

Quantum University, Roorkee
Course Outcomes for the Syllabus 2022-25 Batch



Bachelor of Science (Hons) in Physics/Chemistry/

Program Name **Maths**

Course Name **English Communication**

Course Code **EG3103**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than
CO1	Students will be able to discuss the concept of communication skills	1	S
CO2	Students will be able to increase self awareness about english language.	2	S
CO3	Students will be able to develop public speaking abilities.	1	S
CO4	Students will be able to present each and everything in correct manner.	2	Enp
CO5	Students will be able to discuss the concept of barriers to communication.	2	None

Course Name **Environmental Studies**

Course Code **CY3205**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than
CO1	Students can be able to correlate the human population growth and its trend to the environmental degradation and develop the awareness about his/her role towards environmental protection and preventions.	1	S
CO2	Students should be able to understand the solutions related to environmental problems related with the renewable & non-renewable resources.	2	S
CO3	Students should be able to understand the importance of ecosystem and biodiversity and the method of conservation of biological diversity.	1	S
CO4	Students should be able to understand different components of the environment and their function and the effects pollution on environment and should be able to understand the concept of sustainable development.	2	None
CO5	Students should be able to correlate the human population growth and its trend to the environmental degradation and develop the awareness about his/her role towards environmental protection and preventions.	2	En

Course Name **Mechanics & Properties of Matter**



(Signature)
 Registrar
 Quantum University

Course Code **PH3107**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than
CO1	Students will be able to understand about displacement, velocity and acceleration in Cartesian coordinate system and spherical & cylindrical polar coordinate systems; basic of Newtonian mechanics.	2	S
CO2	Students will be able to gain brief knowledge on two body central force problems, center of mass, along with rigid body dynamics.	3	S
CO3	Students will be able to achieve the brief knowledge on Hydrodynamics including surface tension, viscosity etc.	3	S
CO4	Students will be able to explain the phenomena related to Elasticity including different rigidity modulus.	3	None
CO5	Students will be able to capture the basic knowledge on Special Theory of Relativity.	3	Enp

Course Name **Calculus**

Course Code **MA3107**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than
CO1	Student will learn to find successive differentiation and apply Leibniz rule for finding higher order and learn to find concavity and point of inflexion of the curve, tracing of curve in Cartesian coordinate, indeterminate forms	2	S
CO2	Students will be able to work with parametric equation and their representation and will learn about definite integral and application of integration and find the area of a plane region between two curves, area of a surface of revolution.	3	S
CO3	Students will be able to understand the concept of partial differentiation and learn about increment approximation, total differential and Jacobean.	3	S
CO4	Students will be able to find the maxima and minima of function of several variables and learn the Lagrange multipliers method for finding extreme of function.	2	S
CO5	Students will learn to solve double and triple integral, change of order in double integral and understand beta and gamma functions.	2	S

Course Name **Structure of Atom, Chemical Bonding & Analytical Chemistry**



Course Code **CY3108**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than
CO1	Students able to know the structures, properties, application and the chemical reactivity.	2	S
CO2	Students will gain knowledge on fundamental of chemistry of the main group elements, and importance and real world application of many of these elements	2	S
CO3	Students will gain knowledge on the general characteristics of ions, size and effects.	1	S
CO4	Qualitative idea of valence bond and band theories.	2	S
CO5	Students able to know the Quantum numbers and their significance.	2	S

Course Name **Mechanics& Properties of Matter Lab**

Course Code **PH3142**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than
CO1	Students will acquire knowledge of how to handle measuring instruments (like screw gauge, vernier calipers, Travelling microscope) and graphing data for analysis	2	S
CO2	Students will have hands on experience on verifying various principles learnt in theory. Measuring 'g' using Bar Pendulum, Kater pendulum	3	S
CO3	Students will be able to Measure elastic constants of materials.	3	S

Course Name **Qualitative Analysis Lab**

Course Code **CY3140**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than
CO1	Students will gain hands on experience on different kinds of titrations.	1	Em



CO2	Students will be able to learn calibration of instruments and methods involved by performing experiments.	2	S
CO3	Students will be able to know the preparation of standard solutions.	3	S

Course Name **English Communication Lab**

Course Code **EG3141**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than
CO1	Students will be able to develop public speaking abilities.	2	Em
CO2	Students will be able to speak of each topic.	3	S
CO3	Students will be able to increase self awareness about english language.	2	S

Course Name **Basic Electrical and Electronics Engineering**

Course Code **EC3101**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than
CO1	Students will be able to understand the fundamentals of AC & DC circuits and network analysis using various theorems	2	S
CO2	Students will learn the construction and testing of transformers, AC parameters, RLC circuits and three phase system	2	S
CO3	Students will learn working and application of single/ three phase type AC machines, and DC machines	2	S
CO4	Students will be able to transport phenomenon in semiconductors, electronic devices and applications	3	S
CO5	Students will gain knowledge on Boolean algebra, binary gates, op-amps and electrical measuring instruments,	2	S

Course Name **Basic Electrical and Electronics Engineering Lab**

Course Code **EC3140**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than
CO1	Students will be able to verify Kirchhoff's current and voltage laws	2	S
CO2	Students will know and will be able to apply the Thevenin's, Norton's, superposition and maximum power transfer theorem, Analyze the half-wave and full-wave rectifier using silicon diode	2	S
CO3	Students will be bale to understand and analyze the characteristics of transistors and semiconductor diodes, To know about basic concepts of various logic gates	3	S

Course Name **Solid States & Ionic Equilibrium**

Course Code **CY3107**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than
CO1	Students will be gaining knowledge on basics and advance concepts regarding the three states of matter.	2	S
CO2	Students will be gaining knowledge on diffraction and their analysis.	3	S
CO3	Students will be gaining knowledge on ionic equilibrium.	2	S
CO4	Students will be gaining knowledge on solutions and its applications.	2	Enp
CO5	Students will be gaining knowledge on solubility and their application's,	3	None

Course Name **Solid States & Ionic Equilibrium Lab**

Course Code **CY3141**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than
CO1	Students will understand the concept of surface tension and viscosity.	2	Em

CO2	Students will be gaining knowledge on application of physical chemistry laws experimentally.	2	S
CO3	Students will gain hands on experience on preparation of buffer solutions and determine the solubility of salt.	1	S

Course Name **Analytical Geometry & Vector Calculus**
Course Code **MA3108**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than
CO1	Student will learn to find the position of any particle in the space, find the areas of triangles, quadrilaterals and circles and shapes.	2	S
CO2	Students will gain knowledge on concepts: plane; points; lines; line segments; rays and length of (straight) line,	3	S
CO3	Students will understand the concepts of advance topics related to two and three dimensional geometry and learn the application of sphere, cone and cylinder and understand geometrical terminology for angles, triangles, quadrilaterals and circles.	3	S
CO4	Students will gain knowledge on directional derivative and gradient and will be able to illustrate geometric meanings with the aid of sketches.	2	S
CO5	Students will be able to understand the relation between grad ,Div,and Curl Apply gradient to solve problems involving normal vectors to level surfaces. Explain the concept of a vector integration a plane and in space.	3	S

Course Name **Fundamental of Computer & Programming in C**
Course Code **CS3202**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than
CO1	Students will gain knowledge on programming and write pseudo-code.	1	S
CO2	Students will be able to choose the right data representation formats based on the requirements of the problem.	2	En
CO3	Students will be able to use the comparisons and limitations of the various programming constructs and choose the right one for the task in hand.	2	S
CO4	Students will be able to write the program on a computer, edit, compile, debug, correct, recompile and run it.	3	En

CO5	Students will be able to identify tasks in which the numerical techniques learned are applicable and apply them to write programs, and hence use computers effectively to solve the task.	3	En
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Course Name **Electricity and Magnetism**
Course Code **PH3206**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than
CO1	Students will be able to demonstrate Coulomb's law for the electric field, and apply it to systems of point charges as well as line, surface, and volume distributions of charges. Explain and differentiate the vector (electric fields, Coulomb's law) and scalar (electric potential, electric potential energy) formalisms of electrostatics. Apply Gauss's law of electrostatics to solve a variety of problems.	2	S
CO2	Students will gain knowledge on electric current, resistance and capacitance in terms of electric field and electric potential. Demonstrate a working understanding of capacitors.	2	S
CO3	Students will be able to describe the magnetic field produced by magnetic dipoles and electric currents. Also list examples where its effects are observed.	3	S
CO4	Students will be able to explain Faraday-Lenz and Maxwell laws to articulate the relationship between electric and magnetic fields. Also give basic understanding of magnetic properties of matter.	2	S
CO5	Students will be able to apply Kirchhoff's rules to analyze AC circuits consisting of parallel and/or series combinations of voltage sources and resistors and to describe the graphical relationship of resistance, capacitor and inductor. They will be also able to apply various network theorems such as Superposition Theorem, Thevenin Theorem, Norton Theorem, Reciprocity Theorem, Maximum Power Transfer, etc. and their applications in electronics, electrical circuit analysis, and electrical machines.	3	S

Course Name **Thermodynamics And Its Applications**
Course Code **CY3206**



Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than
CO1	Students will be learn the different laws of thermodynamics.	2	Emp
CO2	Students will be gaining knowledge on thermochemistry.	2	S
CO3	Students will be gaining knowledge on system of variable composition.	1	S
CO4	Students will be gaining knowledge on chemical equilibrium.	2	Enp
CO5	Students will be gaining knowledge on solutions and colligative properties.	1	None

Course Name **Differential Equations**
Course Code **MA3207**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than
CO1	Students will learn to solve the linear ordinary differential equation of first order and also learn the standard methods of solving the DE of first order and first degree.	3	S
CO2	Students will learn to solve the second order DE with constant coefficient and know the different methods of finding CF and PI.	2	S
CO3	Students will learn to solve the second order DE with variable coefficient by different methods like Cauchy Euler homogeneous linear DE, Legendre's homogeneous equation etc.	3	S
CO4	Students will gain knowledge about simultaneous equation and total differentiation.	2	S
CO5	Students will learn about some special functions (Legendre polynomial and Bessel functions) and their properties	3	S

Course Name **Electricity and Magnetism Lab**
Course Code **PH3240**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than
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CO1	Students will learn and practice the basic concepts of magnetism physically.	2	S
CO2	Students will be able to measure the field strength and verify the theorems.	3	S
CO3	Students will gain knowledge on response curve and able to determine high resistance and self and mutual inductance by different methods.	2	S

Course Name **Fundamentals of Computers and Programming in C Lab**
Course Code **CS3241**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than
CO1	Students can be able to correlate the human population growth and its trend to the environmental degradation and develop the awareness about his/her role towards environmental protection and preventions.	1	S
CO2	Students should be able to understand the solutions related to environmental problems related with the renewable & non-renewable resources.	2	S
CO3	Students should be able to understand the importance of ecosystem and biodiversity and the method of conservation of biological diversity.	1	S
CO4	Students should be able to understand different components of the environment and their function and the effects pollution on environment and should be able to understand the concept of sustainable development.	2	None
CO5	Students should be able to correlate the human population growth and its trend to the environmental degradation and develop the awareness about his/her role towards environmental protection and preventions.	2	En

Course Name **Environmental Studies**
Course Code **CY3205**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than
CO1	Students will learn a programming language.	2	Em
CO2	Students will learn problem solving techniques.	2	S
CO3	Students will be able to write programs in C and to solve the problems.	3	S

Course Name **Thermo Chemistry Lab**
Course Code **CY3242**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than
CO1	Students will gain knowledge on working principle of Bomb Calorimeter.	2	S
CO2	Students will be able to determine the heat capacity of calorimeter using standard methods.	2	S
CO3	Students will learn to calculate enthalpy change of different solution.	3	S

Course Name **Disaster Preparedness & Management***
Course Code **CE3102**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than
CO1	Students can be able to correlate the human population growth and its trend to the environmental degradation and develop the awareness about his/her role towards environmental protection and preventions.	2	S
CO2	Students should be able to understand the solutions related to environmental problems related with the renewable & non-renewable resources.	2	S
CO3	Students should be able to understand the importance of ecosystem and biodiversity and the method of conservation of biological diversity.	2	S
CO4	Students should be able to understand different components of the environment and their function and the effects pollution on environment and should be able to understand the concept of sustainable development.	2	S
CO5	Students should be able to correlate the human population growth and its trend to the environmental degradation and develop the awareness about his/her role towards environmental protection and preventions.	2	S

Course Name **United Nations Development Programme**
Course Code **HU3202**



Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than
CO1	Students will learn about the Structure, Mission, Vision and Goals of UNDP	2	S
CO2	Equip the students with the knowledge of sustainable livelihoods for inclusive economic growth.	2	S
CO3	Students will learn and explore about the Human Development index to promote well being at all ages.	2	S
CO4	To impart better education on SDGs goals focusing on Gender Equality and Provide Access to Justice to All and Build Effective.	3	N
CO5	Students will develop knowledge regarding environment sustainability.	3	N

Course Name **Waves & Matter**

Course Code **PH3209**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than
CO1	Students will be able to understand the principle of superposition of waves, so thus describe the formation of standing waves.	2	S
CO2	Students will be able to understand about wave phenomenon and various properties describing wave motion.	2	S
CO3	Students will be able to recognize and use a mathematical oscillator equation and wave equation, and derive these equations for certain systems.	3	S
CO4	Students will be able to use the principles of wave motion and superposition to explain the physics of interference and understand the working of selected optical instruments like biprism.	2	S
CO5	Students will be able to use the principles of wave motion and superposition to explain the physics of polarisation, interference and diffraction and understand the working of selected optical instruments like interferometer, diffraction grating and polarimeter,	3	S

Course Name **Waves and Matter Lab**

Course Code **PH3242**



Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than
CO1	In the laboratory course, student will gain hands-on experience of using various optical instruments such as diffraction grating, prisms	3	S
CO2	student will gain hands-on experience on instruments and making finer measurements of wavelength of light using Newton Rings. and understand the working of selected optical instruments like biprism, interferometer,	2	S
CO3	Students will gain knowledge on the motion of coupled oscillators, and also will study on Lissajous figures and behavior of transverse,	3	S

Course Name **s & p block elements**
Course Code **CY3207**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than
CO1	Students able to know the structures, properties, application and the chemical reactivity of the s&p block	2	S
CO2	Students will learn the fundamental of chemistry of the main group elements, and importance and real world application of many of these elements	2	En
CO3	Students will be able to describe the occurrence, preparation and characteristics of halogens.	2	S
CO4	Students will be able to describe to properties, preparation and uses of noble gas	2	S
CO5	Students will gain knowledge on polymers, their synthesis, reaction, mechanism and kinetics	2	None

Course Name **Group Theory**
Course Code **MA3208**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than

CO1	Students can be able to correlate the human population growth and its trend to the environmental degradation and develop the awareness about his/her role towards environmental protection and preventions.	1	S
CO2	Students should be able to understand the solutions related to environmental problems related with the renewable & non-renewable resources.	2	S
CO3	Students should be able to understand the importance of ecosystem and biodiversity and the method of conservation of biological diversity.	1	S
CO4	Students should be able to understand different components of the environment and their function and the effects pollution on environment and should be able to understand the concept of sustainable development.	2	None
CO5	Students should be able to correlate the human population growth and its trend to the environmental degradation and develop the awareness about his/her role towards environmental protection and preventions.	2	En

Course Name **Environmental Studies**

Course Code **CY3205**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than
CO1	Students will learn about the group theory and properties of group.	2	S
CO2	Students will learn about sub group and theorem based on subgroup.	2	Enp
CO3	Students will learn about cyclic group .student will able to analyze in reference of group .	3	S
CO4	Students will able to understand about group homeomorphism and isomorphism .student is able to understand the statements of theorems based on isomorphism.	3	Enp
CO5	Students understand the concept of Cosets. Students are also able to understand and apply the Lagrang's theorem.	2	Enp

Course Name **Elements of Modern Physics**

Course Code **PH3306**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than

CO1	Students will be able to understand the basic concept of quantum wave mechanics and black body radiation	2	S
CO2	Students will learn about the wave nature of light and Heisenberg principle and its application.	2	S
CO3	Students will be able to explain fundamentals of quantum mechanics and apply it to problems on bound states.	3	S
CO4	Students will gain the knowledge about the basic of atom and nucleus.	2	S
CO5	Students will have an overview of radioactivity.	2	S

Course Name **Spectroscopy**
Course Code **CY3308**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than
CO1	Students will be able to know the working of various instruments.	2	S
CO2	Students will learn the interaction of electromagnetic radiations with molecules and various types of spectra.	2	S
CO3	Students will gain knowledge on the spectra and its uses to detect ,identify, and quantify information about the atoms and molecules.	2	S
CO4	Students able to know the physical, chemical and biological properties of matter.	2	S
CO5	Student will gain knowledge on Spectroscopy and its applications.	2	S

Course Name **Statistics& Correlation**
Course Code **MA3309**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than
CO1	Students will be able to describe and discuss the key terminology, concepts tools and techniques used in business statistical analysis	2	S
CO2	Students will be able to establish the joint distribution of two random variables in terms their correlation and regression.	3	S
CO3	Students will be able to understand the basic concepts of probability.	3	S
CO4	Students will be able to solve a range of problems using the techniques covered	2	S

CO5	Students will be able to understand central limit theorem which shows that the empirical frequencies of so many natural populations exhibit normal distribution.	2	S
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Course Name **Elements of Modern Physics Lab**
Course Code **PH3340**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than
CO1	Students should be able to measure Planck constant using black body radiation and photo detector	2	S
CO2	Students should be able to determine work function of material of filament of directly heated vacuum diode	2	S
CO3	Students should be able to determine the wavelength of laser source using diffraction of single slit and double slit.	2	S

Course Name **Indian Knowledge System**
Course Code **HU3201**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than
CO1	The students will be able to understand the Indian Knowledge System such as historical development, sources and scope.	2	S
CO2	The students will be able to understand the vocabulary system of Indian knowledge system.	2	S
CO3	The students will be able to understand and apply the philosophical foundations and methods of IKS.	3	N
CO4	The students will be able to execute the case studies based on the Indian knowledge system.	3	N
CO5	The students will be able to understand the influence of Indian Knowledge System on world.	2	S

Course Name **Mathematical Physics I**
Course Code **PH3307**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than
CO1	Students will gain knowledge on Vectors and Vector space and their properties.	2	S
CO2	Students will be able work with matrices and determine if a given square matrix is invertible and solve the given values and given vectors of a matrix and determine diagonalization of a matrix.	3	S
CO3	Students will gain knowledge on PDE and their solution by variable separable method and introduction on complex analysis and some important theorem on it ,Jordan lemma, Taylors and Laurents series , conformal mapping and application .	2	S
CO4	Student will learn about Fourier series, periodic functions and their expansion even and odd function and their Fourier expansion and application of fourier series.	3	S
CO5	Students will learn about some special functions (Legendre polynomial, Hermite and Bessel functions) and their properties.	2	S

Course Name **Co-ordination Chemistry**
Course Code **CY3306**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than
CO1	Students will be able to know the structures, properties, application and the chemical reactivity.	2	S
CO2	Students will be able to coordinate compounds are used as catalysts for many applications in qualitative/quantitative chemical analysis within analytical chemistry.	1	S
CO3	Students will learn the interaction of metal and legends	2	S
CO4	Students able to know the physical, chemical properties and structure of the metals.	2	En
CO5	Students able to know the magnetic and catalytic behavior of complex compounds	2	S

Course Name **Quantitative Analysis Lab**
Course Code **CY3343**



Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than
CO1	Students will be able to know the preparation of inorganic and organic compound by various methods.	1	Emp
CO2	Students will learn the synthesis of different compound.	2	S
CO3	Students will able to apply the knowledge of various methods in industries.	3	S

Course Name **Real Analysis**
Course Code **MA3306**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than
CO1	Students will learn about the countable set and properties of countable set .	2	Emp
CO2	Students will learn about sequence and theorem based on sequence.	3	S
CO3	In this students will learn about convergence of positive term series and absolute term series .	3	S
CO4	In this students will learn about concept of continuity and differentiability .	3	Emp
CO5	Students will learn about rehmaan integrals and proof of theorems based on Rehmaan integrals .	3	None

Course Name **Thermal Physics And Acoustics**
Course Code **PH3409**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than
CO1	Students will learn about the zeroth and first law of thermodynamics and their applications.	1	S
CO2	Students will learn about the second law of thermodynamics and should be able to use it in various applications.	2	S
CO3	Students will be able to understand the concepts of entropy and third law of thermodynamics and their applications.	2	S

CO4	Students will gain knowledge about various thermodynamics potential function and should be able to find the relation between them	3	S
CO5	Students will learn about Acoustics, Ultrasonic waves, piezo electric crystal - Magnetostriction effect and Application of ultrasonic waves.	3	S

Course Name **Hydrocarbons, Haloalkanes and Haloarenes**

Course Code **CY3408**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than
CO1	Students will be able to know the structure of compounds and properties.	1	S
CO2	Students will be able to describe the Stereochemistry of molecules and its properties.	2	S
CO3	Students will be able to know the structure of aliphatic compounds	1	S
CO4	Students will gain knowledge on conformational analysis of Cycloalkanes.	2	S
CO5	Students will be able to know the characteristics of organic compounds.	1	S

Course Name **Numerical Analysis**

Course Code **MA3406**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than
CO1	Students will be able to apply numerical methods to find our solution of algebraic equations using different methods under different conditions, and numerical solution of system of algebraic equations.	3	S
CO2	Students will be able to work numerically on the partial differential equations using different methods through the theory of finite differences.	2	S
CO3	Students will be able to work numerically on the ordinary differential equations using different methods through the theory of finite differences	3	S
CO4	Students will be able to solve initial and boundary value problems in differential equations using numerical methods.	2	S
CO5	Students will be able to apply various numerical methods in real life problems.	3	S

Course Name **Thermal Physics And Acoustics Lab**
Course Code **PH3449**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than
CO1	Students should be able to determine the coefficient of thermal conductivity by searle's apparatus	2	S
CO2	Students should be able to determine the coefficient of thermal conductivity by Angstrom's apparatus	2	S
CO3	Students should be able to determine the coefficient of thermal conductivity a bad conductor by lee and Charlton disc method	2	S

Course Name **Numerical Analysis Lab**
Course Code **MA3440**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than
CO1	Students will able to implement various methods for finding the roots of Polynomial equations.	1	S
CO2	Students will able to implement various numerical solutions of Algebraic Equations.	2	S
CO3	Students will able to implement various methods for finite difference and Interpolation.	2	S

Course Name **Atomic and Molecular Physics**
Course Code **PH3408**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than
CO1	To understand the basic idea of X-ray spectrum and its usage in analyzing different types of crystals.	2	S
CO2	To understand the different aspects of studying the structure of an atom and to know different types of methods to find the charge of an electron.	2	S



CO3	To acquire the knowledge of Zeeman effect and its classical and quantum theory approach.	3	S
CO4	To understand the basic idea of molecular spectra and to acquire the knowledge about different types of molecular spectra.	2	S
CO5	To understand the basic idea of NMR spectroscopy, Chemical shifts, J-coupling and NMR Structure determination of molecules.	3	S

Course Name **Electrochemistry**

Course Code **CY3407**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than
CO1	Students will able to know the electrical conductivity of substance in various aqueous solution	1	S
CO2	Students will able to classify the strong electrolyte, weak electrolyte or non-electrolytes. Determine the effect of molar construction as well as the number of ions in solution on the conductivity..	2	S
CO3	Students will gain knowledge on Quantitative aspects ,different laws, oxidation/reduction potential, application of electrolysis in industries.	2	S
CO4	Students will be able to determine of qualitative & quantitative potentiometric titration, enthalpy and entropy of a cell reaction.	2	S
CO5	Students will learn on basics ideas of electrical and magnetic properties of atom and molecules.	2	S

Course Name **Hydrocarbon Lab**

Course Code **CY3441**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than
CO1	Students will learn to determine the melting points of different organic compound using experimental methods.	2	S
CO2	Students will gain information on handling instruments and chemicals in suitable manners.	2	S
CO3	Students will able to know the importance of experiments and how to apply in commercial level.	3	S

Course Name **Algebra of Rings And Field**



Registrar
Quantum University

Course Code **MA3408**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than
CO1	Students will learn about Ring , subrings imbedding of rings and some properties of rings and apply these properties in problem solving.	2	S
CO2	Students will be able to understand the definition of Ideals , product of two ideals , prime ideals, maximal ideals , principle ideals and about quotient ring .	3	S
CO3	Students Will learn about definition and properties of Polynomial rings, Euclidean theorem , factor theorem , irreducible polynomials	2	S
CO4	Students will be able to know the concept of extension field , algebraic extension , Roots of polynomial and apply this concept in problem solving .	3	S
CO5	Students learn concept of Splitting fields and some theorems on it and learn about constructible number, construction by edge and compass	2	S

Course Name **Hydrocarbons Lab**

Course Code **CY3441**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than
CO1	Students will learn to determine the melting points of different organic compound using experimental methods.	1	S
CO2	Students will gain information on handling instruments and chemicals in suitable manners.	2	S
CO3	Students will able to know the importance of experiments and how to apply in commercial level.	3	S

Course Name **Solid State Physics**

Course Code **PH3502**



Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than
CO1	Students will gain a brief idea about crystalline and amorphous substances, about lattice, unit cell, miller indices, reciprocal lattice, concept of Brillouin zones and diffraction of X-rays by crystalline materials.	2	S
CO2	Students will gain knowledge on lattice vibrations, phonons, Einstein and Debye theory of specific heat of solids.	3	S
CO3	Students will understand about the dielectric materials, different types of magnetism from diamagnetism to ferromagnetism and hysteresis loops and energy loss.	2	S
CO4	Students will understand about the ferroelectric properties of materials.	2	S
CO5	Students will understand about the band theory of solids and must be able to differentiate insulators, conductors and semiconductors and they will also understand the basic idea about superconductors and their classifications.	3	S

Course Name **Laser and Fiber Optics**
Course Code **PH3504**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than
CO1	Students will learn and understand with the basics of Laser system.	2	S
CO2	Students will learn about optical resonator, quality factor, Q switching and mode locking techniques.	2	S
CO3	Students will acquire skills to understand the different types of Laser	3	Emp
CO4	Students will be able to know about attenuation in fiber, TE, TM modes and working mechanism of optical fiber.	2	S
CO5	Student will have the knowledge about nonlinear optics.	3	S

Course Name **Renewable Energy & Resources**
Course Code **PH3505**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than
CO1	Understand the need of energy conversion and the various methods of energy storage.	2	S
CO2	Explain the field applications of solar energy.	3	S
CO3	Identify Winds energy and Tidal energy as alternate form of energy and to know how it can be tapped.	2	Emp
CO4	Ability to explain the Geothermal and Hydro energy, its mechanism of production and its applications.	3	Emp
CO5	Ability to explain the electro-magnetic energy harvesting and its application.	2	Emp

Course Name **Solid State Physics Lab**

Course Code **PH3541**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than
CO1	Students will be able to carry out experiments based on theory that have learnt to measure the magnetic stability.	2	S
CO2	Students will be able to carry out experiments on dielectric constant and trace hysteresis loop.	2	S
CO3	Students will also employ to four probe methods to measure electrical conductivity and the hall set up to determine the hall coefficient of a semiconductor.	2	S

Course Name **Analog Systems and Its Applications**

Course Code **PH3611**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than
CO1	Students will be able to understand the basic concept of N- and P-type semiconductors, mobility, drift velocity, fabrication of P-N junctions; forward and reverse biased junctions	2	S

CO2	Students will learn and understand the application of PN junction for different type of rectifiers and voltage regulators.	3	S
CO3	Students will be able to understand the basic concept of NPN and PNP transistors and basic configurations namely common base, common emitter and common collector, and also about current and voltage gain.	2	S
CO4	Students will be able to understand various biasing and equivalent circuits, coupled amplifiers, feedback in amplifiers and oscillators.	2	S
CO5	Students will learn about operational amplifiers and gain knowledge on different configurations namely inverting and non-inverting and applications of operational amplifiers in D to A and A to D conversions.	3	S

Course Name **Medical Physics**
Course Code **PH3616**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than
CO1	Students will be able to explain Loco-motors Systems: joints and movements, Stability and Equilibrium, Physics of cardiovascular system	2	S
CO2	Students will learn and understand the characteristics of sound, Production of speech, Rotating anode x-ray tube and of X-Ray Generator	3	S
CO3	Students will be able to understand about production of x-rays, x-ray spectra, Bremsstrahlung, Characteristic x-ray.	2	S
CO4	Students will be able to explained Interaction of radiation with matter Compton & photoelectric effect, TLD, Semiconductor detectors.	2	S
CO5	Students will learn about radiation protection, protective materials-radiation effects, somatic, genetic stochastic and deterministic effect, Radiation monitors	3	S

Course Name **Space Physics**
Course Code **PH3617**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than
CO1	Student will be able to brief about the history of solar-terrestrial physics.	2	S

CO2	Students will be able to explain about space plasma physics.	2	S
CO3	Students will be understand about solar winds and Interplanetary Magnetic Field.	3	S
CO4	Students are able to explain the interaction of solar winds with magnetized planets.	2	S
CO5	Students will be able to brief about magnetosphere.	3	S

Course Name **Biological Physics**

Course Code **PH3618**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than
CO1	Be able to brief about the distinct property of biological systems	2	S
CO2	Be able to explain about the life at molecular level.	2	S
CO3	Be able to explain the complexity of life at the level of a cell.	3	S
CO4	Be able to explain the complexity of life at the level of a multicellular organism.	2	S
CO5	Be able to brief about The mechanism of evolution.	3	S

Course Name **Instrumental Methods of Chemical Analysis**

Course Code **CY3602**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than
CO1	Students will be able to know the working of various instruments.	1	S
CO2	Students will be able to describe the various techniques of separations	1	S
CO3	Students will be gaining knowledge on spectra and quantify information about the atoms and molecules.	1	S
CO4	Students able to know the principle of various instruments.	1	S
CO5	Students able to know the electro analytical methods.	2	S

Course Name **Thermo Chemistry And Chemical Equilibrium**

Course Code **CY3603**



Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than
CO1	Students will be learning about basics of thermodynamics.	2	S
CO2	Students will be gaining knowledge on Chemical equilibrium.	2	S
CO3	Students will be gaining knowledge on Solution.	2	S
CO4	Students will be gaining knowledge on electrochemistry.	2	S
CO5	Students will be gaining knowledge on electrochemical reactions.	3	S

Course Name **Molecules of Life**
Course Code **CY3611**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than
CO1	Students will be gaining knowledge on classification and properties of Carbohydrates.	1	S
CO2	Students will be gaining knowledge on Lipids and its importance.	1	S
CO3	Students will be gaining knowledge on enzymes and its correlation with drugs.	2	S
CO4	Students will be gaining knowledge on structure and function of nucleic acids.	1	S
CO5	Students will be gaining knowledge on vitamins and food additives.	2	S

Course Name **Biochemistry**
Course Code **CY3612**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than
CO1	Students will be able to gain knowledge on basics of Biochemistry.	1	S
CO2	Students will be gaining knowledge of water.	2	S
CO3	Students will be gaining knowledge of carbohydrates and structure	2	S

CO4	Students will be gaining knowledge of Lipid and amino acids	1	S
CO5	Students will be gaining knowledge of vitamins and nucleic acids	1	S

Course Name **Research Methodology for Chemistry**
Course Code **CY3613**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than
CO1	Students will be able to gain knowledge on Literary survey and their sources.	1	S
CO2	Students will be gaining knowledge on methods of scientific research.	2	S
CO3	Students will be gaining knowledge on chemical safety and ethical handling of chemicals.	2	S
CO4	Students will be gaining knowledge on Data Analysis.	1	S
CO5	Students will be gaining knowledge on electronic circuits.	1	S

Course Name **Partial Differential Equations**
Course Code **MA3601**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than
CO1	Students will learn to solve the linear partial Differential equation of first order and also learn the solution by specific method (Charpit's method ,Lagrange's methods.	3	Emp
CO2	Students will be able to work with partial differential equation and students learns the classifications of partial differential equation of second order and canonical form .	2	S
CO3	Students will learn to solve linear homogeneous partial differential equation of nth order with constant coefficients .learn methods of finding CF and find PI by short method .	2	S
CO4	Students will learn separation of variable method and will be able to apply it for finding the solution of heat equation in one and two dimensions.	3	Emp
CO5	Students will learn to solve the wave equations and equation of vibrating string.	2	S

Course Name **Theory of Complex Analysis**
Course Code **MA3604**



Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than
CO1	Students will be able to understand the significance of differentiability for complex functions and be familiar with the Cauchy-Riemann equations.	2	S
CO2	Students will be able to apply the concept and consequences of analyticity and the Cauchy-Riemann equations and of results on harmonic and entire functions including the fundamental theorem of algebra and use antiderivatives to compute line integrals. Students will be also able to understand the theory and techniques of complex integration.	1	S
CO3	Express complex-differentiable functions as power series. Analyze sequences and series of analytic functions and types of convergence. Apply the theory into application of the power series expansion of analytic functions	2	S
CO4	Students will gain knowledge on functions as Taylor, power and Laurent series, classify singularities and poles, find residues and evaluate complex integrals using the residue theorem.	2	S
CO5	Students will be able to understand the uses of improper integrals in various situations. Understand the basic methods of complex integration and its application in contour integration	2	S

Course Name **Rigid Dynamics**
Course Code **MA3615**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than
CO1	Students will learn about the force in three dimension and also learn the equilibrium of system of particle and central axes	3	S
CO2	Students will learn moments of inertia with different bodies and the classifications momentalellipsoid.	2	S
CO3	Students will learn velocity of the fluid at a points and learn equation of continuity in Cartesian and boundary surface.	3	S
CO4	Students will learn about the motion of fluid in any body , equation of motion like Bernoulli's equation, Emulsion equation.	2	S
CO5	Students will learn to solve two dimension flow also learn about sinks, image system of simple source	3	S

Course Name **Vedic Mathematics**
Course Code **MA3616**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than
CO1	The students will learn the concept of addition and subtraction using completing the whole and from left to right.	2	S
CO2	The students will learn solve the multiplication using vertically and crosswise and one more than the previous one method and demonstrate multiplication by 11, 12 and 13 by using Vedic sutras of multiplication.	3	S
CO3	Distinguish between squaring numbers ending in 5 and squaring numbers near number 50 and manage to simplify algebraic squaring.	3	S
CO4	The students will learn to apply reverse squaring to find square root of number ending in 5 and manage to solve the square root of perfect square.	2	S
CO5	students will learn to identify cube and cube roots, understand and apply division by 9 and understand the concept of division by using straight division.	3	S

Course Name **Number Theory**
Course Code **MA3617**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than
CO1	Students will learn about the Euclidean algorithm ,Diophantine equations.	2	S
CO2	Students will be able to understand the theory of congruencies, binary and decimal representations of integers , linear congruence and Chinese remainder theorem , Fermat's theorem ,Wilson's theorem.	3	S
CO3	Students Will learn about Tau and sigma function , the Mobius inversion formula.	3	S
CO4	Students will be able to know the concept of order of an integer molulon , primitive roots for primes , composite numbers.	2	S
CO5	Students learn concept of the Dirichlet product.	3	S