knowledge gained during the course of study.
PO4	**Individual and Teamwork**	Competency to learn and work as an individual and as a team in multidisciplinary options.
PO5	**Investigation of Problems**	Capable of analysing the different aspects of a problem, designing of experiments, developing new techniques, analysing and interpreting the data to reach a conclusion.
PO6	**Modern Tool Usage**	Capability to learn and use modern skills, tools and technologies for social and scientific practices.
PO7	**Science and Society**	Capable to assess different kinds of social issues by applying reasoning and scientific aptitude developed during the course.
PO8	**Life-Long Learning**	Developed Learning attitude for newer skills and activities throughout their life.
PO9	**Environment and Sustainability**	Capable to use the acquired knowledge and developed thinking to design new ideas and systems that are helpful for environment and its sustainability.
PO10	**Ethics**	Apply ethics and principles in different professional and social practices.

Programme Specific Outcomes (PSOs)

PSO1	To enhance employability of students by developing their linguistic competence and communicative skills.
PSO2	To introduce students to masterpieces of prose and poetry in English so as to develop a rich understanding of life through literature.
PSO3	To sharpen students' critical, creative and analytical skills and enhance their proficiency in English language.
PSO4	To develop understanding of the grammatical system of English language.

SCHEME OF EXAMINATION FOR BACHELOR OF SCIENCE

Semester	Paper Code	Nomenclature of Paper	Internal Assessment	Examination	Total marks	Time
01	101	English Core	10	40	50	3 hours
02	201	English Core	10	40	50	3 hours

Name of the Paper: B.Sc. English (ENG-101)
Semester- 01

Maximum Marks: 50
External Assessment: 40
Internal Assessment: 10
Time: 3 Hours

Course Objectives: Appealing to the emotional, aesthetic, reflective, intellectual and spiritual faculties of the students through some masterpieces of poetry in English.

Programme Outcomes:
1. To enhance the students' awareness in the aesthetics of poetry.
2. To empower students to read, appropriate and critically evaluate poetry independently.
3. To acquaint them to various periods of English literature by introducing prominent poets from each period.
4. To improve their linguistic competence and develop a sound understanding of the language through concepts like translation.

Syllabus

PART A
1. Let Me Not to the Marriage of True Minds – William Shakespeare
2. Death Be Not Proud – John Donne

3. On His Blindness – John Milton
4. The Retreat - Henry Vaughan
5. Shadwell – John Dryden
6. Know Then Thyself – Alexander Pope
7. The Little Black Boy – William Blake
8. Three Years She Grew in Sun and Shower – William Wordsworth
9. England in 1819 – Percy Bysshe Shelley
10. Crossing the Bar – Alfred, Lord Tennyson

PART B
1. Translation from Hindi to English
2. Paragraph Writing
3. Common Phrasal Verbs, Prepositions and Common Errors in English

PRESCRIBED BOOKS- Chronicles of Time
Grammar, Composition and Translation

CO-PO Mapping Matrix for Course Code: ENG-101

COs#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
1	3	2	3	2	3	3	1	3	3	3
2	3	2	3	2	3	2	2	3	3	3
3	3	2	2	2	3	3	2	3	3	3
4	3	3	2	3	2	3	2	3	2	2
Average	3	2.25	2.5	2.25	2.75	2.75	1.75	3	2.75	2.75

Mapping of Course Outcomes to Program Specific Outcomes

COs#	PSO1	PSO2	PSO3	PSO4
1	2	3	3	2
2	2	3	3	2
3	3	3	3	2
4	3	2	3	3
Average	2.5	2,75	3	2.25

Name of the Paper: B.Sc. (ENG-201)
Semester-02

Maximum Marks: 50
External Assessment: 40
Internal Assessment: 10
Time: 3 Hours

Course Objectives: To develop critical thinking along with a comprehensive view of life in students, through essays on varied topics.

Programme Outcomes:
1. To develop logical thinking and analytical ability in students
2. To familiarize students with excellent examples of prose
3. To sensitize students to various issues of mankind and empower them to solve these issues with humanity.
4. To help students to improve their communicative skills and develop a profound understanding of English language.

Syllabus

PART A
1. Our Civilization – C.E.M. Joad
2. It's Question Time – Jayant V. Narlikar
3. An Interview with Christian Barnard– N. Ram
4. Untouchability and the Caste System – B.R. Ambedkar
5. Inhumanisation of War – Huck Gutman
6. Seven Types of Gender Inequality – Amartya Sen

PART B
1. Translation from English to Hindi
2. Precis Writing
3. Official Correspondence: Letter Writing

PRESCRIBED BOOKS- Ideas Aglow
General English

CO-PO Mapping Matrix for Course Code: ENG-201

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
1.	3	2	3	2	3	2	2	3	2	3
2.	3	2	3	2	3	2	2	3	2	3
3.	3	3	3	3	3	2	2	3	2	3
4.	3	3	2	2	2	3	2	3	2	2
Average	3	2.5	2.75	2.25	2.75	2.25	2	3	2	2.75

Mapping of Course Outcomes to Program Specific Outcomes

COs	PSO1	PSO2	PSO3	PSO4
1.	2	3	3	2
2.	2	3	3	2
3.	3	3	3	2
4.	3	2	3	3
Average	2.5	2.75	3	2.25

Bakhar .

Principal
Dyal Singh College
KARNAL

Department of Sanskrit

Course Specific Outcomes
&
Programme Specific Outcomes

For B.Sc Course

DYAL SINGH COLLEGE, KARNAL

B.Sc. (Sanskrit) Programme
Name of the Programme- Bachelor of Science
Semester - 3rd
Subject- Sanskrit

Sanskrit is a very rich language of Indo-European group. It is a medium to know about ancient Indian, history,culture, religion, social life through its text. So the student seeking admission for B.Sc. programme is expected to develop a deep understanding of rich heritage and dynamic prevalent scenario of India through various Sanskrit texts.

Programme Outcomes (Pos)	
PO1	Develop a strong concept of Indian history, Philosophy and literature.
PO2	Enhance communication skills - Listening, Speaking, Reading, writing.
P03	Students will demonstrate the skill needed to participate in conversation that builds knowledge with collaboration.
PO4	Students will be able to understand the advanced and the scientific structure of Sanskrit.
PO5	Develop research aptitude and independent thinking.
P06	Develop a strong concept of ancient Indian history, philosophy and Literature.
P07	Ability to communicate effectively on general and scientific topics with the community and with society at large.
P08	Apply ethical principles and professional responsibilities in daily practices.
P09	Create awareness to become an enlightened citizen with commitment to deliver one's responsibilities within the scope of bestowed rights and privileges.

Programme Specific Outcomes (PSOs)	
PSO1	To understand the basic concept of Sanskrit and its origin.
PSO2	Acquire high proficiency and Knowledge in a particular field of Sanskrit Studies.
PS03	Understand the advanced and the scientific structure of Sanskrit grammer.
PSO4	Understand the traditional and contemporary ways for dealing with Sanskrit Literature, Language and Shastras.
PSO5	Impart the knowledge of Sanskrit Literature as based values of Ethics and Morality capable of providing right grooming.
PS06	Developing philosophy of life inspiring by the vision of eminent writers.
PS07	Understand and articulate issues pertaining to origin and evolution of Sanskrit language literature.

Course Objectives:- The main aim of this course is to increase the knowledge of Literature review, which will help to improve the human values in students and also improve the writing skills.

Course Outcomes

At the end of this course, the student will be able to

B.Sc.SA 23.1	Know about principle thesis of Upnishadas.
B.Sc.SA 23.2	Get acquainted with the philosophy of beginning of Sanskrit prose Literature.
B.Sc.SA 23.3	Understand the basic structural nuances of Panini Grammer i.e Shabd Roop.
B.Sc.SA 23.4	Will become familiar with fundamental Sandhi.
B.Sc.SA 23.5	Write short paragraphs and translate sentence.

Co-PO Mapping Matrix for Course Code B.SC (Sanskrit) SA23									
PO / CO	P01	P02	P03	P04	P05	P06	P07	P08	P09
B.Sc.SA 23.1	3	3	3	2	3	3	3	3	3
B.Sc.SA 23.2	3	2	2	3	3	3	3	2	3
B.Sc.SA 23.3	3	2	3	3	3	3	2	3	2
B.Sc.SA 23.4	3	3	3	3	3	3	2	3	3
B.Sc.SA 23.5	2	2	3	2	2	3	3	3	3
Average	2.8	2.4	2.8	2.6	2.8	3	2.6	2.8	2.8

CO-PS0 Mapping Matrix for course Code B.Sc(Sanskrit) SA 23							
PSO / CO	PS01	PS02	PS03	PS04	PS05	PS06	PS07
B.Sc.SA 23.1	3	3	2	3	2	3	3
B.Sc.SA 23.2	3	3	3	2	3	2	2
B.Sc.SA 23.3	3	3	2	2	3	3	3
B.Sc.SA 23.4	2	3	3	3	3	3	3
B.Sc.SA 23.5	3	2	3	3	3	3	3
Average	2.8	2.8	2.6	2.6	2.8	2.8	2.8

DYAL SINGH COLLEGE, KARNAL

B.Sc(Sanskrit) Programme
Name of the Programme- Bachelor of Science
Semester – 4th
Subject- Sanskrit

Sanskrit is a very rich language of Indo-European group. It is a medium to know about ancient Indian, history,culture, religion, social life through its text. So the student seeking admission for B.Sc. programme is expected to develop a deep understanding of rich heritage and dynamic prevalent scenario of India through various Sanskrit texts.

Programme Outcomes (Pos)	
PO1	Develop a strong concept of Indian history, Philosophy and literature.
PO2	Enhance communication skills - Listening, Speaking, Reading, writing.
P03	Students will demonstrate the skill needed to participate in conversation that builds knowledge with collaboration.
PO4	Students will be able to understand the advanced and the scientific structure of Sanskrit.
PO5	Develop research aptitude and independent thinking.
P06	Develop a strong concept of ancient Indian history, philosophy and Literature.
P07	Ability to communicate effectively on general and scientific topics with the community and with society at large.
P08	Apply ethical principles and professional responsibilities in daily practices.
P09	Create awareness to become an enlightened citizen with commitment to deliver one's responsibilities within the scope of bestowed rights and privileges.

Programme Specific Outcomes (PSOs)	
PSO1	To understand the basic concept of Sanskrit and its origin.
PSO2	Acquire high proficiency and Knowledge in a particular field of Sanskrit Studies.
PS03	Understand the advanced and the scientific structure of Sanskrit grammer.
PSO4	Understand the traditional and contemporary ways for dealing with Sanskrit Literature, Language and Shastras.
PSO5	Impart the knowledge of Sanskrit Literature as based values of Ethics and Morality capable of providing right grooming.
PS06	Developing philosophy of life inspiring by the vision of eminent writers.
PS07	Understand and articulate issues pertaining to origin and evolution of Sanskrit language literature.

Course Objectives:- The main aim of this course is to increase the knowledge of Literature review,which will help to improve the human values in students and also improve the writing skills.
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Course Outcomes

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

B.A. ES 24.1	Understand and analyze the issues and their solutions depicted in Ramayana & Mahabharta.
B.A. ES 24.2	Learn Moral and ethical values that will be an asset in the lived lives.
B.A. ES 24.3	Know the basic of Sanskrit Grammer i.e Dhatu roop.
B.A. ES 24.4	Know the rules of Sandhi.
B.A. ES 24.5	Overview of all the content.

Co-PO Mapping Matrix for Course Code B.Sc (Sanskrit) SA 24								
PO C0	P01	P02	P03	P04	P05	P06	P07	P08	P09
B.A. ES 24.1	3	3	2	2	3	3	3	2	3
B.A. ES 24.2	2	2	3	3	3	3	2	2	3
B.A. ES 24.3	3	2	3	3	3	3	3	3	2
B.A. ES 24.4	3	3	2	3	3	3	2	3	3
B.A. ES 24.5	2	2	3	2	2	3	3	3	3
Average	2.6	2.4	2.6	2.6	2.8	3	2.6	2.6	2.8

CO-PS0 Mapping Matrix for course Code B.Sc (Sanskrit) SA 24							
PSO C0	PS01	PS02	PS03	PS04	PS05	PS06	PS07
B.A. ES 24.1	3	3	2	3	2	3	3
B.A. ES 24.2	2	3	3	3	3	3	2
B.A. ES 24.3	3	2	2	2	3	3	2
B.A. ES 24.4	2	3	2	3	3	3	3
B.A. ES 24.5	3	2	3	3	3	3	3
Average	2.6	2.6	2.4	2.8	2.8	3	2.6

Principal
Dyal Singh College
KARNAL

Department of Hindi

Course Specific Outcomes
&
Programme Specific Outcomes

For B.Sc Course

DYAL SINGH COLLEGE, KARNAL

Name of the Programme : Bachelor of Science

Semester : 3rd

Subject: Hindi

PROGRAMME OUTCOMES (POs)	
PO1	Student seeking admission for B.Sc. programme is expected to imbue with following quality which helps them in their future life to achieve the expected Goals.
PO2	Ability to communicate effectively on general and scientific topics with the scientific community and with society at large.
PO3	Capability of applying knowledge to solve scientific and other problems.
PO4	Ability of critical thinking, analytical reasoning and research based knowledge including design of experiments, analysis and interpretation of data to provide conclusions.
PO5	Apply ethical principles and professional responsibilities in scientific practices.
PO6	To prepare the students with skills to analyze the concept and different theories of Hindi literature and language
PO7	Imbibe the effective communication in both mediums of expression (oral and writing).
PO8	Continue to acquire relevant knowledge and skills appropriate to professional activities.
PO9	Create awareness to become an enlightened citizen with commitment to deliver one's responsibilities within the scope of bestowed rights and privileges.
PO10	Responsible and dutiful citizen.
PO11	Sense of social service.

PROGRAMME SPECIFIC OUTCOMES (PSOs)	
PSO1	To understand the basic concept and subject of Hindi & its origin
PSO2	Understanding the relation between society and literature and analyse the role played by Hindi literature in past and present.
PSO3	Developing philosophy of life inspiring by the vision of eminent writers.
PSO4	Developing skill of writing poems, official letters and essays.
PSO5	To make a attempt in different area and theory such as vocabulary and vice versa.
PSO6	To know about Hindi literature its roots cause perspectives and methods.
PSO7	Evaluating the concept of Hindi from past to present and making the society more closely through literature.
PSO8	To nurture analytical qualities or skills, thinking power, creativity through assignments.

Course Objective: The main aim of this course is to increase the knowledge of literature review, which will help to improve the human values in students and also improve the essay writing or letter writing skills.

COURSE OUTCOMES

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

B.Sc. HI 23.1	Know *Adhunik Hindi Kavya* or *Kavi*.
B.Sc. HI 23.2	Increase vision regarding literary values
B.Sc. HI 23.3	Understand the role played by the poets in Freedom Movement.
B.Sc. HI 23.4	Describe the philosophy of patriotism as well as poems of *Adhuni*k writers - Mathlisarn Gupt , Jai Shankar Parsad, Nirala and Dinkar etc.
B.Sc. H I 23.4	Understand the importance of translation and scientific terminology.

CO-PO Mapping Matrix for Course Code-B.Sc. (Hindi) HI 23											
PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
B.Sc. HI 23.1	3	3	3	2	3	3	3	3	3	2	3
B.Sc. HI 23.2	2	3	3	2	2	2	2	2	3	2	3
B.Sc. HI 23.3	3	2	3	3	3	3	2	3	3	3	2
B.Sc. HI 23.4	3	3	3	3	3	3	2	3	3	3	2
B.Sc. HI 23.5	2	2	3	2	2	3	3	3	3	3	3
Average	2.6	2.6	3	2.4	2.6	2.8	2.4	2.8	3	2.6	2.6

CO-PSO Mapping Matrix for Course Code-B.Sc (Hindi) HI 23								
PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
B.Sc. HI 23.1	3	3	2	3	2	3	3	2
B.Sc. HI 23.2	2	3	2	3	2	3	3	3
B.Sc. HI 23.3	3	3	2	3	3	3	3	2
B.Sc. HI 23.4	2	3	3	3	3	3	3	3
B.Sc. HI 23.5	3	2	3	3	3	2	3	2
Average	2.6	2.8	2.4	3	2.6	2.8	3	2.4

DYAL SINGH COLLEGE, KARNAL

Name of the Programme : Bachelor of Science

Semester : 4th

Subject: Hindi

PROGRAMME OUTCOMES (POs)	
PO1	Student seeking admission for B.Sc. Programme is expected to imbue with following quality which helps them in their future life to achieve the expected Goals.
PO2	Ability to communicate effectively on general and scientific topics with the scientific community and with society at large.
PO3	Capability of applying knowledge to solve scientific and other problems.
PO4	Ability of critical thinking, analytical reasoning and research based knowledge including design of experiments, analysis and interpretation of data to provide conclusions.
PO5	Apply ethical principles and professional responsibilities in scientific practices.
PO6	To prepare the students with skills to analyze the concept and different theories of Hindi literature and language
PO7	Imbibe the effective communication in both mediums of expression (oral and writing).
PO8	Continue to acquire relevant knowledge and skills appropriate to professional activities.
PO9	Create awareness to become an enlightened citizen with commitment to deliver one's responsibilities within the scope of bestowed rights and privileges.
PO10	Responsible and dutiful citizen.
PO11	Sense of social service.

PROGRAMME SPECIFIC OUTCOMES (PSOs)	
PSO1	To understand the basic concept and subject of Hindi & its origin
PSO2	Understanding the relation between society and literature and analyse the role played by Hindi literature in past and present.
PSO3	Developing philosophy of life inspiring by the vision of eminent writers.
PSO4	Developing skill of writing poems, official letters and essays.
PSO5	To make a attempt in different area and theory such as vocabulary and vice versa.
PSO6	To know about Hindi literature its roots cause perspectives and methods.
PSO7	Evaluating the concept of Hindi from past to present and making the society more closely through literature.
PSO8	To nurture analytical qualities or skills, thinking power, creativity through assignments.

Course Objective: The main aim of this course is to understand the Indian culture (Human Values) through one act play, essay writing and letter writing skills. And also increase the knowledge of literature review that will help to improve the human values.

COURSE OUTCOMES

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

B.Sc. HI 24.1	Understand the Indian Culture (Human Values)
B.Sc. HI 24.2	Increase vision regarding literary values
B.Sc. HI 24.3	Understand the different modes of writing- one act play, essay and letter writing
B.Sc. HI 24.4	Describe the Indian philosophy through one act play (Historical Characters and Context).
B.Sc. H I 24.5	Understand the importance of translation and scientific terminology.

CO-PO Mapping Matrix for Course Code-B.Sc. (Hindi) HI 24											
PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
B.Sc. H I 23.1	3	3	3	2	3	3	3	3	3	2	3
B.Sc. HI 24.2	3	2	2	3	3	3	3	2	3	2	3
B.Sc. HI 24.3	3	2	3	3	3	3	2	3	2	2	3
B.Sc. HI 24.4	3	3	3	3	3	3	2	3	3	3	2
B.Sc. HI 24.5	2	2	3	2	2	3	3	3	3	3	3
Average	2.8	2.4	2.8	2.6	2.8	3	2.6	2.8	2.8	2.4	2.8

CO-PSO Mapping Matrix for Course Code-B.Sc (Hindi) HI 24								
PSO CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
B.Sc. HI 24.1	3	3	2	3	2	3	3	2
B.Sc. HI 24.2	3	3	3	2	3	2	2	2
B.Sc. HI 24.3	3	3	2	2	3	3	3	2
B.Sc. HI 24.4	2	3	3	3	3	3	3	3
B.Sc. HI 24.5	3	2	3	3	3	2	3	3
Average	2.8	2.8	2.6	2.6	2.8	2.6	2.8	2.4

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