

School of Basic and Applied **Sciences**

Programme Outcomes (POs), Programme Specific
Outcomes (PSOs) & Course Outcomes (POs)

Physics (B. Sc.)

Course Outcomes (Cos):

Mechanics

- CO1:** Students will be able to articulate and describe relative motion. Inertial and non inertial reference frames.
- CO2:** Students will be able to define the motion of mechanical systems and their degrees of freedom.
- CO3:** Students will be able to understand the interaction of forces between solids in mechanical systems, centre of mass and inertia tensor of mechanical systems.
- CO4:** Students will be able to develop analytical approach as tool for problem solving in mechanics

Optics & Vibrations

- CO1:** Apply knowledge of thermodynamics, sound waves, and light waves to explain natural physical processes and related technological advances.
- CO2:** Use an understanding of algebraic mathematics along with physical principles to effectively solve problems encountered in everyday life, further study in science, and in the professional world.
- CO3:** Design experiments and acquire data in order to explore physical principles, effectively communicate results, and critically evaluate related scientific studies.
- CO4:** Assess the contributions of physics to our evolving understanding of global change and sustainability while placing the development of physics in its historical and cultural context.

Mathematical Physics

- CO1:** The objective of the course is to equip the B.Sc. students with the mathematical techniques that he/she needs for understanding theoretical treatment in different courses taught in this class.
- CO2:** The students will learn important mathematical analysis complex analysis, tensor analysis, group theory etc. needed for understanding theoretical treatment in different courses

Electricity & Magnetism

- CO1: Apply knowledge of electricity and magnetism to explain natural physical processes and related technological advances.
- CO2: Use an understanding of calculus along with physical principles to effectively solve problems encountered in everyday life, further study in science, and in the professional world.

Thermal Physics

- CO1: Provide students with a broad understanding and appreciation of the physical principles and laws governing the universe.
- CO2: Prepare students for success in their chosen careers by emphasizing critical thinking and scientific reasoning through an inquiry-based curriculum.
- CO3: Develop quantitative, analytical and problem-solving skills in majors and non-majors to ensure that students emerging from the coursework/program are equipped with the set of competencies required in Science, Technology, Engineering and Mathematics workplace.

Solid State Physics

- CO1: Students should gain basic knowledge of solid state physics.
- CO2: The student will:
- be able to account for interatomic forces and bonds
 - have a basic knowledge of crystal systems and spatial symmetries
 - be able to account for how crystalline materials are studied using diffraction, including concepts like form factor, structure factor, and scattering amplitude.
 - know the principles of structure determination by diffraction.
 - understand the concept of reciprocal space and be able to use it as a tool
 - know the significance of Brillouin zones

Laser Physics

- CO1: predict fundamental (and ultimate) characteristics of laser systems based on specific laser materials, such as output power and lasing threshold
- CO2: determine the laser behaviour depending on the line broadening mechanism
- CO3: Students will gain a significantly enhanced understanding of how lasers work and which types of lasers are most relevant for specific performance specifications and subsequent applications.

Nuclear Physics

CO1: to understand the basic concepts of nuclear physics and express the radioactive decay such as alpha decay, beta decay etc..

CO2: Can explain nuclear reactions, nuclear fusion, nuclear fission.

Atomic & Molecular Physics

CO1: describe the atomic spectra of one and two valance electron atoms.

CO2: explain the change in behavior of atoms in external applied electric and magnetic field.

CO3: explain rotational, vibrational, electronic and Raman spectra of molecules.

CO4 Describe electron spin and nuclear magnetic resonance spectroscopy and their applications..

Particle Physics

CO1: Acquire knowledge in the content areas of particle physics

CO2: Develop and communicate analytical skills in subatomic physics.

CO3: Develop familiarity with particle physics, facilitating informed decisions as students pursue research projects, internships, careers, and graduate study.

CO4: Learn about topics of interest independently, and subsequently organize and present information to each other and to a group, at an appropriate level for their target audience.

Fundamentals of Quantum Mechanics

CO1: Learn the mathematical tools needed to solve quantum mechanics problems.

CO2: Solutions of ordinary and partial differential equations that arise in quantum mechanics will also be studied.

CO3: Build connections between mathematical development and conceptual understanding.

Electronics

CO1: Identify the unique vocabulary associated with electronics and explain the basic concepts of Semiconductor diodes such as pn junction diode, characteristics and ammeters, DC loadline, Zener diode.

- CO2:** To apply the basics of diode to describe the working of rectifier circuits such as Full and half wave rectifiers. To solve examples on rectifiers for parameters such as Capacitance, load and source effect, line and load regulations, and circuit current.
- CO3:** Draw and explain the structure of bipolar junction transistor. Explain the operation of each device in terms of junction bias voltage and charge carrier movement. Identify and explain the various current components in a transistor.
- CO4:** Describe the application of transistors for Current and voltage amplification. Also to describe the characteristics of different configurations of the transistor. Describe DC load line and bias point. List, explain, and design and analyze the different biasing circuits.
- CO5:** List and explain the different number system. Solve examples on converting one form of number system to another form. State Boolean laws and theorems. State and explain the different logic gates using truth table. Analyze and design different adder circuits.

Digital Electronics

- CO1:** Convert different type of codes and number systems which are used in digital communication and computer systems.
- CO2:** Employ the codes and number systems converting circuits and Compare different types of logic families which are the basic unit of different types of logic gates in the domain of economy, performance and efficiency.
- CO3:** Analyze different types of digital electronic circuit using various mapping and logical tools and know the techniques to prepare the most simplified circuit using various mapping and mathematical methods.
- CO4:** Acquire the fundamental knowledge of analog and digital electronics to get different types analog to digitalized signal and vice-versa converters in real world with different changing circumstances.

Statistical Mechanics & Thermodynamics

- CO1:** To acquire working knowledge of the zero-th and first law of thermodynamic
- CO2:** To acquire working knowledge of the second law of thermodynamics.
- CO2:** To apply the laws of thermodynamics.
- CO4:** To link thermodynamics to the micro description used in classical Statistical Mechanics.
- CO5:** To introduce advanced topics related to Quantum Statistical Mechanics

Computer Simulations in Physics

CO1: Break apart a problem into its component parts.

CO2: Debug computer code that they write.

CO3: Make comparisons between the computer model and the actual physical system.

Astronomy & Astrophysics

CO1: Understand the relation between astronomy and astrophysics.

CO2: Apply principles of physics to astronomical objects.

CO3: Introduce students to the field of astrophysics with mathematically based principles.

Nanotechnology

CO1: Discuss and evaluate state-of-the-art characterization methods for nanomaterials, and determine nanomaterial safety and handling methods required during characterization.

CO2: Explain the fundamental principles of nanotechnology and their application

CO3: Acquire knowledge to identify and compare state-of-the-art nanofabrication methods

Introduction to Microprocessor

CO1: To understand basic architecture of 16 bit and 32 bit microprocessors.

CO2: To understand interfacing of 16 bit microprocessor with memory and peripheral chips involving system design.

CO3: To understand techniques for faster execution of instructions and improve speed of operation and performance of microprocessors.

CO4: 4. To understand RISC and CISC based microprocessors. 5. To understand concept of multi core processors.

Renewable Sources of Energy

CO1: define basic properties of different renewable sources of energy and technologies for their utilisation,

CO2: describe main elements of technical systems designed for utilisation of renewable sources of energy,

CO3: interpret advantages and disadvantages of different renewable sources of energy

- CO4:** undertake simple analysis of energy potential of renewable sources of energy,
- CO5:** explain the correlation between different operational parameters,
- CO6:** select engineering approach to problem solving when implementing the projects on renewable sources of energy

Higher Mathematical Physics

- CO1:** The objective of the course is to equip the B.Sc. students with the mathematical techniques that he/she needs for understanding theoretical treatment in different courses taught in this class and for developing a strong background if he/she chooses to pursue research in physics as a career.
- CO2:** The students will learn important mathematical functions beta, gamma, delta function, complex analysis, tensor analysis and their applications in physics so that he/she needs for understanding theoretical treatment in different courses

Physics (M.Sc.)

Programme Outcomes (Pos):

- PO1: This program is designed to enhance the competencies of the students in demanding fields such as Electronics, Manufacturing and Teaching.
- PO2: The program will develop student skills in analysis, interpretation of complex information of Physics and its applications in a technology-rich, interactive environment to meet the industrial needs.

Programme Specific Outcomes (PSOs):

On completion of program, the students will be able to think creatively (divergently and convergent) to propose novel ideas in explaining facts and figures or providing new solution to the problems. The students will become professionally trained in the area of electronics, optical communication, nonlinear circuits, materials characterization and lasers. The students will get trained to apply their knowledge and skill in the design and development of Electronics circuits to cater to the needs of Electronic Industry They will excel in the research related to Physics and Materials characterization.

Course Outcomes (Cos):

Mathematical Physics I & II:

- CO1: The objective of the course is to equip the M.Sc. students with the mathematical techniques that he/she needs for understanding theoretical treatment in different courses taught in this class and for developing a strong background if he/she chooses to pursue research in physics as a career.
- CO2: The students will learn important mathematical functions such as Bessel function, Legendre polynomial, Green's function etc. their basic properties and applications in physics so that he/she needs for understanding theoretical treatment in different courses

Classical Mechanics:

- CO1: The course will train the students of in the Lagrangian and Hamiltonian formalisms to an extent that they can use these in the modern branches like Quantum Mechanics, quantum Field Theory, Condensed Matter Physics, Astrophysics etc.

Electrodynamics:

- CO1: On completion the students will gain knowledge in Electrostatics and Magnetostatics fields including Boundary value problems, Maxwell equations in metals and plasma media, Poynting theorem for a complex vector field, Thomson and Compton scattering.

CO2: It also covers motions of relativistic and non- relativistic charged particles in electrostatic and magnetic fields.

Computational Physics:

CO1: The M.Sc. students will be familiarized with the numerical methods used in computation and programming using C language so that they can use these in solving simple problems pertaining to Physics.

Nuclear & Particle Physics:

CO1: The students will be taught the basic aspects of nuclear physics like static properties of nuclei, radioactive decays, nuclear forces and relatively advanced topics in nuclear models and nuclear reactions so that they understand the details of the underlying aspects so that they are equipped with the techniques used in studying these things.

Electronics-I & II :

CO1: This course covers semiconductor physics, physical principles of devices and their basic applications, Analysis of Passive and Active filters, OPAMP based analog circuits and introduction to various communication techniques.

CO2: The students will be introduced basics of integrated circuit technology, Microprocessor 8085 Architecture, instruction set, interfacing with memory and I/O devices.

Solid State Physics I & II:

CO1: This course will expose the students to the basic properties of solids, lattice vibrations, dielectric properties, energy band theory and transport theory so that they are equipped with the techniques used in investigating these aspects of the matter in condensed phase.

Quantum Mechanics I & II:

CO1: The aim of the course is to equip the students with the techniques of angular momentum, perturbation theory, scattering theory and techniques of quantum field theory so that they can use these in various branches of physics as per their requirement.

Statistical Mechanics:

CO1: This course will equip the students with the techniques of Ensemble theory so that he/she can use these to understand the macroscopic properties of the matter in bulk in terms of its microscopic constituents.

Optoelectronics:

CO1: This course will introduce the students to the basics of the challenging research field of optical fibers.

Material Science & Nanotechnology:

CO1: This course will familiarize the students. to the various aspects related to preparation, characterization and study of different properties of different kinds of materials so that they can pursue this emerging research field as career.

High Energy Physics:

CO1: This course will introduce the students to the various weak interactions, symmetries and conservation laws in high energy physics, unitary groups, Quark model and Quantum-chromodynamics so that they grasp the basics of high energy physics.

Astrophysics:

CO1: This course gives the basic understanding of the astronomical techniques, to understand the nature and structure of the universe from terrestrial planets to galaxies.

CO2: To understand the celestial phenomena related with the origin of the universe, galaxies, stars and planetary systems along with the synthesis of elements by stellar and primordial nucleosynthesis.

CO3: To explore the future evolution of the universe.

Experimental Techniques in Nuclear Physics:

CO1: The course will expose the students to theoretical aspects of different equipment and methods used in the fields of nuclear physics and particle physics.

Atomic and Molecular Spectroscopy:

CO1: This course will provide platform to the students to the various aspects of spectroscopy and their basic theory so that they can benefit this course in competitive examination and pursue this emerging research field as career.

Project Work

CO1: This course is in M.Sc. 4th semester. This course will expose the students to preliminaries and methodology of research. It may consist of review of some research papers, development of a laboratory experiment, fabrication of a device, working out some problem, participation in some ongoing research activity, analysis of data, etc. Project work can be in Experimental Physics or Theoretical Physics in the thrust as well as non-thrust research areas of the department.

Chemistry (B.Sc.)

Programme Outcomes (Pos):

PO1: To demonstrate broad knowledge of descriptive Chemistry.

PO2: To impart the basic analytical and technical skills to work effectively in the various fields of chemistry.

PO3: To motivate critical thinking and analysis skills to solve complex chemical problems, e.g., analysis of data, synthetic logic, spectroscopy, structure and modeling, team-based problem solving, etc.

PO4: To demonstrate an ability to conduct experiments in the above sub-disciplines with mastery of appropriate techniques and proficiency using core chemical instrumentation and modeling methods.

PO5: To demonstrate the ability to perform accurate quantitative measurements with an understanding of the theory and use of contemporary chemical instrumentation, interpret experimental results, perform calculations on these results and draw reasonable, accurate conclusions.

PO6: To develop skills in quantitative modeling of static and dynamic chemical systems.

PO7: To develop laboratory competence in relating chemical structure to spectroscopic phenomena.

PO8: To demonstrate the ability to synthesize, separate and characterize compounds using published reactions, protocols, standard laboratory equipment, and modern instrumentation.

PO9: To provide knowledge and skill in Chemical Sciences.

PO10: To undertake research in emerging areas of Chemical Sciences and transform the findings for the benefit of the society.

PO11: To establish collaboration with industries and research Institutes to promote joint research projects.

PO12: To provide required knowledge in Chemical Sciences for all programs in science.

Programme Specific Outcomes (PSOs):

On successful completion of this Programme, students will have the ability to: • think critically and analyze chemical problems. • present scientific and technical information resulting from laboratory experimentation in both written and oral formats. • work effectively and safely in a laboratory environment use technologies/instrumentation to gather and analyze data. • work in

teams as well as independently. • apply modern methods of analysis to chemical systems in a laboratory setting. Students will have a firm foundation in the fundamentals and application of current chemical and scientific theories including those in Analytical, Inorganic, Organic and Physical Chemistries. Students will be able to design and carry out scientific experiments as well as accurately record and analyze the results of such experiments. Students will be skilled in problem solving, critical thinking and analytical reasoning as applied to scientific problems. Students will be able to clearly communicate the results of scientific work in oral, written and electronic formats to both scientists and the public at large. Students will be able to explore new areas of research in both chemistry and allied fields of science and technology. Students will appreciate the central role of chemistry in our society and use this as a basis for ethical behavior in issues facing chemists including an understanding of safe handling of chemicals, environmental issues and key issues facing our society in energy, health and medicine. Students will be able to explain why chemistry is an integral activity for addressing social, economic, and environmental problems. Students will be able to function as a member of an interdisciplinary problem solving team. Students will have a firm foundation in the fundamentals and application of current chemical and scientific theories including those in Analytical, Inorganic, Organic and Physical Chemistries. Majors to be certified by the American Chemical Society will have extensive laboratory work and knowledge of Biological Chemistry.

Course Outcomes (Cos):

Inorganic Chemistry:

CO1: Students will be able to design and carry out scientific experiments as well as accurately record and analyze the results of such experiments.

CO2: Students will be skilled in problem solving, critical thinking and analytical reasoning as applied to scientific problems.

CO3: Students will be able to clearly communicate the results of scientific work in oral, written and electronic formats to both scientists and the public at large.

CO4: Students will be able to explore new areas of research in both chemistry and allied fields of science and technology.

CO5: Students will appreciate the central role of chemistry in our society and use this as a basis for ethical behavior in issues facing chemists including an understanding of safe handling of chemicals, environmental issues and key issues facing our society in energy, health and medicine.

CO6: Students will be able to explain why chemistry is an integral activity for addressing social, economic, and environmental problems.

CO7: Students will be able to function as a member of an interdisciplinary problem solving team.

Organic Chemistry:

CO1: Know and recall the fundamental principles of organic chemistry that include chemical bonding, nomenclature, structural isomerism, stereochemistry, chemical reactions and mechanism.

CO2: Name the functional groups and different class of organic compounds.

CO3: Recognize the basic practical skills for the synthesis and analysis of organic compounds.

CO4: Synthesis, classification and isolation of different natural products

CO5: Design, synthesize and characterize drug molecules and polymers

CO6: Predict the reactivity of an organic compound from its structure.

CO7: Develop basic skills for the multi-step synthesis of organic compounds.

CO8: Justify a reasonable mechanism for a chemical reaction.

CO9: Write comprehensive reports on experiments such crystallization, distillation, synthesis, hydrogenation, isolation and filtration processes.

Physical Chemistry:

CO1: Chemical reactions and strategies to balance them.

CO2: The relative quantities of reactants and products.

CO3: The fundamental properties of atoms, molecules, and the various states of matter.

CO4: The electronic structure of atoms and its influence on chemical properties.

CO5: Molecular geometries of selected molecular species.

CO6: The fundamentals of acid/base chemistry, including pH calculations, buffer behavior, and acid/base titrations.

CO7: The energy and speed of chemical reactions.

CO8: Unit conversions and their importance in clinical medicine.

CO9: Molecular interactions and chemical reactions in the body.

CO10: The scientific method of collecting and analyzing information.

CO11: The basic (colligative) properties of solutions.

CO12: The fundamentals of acid/base equilibria, including pH calculations, buffer behavior, acid/base titrations, and their relationship to electrophiles and nucleophiles.

CO13: The thermodynamic and kinetic forces involved in chemical reactions which determine how much and how soon products are formed.

CO14: The basics of electrochemistry, and the relationship of electrical parameters to thermodynamic and stoichiometric parameters.

CO15: Current bonding models for simple inorganic and organic molecules in order to predict structures and important bonding parameters.

CO16: General periodicity patterns of (organic/inorganic) molecules, and the ability to design synthetic approaches to such species.

CO17: General chemical equilibria.

CO18: Solubility and complex ion equilibria.

CO19: Basic aspects of nuclear chemistry.

Chemistry (M.Sc.)

Programme Outcomes (Pos):

PO1: To demonstrate broad knowledge of descriptive Chemistry.

PO2: To impart the basic analytical and technical skills to work effectively in the various fields of chemistry.

PO3: To motivate critical thinking and analysis skills to solve complex chemical problems, e.g., analysis of data, synthetic logic, spectroscopy, structure and modeling, team-based problem solving, etc.

PO4: To demonstrate an ability to conduct experiments in the above sub-disciplines with mastery of appropriate techniques and proficiency using core chemical instrumentation and modeling methods.

PO5: To demonstrate the ability to perform accurate quantitative measurements with an understanding of the theory and use of contemporary chemical instrumentation, interpret experimental results, perform calculations on these results and draw reasonable, accurate conclusions.

PO6: To develop skills in quantitative modeling of static and dynamic chemical systems.

PO7: To demonstrate the ability to synthesize, separate and characterize compounds using published reactions, protocols, standard laboratory equipment, and modern instrumentation.

PO8: To provide knowledge and skill in Chemical Sciences.

PO9. To undertake research in emerging areas of Chemical Sciences and Transform the findings for the benefit of the society.

PO10. To establish collaboration with industries and research Institutes to promote joint research projects.

PO11. To provide required knowledge in Chemical Sciences for all programs in science.

PO12. To develop laboratory competence in relating chemical structure to spectroscopic phenomena.

Programme Specific Outcomes (PSOs):

On successful completion of this Programme, students will have the ability to: think critically and analyze chemical problems. present scientific and technical information resulting from laboratory experimentation in both written and oral formats. work effectively and safely in a laboratory environment use technologies/instrumentation to gather and analyze data. work in

teams as well as independently. apply modern methods of analysis to chemical systems in a laboratory setting. Students will have a firm foundation in the fundamentals and application of current chemical and scientific theories including those in Analytical, Inorganic, Organic and Physical Chemistries. Students will be able to design and carry out scientific experiments as well as accurately record and analyze the results of such experiments. Students will be skilled in problem solving, critical thinking and analytical reasoning as applied to scientific problems. Students will be able to clearly communicate the results of scientific work in oral, written and electronic formats to both scientists and the public at large. Students will be able to explore new areas of research in both chemistry and allied fields of science and technology. Students will appreciate the central role of chemistry in our society and use this as a basis for ethical behavior in issues facing chemists including an understanding of safe handling of chemicals, environmental issues and key issues facing our society in energy, health and medicine. Students will be able to explain why chemistry is an integral activity for addressing social, economic, and environmental problems. Students will be able to function as a member of an interdisciplinary problem solving team. Students will have a firm foundation in the fundamentals and application of current chemical and scientific theories including those in Analytical, Inorganic, Organic and Physical Chemistries. Majors to be certified by the American Chemical Society will have extensive laboratory work.

Course Outcomes (Cos):

Inorganic Chemistry:

CO1: Students will be able to design and carry out scientific experiments as well as accurately record and analyze the results of such experiments.

CO2: Students will be skilled in problem solving, critical thinking and analytical reasoning as applied to scientific problems.

CO3: Students will be able to clearly communicate the results of scientific work in oral, written and electronic formats to both scientists and the public at large.

CO4: Students will be able to explore new areas of research in both chemistry and allied fields of science and technology.

CO5: Students will appreciate the central role of chemistry in our society and use this as a basis for ethical behavior in issues facing chemists including an understanding of safe handling of chemicals, environmental issues and key issues facing our society in energy, health and medicine.

CO6: Students will be able to explain why chemistry is an integral activity for addressing social, economic, and environmental problems.

CO7: Students will be able to function as a member of an interdisciplinary problem solving team.

Organic Chemistry:

CO1: Know and recall the fundamental principles of organic chemistry that include chemical bonding, nomenclature, structural isomerism, stereochemistry, chemical reactions and mechanism.

CO2: Name the functional groups and different class of organic compounds.

CO3: Recognize the basic practical skills for the synthesis and analysis of organic compounds.

CO4: Synthesis, classification and isolation of different natural products

CO5: Design, synthesize and characterize drug molecules and polymers

CO6: Predict the reactivity of an organic compound from its structure.

CO7: Develop basic skills for the multi-step synthesis of organic compounds.

CO8: Justify a reasonable mechanism for a chemical reaction.

CO9: Write comprehensive reports on experiments such crystallization, distillation, synthesis, hydrogenation, isolation and filtration processes.

Physical Chemistry:

CO1: The relationship between microscopic properties of molecules with macroscopic thermodynamic observables

CO2: The derivation of rate equations from mechanistic data

CO3: The use of simple models for predictive understanding of physical phenomena associated to chemical thermodynamics and kinetics

CO4: The limitations and uses of models for the solution of applied problems involving chemical thermodynamic and kinetics

CO5: Concepts in thermodynamics, different thermodynamic quantities such as heat and work and how they are measured, related or transformed from one to the other

CO6: States of matter and how they depend on temperature and pressure as well as how they co-exist in phase equilibria

CO7: Chemical equilibrium and its relationship with thermodynamic quantities.

CO8: The preparation for each experiment by studying lab handouts and links therein

CO9: Safety requirements and lab skills to perform physico-chemical experiments

CO10: How to keep records of instruments, parameters, and experimental observations

CO11: Reporting of experimental results (including error analysis) in a publication-style (journal paper)

CO12: An appreciation for modern problems and scientific controversies in physical chemistry

CO13: Key spectroscopic techniques including FTIR, UV-vis absorption, luminescence, laser methods.

CO14: The use of chemistry software programs to model energy potentials and vibrational levels of molecules.

CO15: The use of standard vacuum and cryogenic techniques used in physic-chemical experiments.

Analytical chemistry

CO1: The course gives an introduction to inorganic and organic analytical chemistry, including basic analytical methods. The laboratory course gives the students experience with quantitative methods of working.

CO2: Explain the theoretical principles and important applications of classical analytical methods within titration (acid/base titration, complexometric titration, redox titration), and various techniques within gravimetric and coulometric methods.

CO3: Explain the theoretical principles of selected instrumental methods within electroanalytical and spectrometric/spectrophotometric methods, and main components in such analytical instruments.

CO4: Explain the theoretical principles of various separation techniques in chromatography, and typical applications of chromatographic techniques.

CO5: Assess and suggest a suitable analytical method for a specific purpose, and evaluate sensitivity, important sources of interferences and errors, and also suggest alternative analytical methods for quality assurance.

CO6: Performing risk assessment of chemical experiments and chemical analytical activity

CO7: Performing classical analytical experiments, and make observations and assessments of important factors that could affect the analytical result.

CO8: Be familiar with calculations in analytical chemistry, be able to calculate titration errors for method evaluation, and perform statistical evaluation of results from classical and instrumental chemical experiments and analyses.

CO9: Make scientific reports from chemical experiments and present the results in a transparent manner.

CO10: Understand how different sampling techniques and instrumental methods can be used in speciation studies.

Chemistry of Life Science:

CO1: Recall the structure and properties of the major types of biological organic molecules, and be able to describe the relationships between structure, properties and functions;

CO2: Describe organic reaction mechanisms that impact on biochemical processes.

CO3: Discuss the fundamental chemistry of elements of biological importance, their significance to biological processes, and understand the biological transport and partitioning of solutes, hydrogen ions and water.

CO4: Describe the kinetics of reactions and diffusion processes;

CO5: Extend the appreciation of fundamental principles of chemistry into areas of major importance for the life sciences.

CO6: Safely and efficiently perform simple chemical laboratory processes;

CO7: Conduct, record, analyse and interpret chemical observations and measurements;

CO8: Effectively communicate the results, at a consolidating level;

CO9: Develop your scientific problem-solving skills.

Zoology (B.Sc.)

Programme Outcomes (Pos):

PO1: Technical Knowledge of Biological Science (core subjects) and Practice (applications of the subjects in profession).

PO2: Animal diversity and their conservation with sustainable development.

PO3: To impart knowledge about the Code of Conduct and Professional Integrity to practice the profession of Biology.

PO4: Providing floral and faunal importance to the society.

PO5: Development of environmental awareness and leadership qualities.

PO6: Brainstorming of the potential problems pertaining to technical, cognitive and communicative skills and their solutions by mentors.

PO8: Placement of Students/ Self-employment.

Programme Specific Outcomes (PSOs):

Bachelor of medical is a three year degree programme divided in six semesters. The students are introduced to the basics of zoology, botany, chemistry and english. Students are taught biodiversity, anatomy, physiology, evolutionary biology, development biology, comparative biology, ecology and biochemistry to understand the structure, functions and composition of the animal and plant body. The knowledge of biology is useful to identify the plants and animals taxonomically, along with the methods of conservation and utilization of flora and fauna.

The students after graduating have a wide array of options as below:

Trained youths will be beneficial to the society by rendering their services in Indian forest services/Provincial Forest Officers, Field Officer in banks, Biology laboratory technician.

Can grow as future microbiologist, biophysicist, zoologist, botanist and biochemist.

Higher Education:

Students after B. Sc., can pursue masters in Zoology, botany, microbiology, biophysics, biotechnology. Can find job opportunities in research, managerial and advisory options in wildlife & biodiversity boards or academic institutions.

Course Outcomes (Cos):

CO1: On successful completion of this subject the student will have knowledge about invertebrates, vertebrates and faunal diversity.

CO2: Can serve as IFS and PFS. As well as Lab assistants in laboratories, university and colleges.

Zoology (M.Sc.)

Programme Outcomes (PO):

- PO1: Programme could provide well trained professionals of faunal diversity, Physiologist, Taxonomist, Herpetologist, Veterinary Technologists,
- PO2: Development of educators at different levels of educational institutions (Teachers & Professors).
- PO3: Development of research oriented minds and researchers, project Fellows and Scientists (ICR, CSIR, ICMR, DBT, CST, CBB, SBB). Wild life advisor and Conservationist in deferent organization (WWF, IUCN, Traffic India, BNHS) and Forest Department of deferent Stats, state Biodiversity Boards,
- PO4: To impart knowledge about the animal handling and animal ethical issues.
- PO5: Rendering services as Administrative officer (PFS & IFS), Wild life Conservators and Zoo-keepers.
- PO6: Able to maintain aquarium, animal house, pisciculture, sericulture and lac culture.
- PO7: Brainstorming of the potential problems pertaining to technical, cognitive and communicative skills and their solutions by mentors.
- PO8: Placement of Students/ Self-Employment.

Programme Specific Outcomes (PSOs):

Masters in zoology is a Two-year programme divided in four semesters. The students are introduced to the basics of Animal diversity, Physiology, endocrinology, parasitology, embryology, ethology, immunology, ethiology, entomology, herpetology and biochemistry to understand the concepts and applications of these subjects in zoology and applied animal science. The students are taught with the basics of animal handling, molecular techniques, histo-pathological analysis and hematology. The knowledge of zoology is useful to gain understanding of animal health, culture, capture and economic importance with their ecological role in environment. The students after passing out M.Sc. programme, have the following placement options as below:

As Employee:

- a) **Zoologist:** In NGO, private and Government institution.
- b) **Technician:** In colleges, schools, university, institutional laboratory.

As Entrepreneur:

- c) As educators as awareness programme for the biodiversity and wildlife conservation.

Course Outcomes (Cos):

Animal Physiology:

CO1: Knowledge will develop Animal physiologist, Zoologist and Toxicologist.

Animal Behavior:

CO1: Migration Investigator,

Fisheries:

CO1: Fisheries Inspector, ADF, Aqua-culturist, Pearl Fisheries, Chunk fisheries and Shell fisheries.

Entomology:

CO1: Apiculturist, Seri-culturist, Lac culture, Prawn fisheries, Shrimp culture,

Toxicology:

CO1: Toxicologist, Environmentalist, Scientist in CPCB, SPCB,

Wildlife Conservation :

CO1: Wild life advisor and Conservationist in deferent organization (WWF, IUCN, Traffic India, BNHS) and Forest Department of deferent Stats, state Biodiversity Boards,

M.Sc. (Biotechnology)

Programme Outcomes (Pos):

- PO1: Biotechnology as a subject has grown rapidly and as far as employment is concerned, it has become one of the fast growing sectors. Employment record shows that biotechnology has a great scope in future. Biotechnologists can find careers with pharmaceutical companies, chemical, agricultural and allied companies.
- PO2: They can be employed in the areas of planning, production and management of bioprocessing industries. There is a large scale employment in research laboratories run by the government as well as the corporate sectors.

Programme Specific Outcomes (PSOs):

Biotechnology post-graduate students may find work in government based entity such as universities, research institutes or at private centres as research scientists/assistants. Alternatively, they may find employment in specialized biotechnology companies or biotech-related companies such as pharmaceutical firms, food manufacturers, aquaculture and agricultural companies that are engaged in business related to life sciences ranging from equipment to chemicals to pharmaceuticals and diagnostics. Different job profiles for biotechnologists include research scientists, academicians, lab technicians, research associates, engineers, sales representatives, marketing executives and business development managers. The scope of work can range from research, sales, marketing, administration, quality control, breeding, technical support etc

Course Outcomes (Cos):

Biomolecules:

- CO1: The course explores the chemistry of living organisms and that of their biological processes.
- CO2: It deals with the chemical combinations and reactions that takes place because of the biological processes such as growth, reproduction, metabolism, heredity

Microbiology:

- CO1: This course enables students with detailed understanding of micro-organisms, their role in biotechnology and other relevant industries.

Molecular Cell Biology

- CO1: It deals with the study of the structure and function of living systems at the molecular level. It focuses mainly on DNA, RNA, Protein Synthesis and their regulatory

mechanism. A molecular biologist aims to understand the functions of cells at molecular level.

Biotechniques:

CO1: The M.Sc. students will be familiarized with original laboratory methods, related technical tools, and methods-oriented review articles that are of broad interest to professional life scientists, as well as to scientists from other disciplines (e.g., chemistry, physics, computer science, plant and agricultural science and climate science) interested in life science applications for their technologies.

Principles of Genetic Engineering:

CO1: To understand the general principles of gene organization and expression in prokaryotic and eukaryotic organisms, basic pathways and mechanisms in biological energy transduction and cell cycle control and relate properties of cancerous cells to mutational changes in gene function.

Biosafety, Computer Application & Biostatistics:

CO1: On completion of this course the students will be acquainted with basics of computer applications, biosafety guidelines and measures to be followed and basics of biostatistics and statistical analysis of research data

Immunology & Immunotechnology:

CO1: It deals with the study of the tissues, cells and molecules involved in host defence mechanisms. Immunologists attempt to understand how the immune system develops, how the body defends itself against disease, and what happens when it all goes wrong.

Enzyme Technology:

CO1: To enable the students to understand advanced concepts related to working of enzymes, their properties and application in various industries and research.

Animal Biotechnology:

CO1: To enable the students to understand the molecular biology techniques which were used to genetically engineer (i.e. modify the genome of) animals in order to improve their suitability for pharmaceutical, agricultural or industrial applications.

CO2: Animal biotechnology has been used to produce genetically modified animals that synthesize therapeutic proteins, have improved growth rates or are resistant to disease

Molecular Genetics:

CO1: To understand the general principles of gene organization and expression in prokaryotic and eukaryotic organisms, basic pathways and mechanisms in biological energy transduction and cell cycle control and relate properties of cancerous cells to mutational changes in gene function.

Environmental Biotechnology:

CO1: Environmental biotechnology is biotechnology that is applied to and used to study the natural environment. In nutshell, environmental biotechnology is the integration of natural and engineering sciences to achieve the application of organisms, cells, parts thereof and molecular analogues for products and services.

Industrial Biotechnology:

CO1: This course aims to introduce various industries where biotechnology is used. It enables students to understand the concept of application of biotechnology in different industries, fermentation and scale-up.

Food Biotechnology:

CO1: To enable the students to learn application of biotechnology in food industry.

Plant Biotechnology:

CO1: The course will enable the students to acquire knowledge about various techniques like micropropagation, single cell culture, suspension culture, protoplast culture, hairy root culture and various techniques of recombinant DNA technology to produce genetically modified organisms with novel characters.

Bioinformatics, Bioethics and IPR:

CO1: This course provides knowledge about basics of bioinformatics and its applications, bioethics and different bioethics regulatory agencies. The students will also learn about IPR, its types and differences, and applications.

Genomics and Proteomics:

CO1: Genomics is the new science that deals with the discovery and noting of all the sequences in the entire genome of a particular organism. Likewise, Proteomics helps in understanding the structure and function of different proteins as well as protein-protein interactions

English (Ph.D.)

Programme Outcomes (Pos):

PO1: Doctoral degree in English is meant for the students who have a profound affection for Language and Literature.

PO2: This programme enables the scholars with the vast and deep knowledge of the English Language and Literature.

PO3: This specific course update and aware the students with new perspectives and approaches of Literature.

PO4: The course further motivates the students towards the different areas of research in English Literature.

Communication Skills and Personality Development Classes in UG and PG:

PO1: This Programme enables the students with the ability of Soft Skills and Communication Skills by grooming their personality.

PO2: Students, equipped with these skills enhance their professional ability to enlighten their career path.

PO3: This program prepares the students as professions with the help of Personality development.

Programme Specific Outcomes (PSOs):

It is a **3-years** doctorate degree in English, essentially consisting of research work. After completion of the course, for procurement of the degree, scholars are needed to submit a detailed thesis. The advanced course in English literature comprises literature not only by authors from one country, but from across the globe.

The Scholars after Doctoral Degree have a wide array of options as below:

As Employee:

- a) **As scholars or educators:** After completion of this Programme, The students acquire the knowledge about the various types of Research Domain and they represent themselves as Scholars and as Educators in the various Institutions and in Universities.
- b) **Post-Doctoral Research:** This Programme also enables the students for the Post-Doctoral Research in different areas of English Literature.
- c) **Research Guide:** Those who have acquired expertise in the English Literature can further supervise upcoming Scholars.

As Entrepreneur:

- a) Professional Skill Trainer-With the Knowledge of English a scholar can guide the Students and enhance their professional skills in his private institute.
- b) Editor of Journals- A Scholar may also start his journal of his own and can work as an editor.

Higher Education:

Students after Doctorate can pursue Post Doctorate in literature, to find job opportunities in research and in the field of Literature.

Communication Skills and Personality Development Classes in UG and PG:

This program provides well trained professionals for every job sector. It is beneficial in social interaction, developing a healthy mind, body and life style, enable the students to identify one's own strengths and weaknesses and learning how to develop skills. Purpose of this course is to equip learners with tools for formal communication which includes group discussion, debate, JAM Sessions, report writing, formal letters.

The students after passing out UG and PG programmes, have the following placement options as below:

As Employee:

- d) **Professionals:** After completion of their UG and PG, The students acquire the knowledge about personality traits, soft skills and communication skills and they represent themselves as professionals in industry and organizations.
- e) **Skills Trainer:** This Programme also enables the students as the Skills trainers in different organizations.
- f) **Trained Graduates and Post Graduates:** This Programme also prepares Trained Graduates and Post Graduates as per the industry and organizational needs.

As Entrepreneur:

- g) **Soft skills trainer-** They may start their self-Soft Skills Training institute.
- h) **IELTS trainers-** They may Work as IELTS trainers

Higher Education:

Students after passing UG and PG Course can pursue his/ her Higher Education in their respective fields.

Course Outcomes (Cos):

English Literature:

CO1: To understand the basics of different Literary terms and theories.

CO2: To understand various research in the English Literature.

CO3: To develop the new perspective towards literature.

Writing in different field as expatriate literature/Indian English Writing:

CO1: To understand the Writing in Literature.

CO2: To understand Indian writers in the field of English Literature.

CO3: To understand current Indian Issues to discuss.

Course Outcomes (Cos):

Communication Skills and Personality Development Classes in UG and PG:

CO1: To understand the basics of different Soft Skills.

CO2: To know various stages of Personality developments

CO3: To Develop Communication Skills.

CO4: To learn and practice verbal and non-verbal communication along with managerial skills.

Mathematics (BCA):

Programme Outcomes (Pos):

PO1: This programme provide a training to students for jobs in different sectors like Banking sectors, Computer industry, biotech industries, pharmaceutical industries etc .

PO2: Hands-on practical training on sophisticated analytical instruments, biomedical devices, simulated software for animal studies, drug designing through CADD.

PO3: To impart knowledge about the Code of Conduct and Professional Integrity

PO4: Development of Team spirit and leadership qualities.

PO5: Effective verbal and non-verbal communication while dealing with professional clients and peers.

PO6: Brainstorming of the potential problems pertaining to technical, cognitive and communicative skills and their solutions by mentors.

PO7: Placement of Students/ Self-employment.

Programme Specific Outcomes (PSOs):

Bachelor of Computer Application is a three year degree programme divided in six semesters. The students are introduced to the basics of Computer, Accounts, Modulation, Programming and Mathematics for the synthesis, analysis and instrumentation. Students are taught basics of Computer, Accounts, Modulation, Programming and Mathematics of the pure and applied Computer Sciences. Knowledge of these basic subjects is essential for thorough understanding of the concepts and applications of basics of Computer, Accounts, Modulation, Programming and Mathematics which will help students to understand the fundamentals laws of nature which are essential in understanding the principles of the technology. After completing the course the students are well trained in basics of Computer, Accounts, Modulation, Programming and Mathematics. Students will be able to analyze real world problems, in fruitful decision making and will have knowledge of basics of Computer, Accounts, Modulation, Programming and Mathematics laws.

As Entrepreneur:

- c) **Own Wholesale shop:** Students after graduating have enough knowledge of hardware and software to start wholesale shop.
- d) **Set up a Computer Manufacturing Unit:** After passing out BCA, the students can apply to the license to set up a Computer manufacturing unit.

Higher Education:

Students after BCA can pursue for MCA and Law (LLB) and (MBA) to find job opportunities in research, managerial and advisory options in Pharmaceutical industry or academic institutions.

Course Outcomes (Cos):

Real Analysis:

CO1: This provides the knowledge of different kind of properties of functions defined on different sets.

CO2: This also provides the knowledge of how to use these properties to solve real world problems.

Algebra:

CO1: Enables to students to understand different properties of a set and different kind of relationships between different kinds of sets.

CO2: It improves the analytic approach and develops reasoning power of students.

Discrete Mathematics:

CO1: This provides a study of mathematics used in computer and machines

CO2: It enables student to understand the language of machines.

Differential Equations:

CO1: It enables students of solve different kind of differential equations which appears in different branches of science and engineering.

CO2: It enables students to formulate differential equations of real world problems.

Numerical Methods:

CO1: It enables students to learn tools to solve different kind of numerical problems arriving in science and engineering.

CO2: It improves numerical problem solving ability of students.

Mathematics (B.Sc. non-medical):

Programme Outcomes (Pos):

PO1: This programme provide a training to students for jobs in different sectors like Banking sectors, Computer industry, biotech industries, pharmaceutical industries etc .

PO2: Hands-on practical training on sophisticated analytical instruments, biomedical devices, simulated software for animal studies, drug designing through CADD.

PO3: To impart knowledge about the Code of Conduct and Professional Integrity

PO4: Development of Team spirit and leadership qualities.

PO5: Effective verbal and non-verbal communication while dealing with professional clients and peers.

PO6: Brainstorming of the potential problems pertaining to technical, cognitive and communicative skills and their solutions by mentors.

PO7: Placement of Students/ Self-employment.

Programme Specific Outcomes (PSOs):

Bachelor of Science is a three year degree programme divided in six semesters. The students are introduced to the basics of Physics, Chemistry and Mathematics for the synthesis, analysis and instrumentation. Students are taught Physics, Chemistry and Mathematics to understand the structure, functions and composition of the pure and applied Sciences. Knowledge of these basic subjects is essential for thorough understanding of the concepts and applications of Physics, Chemistry and Mathematics which will help students to understand the fundamentals laws of nature which are essential in understanding the principles of the technology. After completing the course the students are well trained in Mathematics, Physics and Chemistry. Students will be able to analyze real world problems, in fruitful decision making and will have knowledge of physical, chemical and Mathematical laws.

Course Outcomes (Cos):

Real Analysis:

CO1: This provides the knowledge of different kind of properties of functions defined on different sets.

CO2: This also provides the knowledge of how to use these properties to solve real world problems.

Algebra:

CO1: Enables to students to understand different properties of a set and different kind of relationships between different kinds of sets.

CO2: It improves the analytic approach and develops reasoning power of students.

Differential Equations:

CO1: It enables students of solve different kind of differential equations which appears in different branches of science and engineering.

CO2: It enables students to formulate differential equations of real world problems.

Discrete Mathematics:

CO1: This provides a study of mathematics used in computer and machines

CO2: It enables student to understand the language of machines.

Complex Analysis:

CO1: This provides the knowledge of different kind of properties of complex functions defined on different sets.

CO2: This also provides the knowledge of how to use these properties to solve real world problems.

Mathematics (M. Sc):

Programme Outcomes (POs)

PO1: Technical Knowledge of Mathematical Science (core subjects) and Practice (applications of the subjects in real world).

PO2: To impart knowledge about the Code of Conduct and Professional Integrity to practice the profession of Mathematics.

PO3: Effective verbal and non-verbal communication while dealing with professional.

PO4: To impart knowledge about the interest of Mathematics and handling the requirements of real world.

PO5: Brainstorming of the potential problems pertaining to technical, cognitive and communicative skills and their solutions by mentors.

PO6: Placement of Students/ Self-Employment.

Programme Specific Outcomes (PSOs):

Master of Science in Mathematics is a two years degree programme divided in four semesters. The students are introduced to the Pure and Applied Mathematics to develop analytical and numerical ability. Students are taught Pure and Applied Mathematics to understand the structure, functions and composition of the pure and applied Sciences. Knowledge of these basic subjects is essential for thorough understanding of the concepts and applications of Pure and Applied Mathematics which will help students to understand the fundamentals laws of nature which are essential in understanding the principles of the technology. After completing the course the students are well trained in Pure and Applied Mathematics. Students will be able to analyze real world problems, in fruitful decision making and will have knowledge of Pure and Applied Mathematics laws.

The students after graduating have a wide array of options as below:

As Employee:

- a) **Teaching Industry:** Students keen to make their career in a teaching have the following job profiles:
 - i) **School Teacher** etc.
 - ii) **College Teacher.**
 - iii) **University Professor.**
- b) **Research Industry:** Students keen to make their career in as a research in all departments as Mathematics is fundamental requirement research topics.

- c) **Banking Sector:** To fulfill the requirement of banking sector, M.Sc students have required potentials.
- d) **Marketing:** As sales representatives. Freshers are inducted as trainee in the Business Development Team or Marketing and Sales Representatives. They are generally promoted as Area Sales Manager, Regional Sales Manager and Vice President
- e) **Analyst / Statistician:** As Government certified Analysts in Government Drug Testing Laboratories and Pharmaceutical industries.

As Entrepreneur:

- e) **Own School set up:** Students after M.Sc, they can set up their own School.
- f) **Set up a Coaching Academy:** Students after M. Sc, they can set up their own coaching academy.
- g) **Set up a Contract Research Organization (CRO):** Students can set up their own CRO and get necessary approvals and certifications from the Government Accreditation/ Licensing Authorities to take up contract research projects.

Higher Education:

Students after M.Sc. can pursue Ph.D, M.tech in Computer Science to find job opportunities in research, managerial and advisory options in academic institutions.

Course Outcomes (Cos):

Real Analysis:

CO1: This provides the knowledge of different kind of properties of functions defined on different sets.

CO2: This also provides the knowledge of how to use these properties to solve real world problems.

Algebra:

CO1: Enables to students to understand different properties of a set and different kind of relationships between different kinds of sets.

CO2: It improves the analytic approach and develops reasoning power of students.

Differential Equations:

CO1: It enables students of solve different kind of differential equations which appears in different branches of science and engineering.

CO2: It enables students to formulate differential equations of real world problems.

Discrete Mathematics:

CO1: This provides a study of mathematics used in computer and machines

CO2: It enables student to understand the language of machines.

Complex Analysis:

CO1: This provides the knowledge of different kind of properties of complex functions defined on different sets.

CO2: This also provides the knowledge of how to use these properties to solve real world problems.

Differential Geometry:

CO1: It provides the knowledge of geometric properties of higher dimensional mathematical objects.

CO2: This also provides opportunity to visualize and understand the properties of higher dimensional mathematical objects.

Topology:

CO1: Enables to students to understand the properties of higher dimensional mathematical objects.

CO2: This also provides opportunity to visualize higher dimensional mathematical objects.

Functional Analysis:

CO1: This provides the knowledge of function defined on more complicated sets and defined on higher dimensional objects

CO2: It also provides different kind of properties of these functions.

Integral Transforms:

CO1: It enables students to learn tools to solve different kind of numerical problems arriving in science and engineering.

CO2: It also improve numerical problem solving capacity of students.

Discrete Mathematics:

CO1: This provides a study of mathematics used in computer and machines

CO2: It enables student to understand the language of machines.

School of Law

**Programme Outcomes (POs), Programme Specific
Outcomes (PSOs) & Course Outcomes (POs)**

Programme Outcomes (Pos):

Graduate Courses (BALLB, BCOM LLB & LLB):

PO1: Practical Knowledge of Law (core subjects) and Practice (applications of the subjects in profession).

PO2: To impart knowledge about the Code of Conduct and Professional Integrity to practice the profession of Law.

PO3: Providing Legal Awareness to the people(through legal aid camps).

PO4: Development of Team spirit and leadership qualities.

PO5: Effective verbal and non-verbal communication.

PO6: Brainstorming of the potential problems pertaining to technical, cognitive and communicative skills and their solutions by mentors.

PO7: Self-employment.

LLM:

PO1: Practical Knowledge of Law (core subjects) and Practice (applications of the subjects in profession).

PO2: To impart knowledge about the Code of Conduct and Professional Integrity to practice the profession of Law.

PO3: Providing Legal Awareness to the people(through legal aid camps).

PO4: Effective verbal and non-verbal communication.

PO5: To impart knowledge about prescription handling and patient counselling.

PO6: To study the inventory control and Drug store management in the drug store/ Pharmacy of a hospital.

PO7: Brainstorming of the potential problems pertaining to technical, cognitive and communicative skills and their solutions by mentors.

PO8: Self-Employment.

Programme Specific Outcomes (PSOs):

Graduate Courses (BALLB, BCOM LLB & LLB)

BALLB & B.COMLLB is a five years degree integrated programme divided in ten semesters and LLB is a three years degree programme divided in six semesters. The school has well defined learning outcomes. The vision and mission of the school emphasizes on promoting value education through motivated trained faculty to prepare the students to accept the challenges of globalization. Maharaja Agrasen University, School of Law recognizes the need to educate students holistically, fostering a strong basis of knowledge in the law, a command of skills such as writing and advocacy, a passion for serving clients, and a portfolio of met cognitive skills (including leadership, determination, self-awareness, and relationship building). With these goals in mind, the School of Law has implemented learning outcomes, performance criteria, and an assessment plan geared towards developing exceptional lawyers. Each learning outcome is important in the formation of well-rounded attorneys. When students graduate, they will show competency in all areas, including integrity and professionalism, knowledge of the law, research skills, analysis and counselling, communication, ethics and metacognitive skills, an understanding of the business behind the profession.

The students after graduating have a wide array of options as below:

As Employee:

- a). Law Officer:** In private companies and in Government sector (Banks, Insurance companies etc).
- b). Legal Adviser:** In private companies and in Government sector (Banks, Insurance companies etc).
- c.) Public Prosecutor :** After graduation students can opt the profession of public prosecutor in the court of Law.
- d.) Judicial Services:** After graduation students apply for Judicial Services Examination. In the judiciary , lowest judicial cadre post of magistrate or sub judge a fill by these judicial services examination or otherwise under the guidelines of the high court. There can be further promotion as district and sessions Judge and further as a judge of High Court or Supreme Court subject to seniority.

e.) Judge Advocate General: The post of Judge Advocate General in India is held by a major general who is the legal and judicial chief of the Army.

As Entrepreneur:

- a) **Litigation:** To practice Law in the court After Graduation one should enroll with State Bar Council as per Advocates Act, 1961. Student is also required to qualify the Bar Council of India Examination to obtain the License to start practice in the respective courts.

Higher Education:

Students after BALLB, B.COM LLB & LLB can pursue Masters in Law (LLM) to find job opportunities in research, managerial and advisory options in Law industry or academic institutions.

LLM:

LLM is a one year degree programme divided in two semesters. The school has well defined learning outcomes. The vision and mission of the school emphasizes on promoting value education through motivated trained faculty to prepare the students to accept the challenges of globalization. Maharaja Agrasen University, School of Law recognizes the need to educate students holistically, fostering a strong basis of knowledge in the law, a command of skills such as writing and advocacy, a passion for serving clients, and a portfolio of met cognitive skills (including leadership, determination, self-awareness, and relationship building). With these goals in mind, the School of Law has implemented learning outcomes, performance criteria, and an assessment plan geared towards developing exceptional lawyers. Each learning outcome is important in the formation of well-rounded attorneys. When students graduate, they will show competency in all areas, including integrity and professionalism, knowledge of the law, research skills, analysis and counselling, communication, ethics and metacognitive skills, an understanding of the business behind the profession.

The students after graduating have a wide array of options as below:

As Employee:

- a). **Law Officer:** In private companies and in Government sector (Banks, Insurance companies etc).
- b). **Legal Adviser:** In private companies and in Government sector (Banks, Insurance companies etc).

c.) Public Prosecutor : After graduation students can opt the profession of public prosecutor in the court of Law.

d.) Judicial Services: After graduation students apply for Judicial Services Examination. In the judiciary, lowest judicial cadre post of magistrate or sub judge is filled by these judicial services examination or otherwise under the guidelines of the high court. There can be further promotion as district and sessions Judge and further as a judge of High Court or Supreme Court subject to seniority.

e.) Judge Advocate General: The post of Judge Advocate General in India is held by a major general who is the legal and judicial chief of the Army.

f.) Academic career: After Masters in Law start teaching in colleges/ universities.

As Entrepreneur:

a). Litigation: To practice Law in the court After Graduation one should enroll with State Bar Council as per Advocates Act, 1961. Student is also required to qualify the Bar Council India Examination to obtain the License to start practice in the courts.

Higher Education:

LLM programme research-focused, and actively support and encourage students to explore new fields and contribute to publishable research gateway into a PhD and a future role in academia.

Course Outcomes (Cos):

Graduate Courses (BALLB, BCOM LLB & LLB)

Constitutional and Human Rights Law:

CO1: To understand the basics of State what are the main institutions of the State and the main functions of each.

CO2: To understand the basics of rights and duties of the citizens.

CO3: an understanding of the principles and institutions of international human rights law, including their origins, assumptions, contents, limits and potential.

CO4: To understand the basic of understand the historical growth of the idea of human rights and demonstrate an awareness of the international context of human rights

Criminal Laws:

CO1: To understand the major areas of the criminal justice system: policing, courts, law, and corrections.

CO2: Recognize the importance of federal and state statutory law, case law, and constitutional law as it constrains the police, the courts, and corrections.

CO3: Demonstrate the relationship between crime and the various correlates, such as race, gender, age, social class, and social institutions.

CO4: Examine the special issues of minorities and females in every aspect of the criminal justice system.

Administrative law:

CO1: Understand the principles of judicial review of administrative action at both the State and Federal levels of government.

CO2: Understand some of the way in which administrative action can be review of administrative action, and the constitutional protection of such review.

CO3: Understand the limits on the powers of the courts to engage in judicial review of administrative action, and the constitutional protection of such review.

CO4: Be aware of some of the current controversies and trends in the area of administrative law: have the capacity to think critically about administrative law, its underpinning values, and its impact on administrative decision making.

International Law:

CO1: An understanding of the nature of the international legal system

CO2: An understanding of the law creating processes and the doctrines of International Law

CO3: Knowledge of the relationship between International Law and domestic law

CO4: An understanding of the development of international law in response to contemporary challenges and the key issues of policy which lie behind the law

CO5: Knowledge of the practice of the exercise by the participants of rights in this field, including claims, protests, treaties and the peaceful settlement of disputes.

Civil Law:

CO1: Explain the purpose and function of civil procedure law and the structure of the civil court organization and the duties of professionals that work at the courts.

CO2: Explain the competent and jurisdiction of the civil courts.

CO3: Explain the competent of the general and special civil courts.

CO4: distinguish the differences between the general and special jurisdiction rules.

Corporate Law:

CO1: To encourage the development of students' skills in legal reasoning and analysis through study of statutes, case law and regulatory practice relating to Company Law.

CO2: To explain the legal nature and significance of limited liability and the price which those using a company as a business structure are required to pay for it.

CO3: To facilitate an appreciation of the legal basis of the control exercised by a company's board of directors over a company's management and affairs, the legal limitations and constraints on this control and the effectiveness of these limitations and constraints in practice.

CO4: To provide students with an awareness of current policy trends and developments in Company Law.

Personal Law:

CO1: Personal laws governing family relations such as marriage, separation (divorce), maintenance, guardianship and custody, adoption, etc.

CO2: the status of women and children in family relations law with a view to ensure greater protection of constitutional rights of these groups in family law administration.

LLM:

Constitutional and Human Rights Law:

CO1: To understand the basics of State what are the main institutions of the State and the main functions of each.

CO2: To understand the basics of rights and duties of the citizens.

CO3: an understanding of the principles and institutions of international human rights law, including their origins, assumptions, contents, limits and potential.

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CO2: Understand some of the way in which administrative action can be review of administrative action, and the constitutional protection of such review.

CO3: Understand the limits on the powers of the courts to engage in judicial review of administrative action, and the constitutional protection of such review.

CO4: Be aware of some of the current controversies and trends in the area of administrative law: have the capacity to think critically about administrative law, its underpinning values, and its impact on administrative decision making.

Maharaja Agrasen Institute of Technology (MAIT)

**Programme Outcomes (POs), Programme Specific
Outcomes (PSOs) & Course Outcomes (POs)**

Programme Outcomes (Pos):

B.Tech.

PO1 : Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2 : Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4 : Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO6: The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7: Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11: Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12: Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Programme Specific Outcomes (PSOs):

B.Tech:

Bachelor of Technology is a 4 year course which includes the specification, design, implementation and testing of engineering systems to professional standards and within a code of ethics. All students get an opportunity to consolidate their knowledge of the fundamentals, as well as to specialize in various areas. After the completion of Bachelor of Technology degree, Students can work in the field of IT industries, telecommunication, power generation and transmission multimedia, Automobile and Mechanical Industries, *etc.*

Programme Specific Outcomes

B.Tech- Computer Science & Engineering:

On completion of the B.Tech(Computer Science & Engineering) degree the graduates will be able to

PSO1:Apply standard Software Engineering practices and strategies in real-time software project development using open-source programming environment or commercial environment to deliver quality product for the organization success

PSO2:Design and develop computer programs/computer-based systems in the areas related to algorithms, networking, web design, cloud computing, IoT and data analytics of varying complexity

PSO3:Acquaint with the contemporary trends in industrial/research settings and thereby innovate novel solutions to existing problems

PSO4:Able to provide socially acceptable technical solutions to complex computer science engineering problems with the application of modern and appropriate techniques for sustainable development relevant to professional engineering practice.

PSO5: Able to apply the knowledge of ethical and management principles required to work in a team as well as to lead a team.

PSO6:Able to comprehend and write effective project reports in multidisciplinary environment in the context of changing technologies.

B.Tech- Electronics and Communication Engineering:

On the completion of the B.E (ECE) degree the Electronics and Communication graduates will be able to

PSO1: Apply the fundamental concept of Electronics and Communication Engineering to design a variety of components and systems for applications including signal processing, Communication, Networking, Embedded systems, VLSI and control system.

PSO2: Select and apply cutting-edge engineering hardware and software tools to solve complex Electronics and Communication Engineering problems.

BTech- Mechanical Engineering:

On completion of the BTech(Mechanical Engineering) degree the graduates will be able to

PSO1: Graduates of the program will achieve excellence in product design, thermal engineering and manufacturing system by acquiring knowledge in mathematics, science and designing principles.

PSO2: Graduate will be able to analyze, interpret and provide solutions to the real life mechanical engineering problems

PSO3: Graduate will develop an approach to solve multidisciplinary problems of manufacturing and allied industries.

PSO4: Graduates will learn managerial skills to work effectively in a team and in a society by following ethical and environmental practices

PSO5: Able to apply the knowledge of ethical and management principles required to work in a team as well as to lead a team.

PSO6: Graduate will respond to the demand of the society by engaging in lifelong learning.

B.Tech -Electrical and Electronics & Engineering

On completion of the B.Tech (Electrical and Electronics & Engineering) degree the graduates will be able to

PSO.1 The application of fundamental knowledge to identify, formulate and investigate various real time problems of Electrical Machines, Power Electronics, Control System, Instrumentation System, Power System and Power Electronic systems.

PSO.2 The application of recent techniques along with modern software tools (like MATLAB, MULTISIM etc) for designing, simulating and analyzing electrical systems as well as electronic system to engage in lifelong learning.

PSO.3 The utilization of knowledge regarding project management techniques and sustainable technologies for developing projects related to Smart Power Grid, Automatic Controllers, Advanced Power System Protection, Wireless System, Power Quality, Energy Saving, Embedded Systems etc.

B.Tech -Civil Engineering

PSO. 1 Apply principles of mechanics and basic sciences to analyze civil engineering structures

PSO. 2 Survey, map, measure and analyze data for sustainable infrastructure planning.

PSO. 3 Characterize and evaluate materials for adoptability in civil engineering projects

PSO. 4 Analyze and design concrete & steel structures, earthen embankments, irrigation structures, water supply, waste treatment systems and transport systems.

PSO. 5 Apply best management practices for construction and maintenance of infrastructure facilities.

PSO. 6 Predict and forecast societal needs, floods, droughts, pollution and travel demand.

PSO. 7 Work and lead in multi-disciplinary projects and demonstrate social responsibility and professional ethics.

Course Outcomes (Cos):

B.Tech- Computer Science & Engineering:

Algorithms:

CO1:Analyze the pros and cons of applying the different design paradigms in different Contexts.

CO2:Exposure to randomization as a tool for developing algorithms.

CO3:Relevance of analysis to the design of efficient computer algorithms.

CO4:Identify the computational issues and apply suitable algorithms to solve it effectively

CO5:Conceptualize and design efficient and effective algorithmic solutions for different real-world problems.

Computer Networks:

CO1:Illustrate the concepts of Network Security and Compare Various Symmetric and Asymmetric Cryptographic methods used for Network Security.

CO2:Classify various Algorithms to be used at various TCP/IP Layers & to operate Digital Signature in Real World Situation

CO3:Summarize different Authentication Techniques & Describe programs like PGP & S/MIME

CO4:Implement IP Security Architecture &Transport Layer Security to identify the vulnerability of the Internet systems and recognize the mechanisms of the attacks, and apply them to design and evaluate counter-measure tools

CO5:Implement Firewall design principles and identify various intrusion detection systems and be able to achieve highest system security

Software Engineering:

CO1:Formulate problem by following Software Testing Life Cycle.

CO2:Design Manual Test cases for Software Project.

CO3:identify the realistic problem for different category of software.

CO4:Use automation testing tool students will be able test the software.

CO5:Follow the process related activity and testing techniques to work as team member.

Operating System:

CO1: Classify Linux Kernel mode with user mode & contrast between Kernel structures.

CO2: Identify and estimate process management & thread management strategies along with their different operations (Process creation)

CO3:Implement different system calls for various file handling operations.

CO4:determine paging and Caching techniques related to Virtual Memory.

CO5: construct shell scripts .

CO6: debate various case studies .

Artificial Intelligence:

CO1:Exhibit strong familiarity with a number of important AI techniques, including in particular search, knowledge representation, planning and constraint management.

CO2:Interpret the modern view of AI as the study of agents that receive percepts from the environment and perform actions.

CO3:Build awareness of AI facing major challenges and the complexity of typical problems within the field.

CO4:Assess critically the techniques presented and apply them to real world problems.

CO5:Develop self-learning and research skills to tackle a topic of interest on his/her own or as part of a team.

Cloud Computing:

CO1: Identify the appropriate cloud services for a given application.

CO2: Assess the comparative advantages and disadvantages of Virtualization technology.

CO3: Analyze authentication, confidentiality and privacy issues in cloud computing.

CO4: Identify security implications in cloud computing.

CO5: Understand the importance of protocols and standards in management for cloud services

Computer Graphics:

CO1: Describe different image representation, their mathematical representation and different their data structures used. K2

CO2:Classify different segmentation algorithm for given input K2

CO3:Create a 3D object from given set of images K3

CO4: Detect a moving object in video using the concept of motion analysis K3

CO5: Recognize the object using the concept of computer vision K4

Algorithm Analysis and Design

CO1:Identify Data Structures, Design paradigms and Computational complexity in the design of simple tools

CO2:Demonstrate relationships among NP-Complete Problems

CO3: Implement the approximate algorithms approach to solve some NP-Complete Problems.

CO4: Demonstraterandomness by solving some examples

CO5: Implement algorithms for geometry and large data-sets.

Cryptography and Network Security:

CO1: Identify Vulnerabilities in a Network

CO2: Solve Problems using various Algorithms

CO3: Identify Various Attacks and Formulate Defense Mechanism

CO4: Understand Wireless Security

CO5: Understand Web And DNS Security.

Distributed Database:

CO1: Aware of fundamentals of Distributed Database systems.

CO2: Use the different techniques of Distributed query processing.

CO3: Set the rules over management of transaction and concurrency control.

CO4: Familiar with parallel database system architecture.

CO5: Apprehend Machine Learning Algorithms.

Mobile Computing:

CO1: Understand and identify the GSM, GPRS and Bluetooth software model for mobile computing.

CO2: The ability to develop applications that are mobile-device specific and demonstrate current practice in mobile computing contexts.

CO3: Understanding of the characteristics and limitations of mobile hardware devices including their user-interface modalities

CO4: Analyze QoS over wire and wireless channels

CO5: Able to promote the awareness of the life-long learning, business ethics, professional ethics and current marketing scenarios.

Compiler Design:

CO1: Identify all essential steps for automatically converting source code into object code. (Understand)

CO2: Generate the low-level code for calling functions/methods in modern languages. (Apply)

CO3: Discuss opportunities for optimization introduced by naïve translation and approaches for achieving optimization such as instruction selection, instruction scheduling, register allocation, and peephole optimization. (Apply)

CO4: Interpret benefits and limitations of automatic memory management. (Understand)

CO5: Explain advantages, disadvantages and difficulties of just in time and dynamic recompilation.

Dataware House and Datamining:

CO1: Understand the concepts of Big data and challenges in processing Big Data

CO2: Understand Hadoop architecture and eco-system.

CO3: Gain conceptual understanding of Hadoop Distributed File System.

CO4: Understand the concepts of map and reduce and functional programming

CO5: Identify appropriate techniques and tools to solve actual Big Data problems.

Multimedia Technologies:

CO1: Identify different media; representations of different multimedia data and data formats.

CO2: Analyze various compression techniques.

CO3: Compare various audio and video file formats.

CO4: Apply different coding technique for solving real world problems.

CO5: Choose optical storage media suitable for multimedia applications.

Data Structures:

CO1: Apply measures of efficiency to algorithms and Compare various linear data structures like Stack ADT, Queue ADT, Linked lists.

CO2: Analyze and compare linear data structures and analyze different searching and hashing techniques.

CO3: Analyze and compare various non – linear data structures like Trees and Graphs.

CO4: Analyze and compare various sorting algorithms, to select from a range of possible options, to provide justification for that selection, and to implement the algorithm in a particular context.

CO5: Understand and execute lab experiments and develop a small project along with his/her team members.

Computer Organization & Architecture:

CO1: Student will be able to Understand the Overview of von Neumann architecture and Pipelining

CO2: Student will be able to Demonstrate Hierarchical Memory Technology

CO3: Student will be able to Explain the Instruction level parallelism

CO4: Student will be able to Analyze the Multiprocessor Architecture

CO5: Student will be able to Analyze the Multiprocessor Architecture

Soft Computing:

CO1: Explain soft computing differentiating hard and soft computing and enumerate briefly overview of fuzzy systems , neural networks and genetic algorithms.

CO2: Demonstrate a fuzzy controller using fuzzy logic systems

CO3: Interpret pattern recognition using artificial neural network

CO4: Interpret Genetic algorithms and operations.

Machine Learning:

CO1: Understand and apply the differences among the styles of learning: supervised, reinforcement, unsupervised and parametric methods

CO2: Comprehend probabilistic methods for learning and for classification

CO3: Analyze the non parametric methods and decision trees to take the proper decision making.

CO4: Understand rule based knowledge and Kernel machines to reduce the cost of various statistical methods , Bayesian Estimation, HMM models

Project-I:

CO1: Identify and Finalize problem statement by surveying variety of domains.

CO2: Perform requirement analysis and identify design methodologies

CO3: Apply advanced programming techniques

CO4: Present technical report by applying different visualization tools and Evaluation metrics.

Project-II:

CO1: Review the literature and develop solutions for framed problem statement.

CO2: Implement hardware and/or software techniques for identified problems.

CO3: Test and analyze the modules of planned project.

CO4: Write technical report and deliver presentation.

CO5: Apply engineering and management principles to achieve project goal

B.Tech- Electronics & Communication Engineering

Basic Electronics Engineering:

CO1 Characterize semiconductors, diodes, transistors and operational amplifiers

CO2 Design simple analog circuits

CO3 Design simple combinational and sequential logic circuits

CO4 Identify functions of digital multimeter, cathode ray oscilloscope and transducers in the measurement of physical variables

CO5 Understand fundamental principles of radio

Analog Electronics:

CO1 Study and analyze the behavior of semiconductor devices.

CO2 Characterize the current flow of a bipolar transistor in CB,CE and CC configurations

CO3 Bias the transistors and FETs for amplifier applications.

CO4 Realize simple amplifier circuits using BJT and FET.

CO5 Design half wave and full wave rectifiers with filters

Digital Circuit Design:

CO1 Design and analyze combinational and sequential logic circuits through HDL models

CO2 Optimize combinational and sequential logic circuits

CO3 Understand fault detection techniques for digital logic circuits

CO4 Analyze a memory cell and apply for organizing larger memories

Signals and Systems:

CO1 Classify the signals as Continuous time and Discrete time

CO2 Analyze the spectral characteristics of signals using Fourier analysis.

CO3 Classify systems based on their properties and determine the response of LTI system using convolution.

CO4 Identify system properties based on impulse response and Fourier analysis.

CO5 Apply transforms techniques to analyze continuous-time and discrete-time signals and systems.

Electro Magnetic Field and Theory:

CO1 Solve Maxwell's equations using vector calculus in three standard coordinate systems

CO2 Deduce EM wave propagation in free space and in dielectric medium

CO3 Analyze electromagnetic wave propagation in guiding structures under various matching conditions

CO4 Understand the power flow mechanism in guiding structures and in unbounded medium

Communication System-I:

CO1 Compare the performance of AM, FM and PM schemes with reference to SNR

CO2 Understand noise as a random process and its effect on communication receivers

CO3 Evaluate the performance of PCM, DPCM and DM in a digital communication system

CO4 Identify source coding and channel coding schemes for a given communication link

Antennas and Propagation:

CO1 Understand the concept of radiation through mathematical formulation

CO2 Plot the characteristics of wire and aperture antennas

CO3 Develop the performance characteristics of array antennas

CO4 Measure the antenna parameters

CO5 Understand the behavior of nature on em wave propagation

Linear Integrated circuits And Applications:

CO1 Design op-amp circuits to perform arithmetic operations.

CO2 Analyze and design linear and non-linear applications using op-amps.

CO3 Analyze and design oscillators and filters using functional ICs.

CO4 Choose appropriate A/D and D/A converters for signal processing applications.

Communication System-II

CO1 Model a digital communication system.

CO2 Compute probability of error and inter symbol interference from eye diagram in data transmission.

CO3 Obtain the power spectra of digital modulated signals.

CO4 Design encoder and decoder schemes for error control.

Digital Signal Processing

CO1 Find DFT of a given signal through Fast Fourier Transform Techniques

CO2 Design FIR and IIR type digital filters.

CO3 Identify filter structures and evaluate the coefficient quantization effects

CO4 Understand sample rate conversion techniques.

CO5 Compare the architectures of DSP and General Purpose Processors.

Micro Controllers:

CO1 Understand the evolution of processor architectures

CO2 Write simple programs in assembly language of Pentium processor

CO3 Interface peripheral devices and memory with microcontrollers

CO4 Program an ARM processor for DSP Applications

Computer Networks:

CO1 Identify the issues and challenges in the architecture of a computer network.

CO2 Understand the ISO/OSI seven layers in a network.

CO3 Realize protocols at different layers of a network hierarchy.

CO4 Recognize security issues in a network.

Satellite Communication:

CO1 Understand the orbital and functional principles of satellite communication systems

CO2 Architect, interpret, and select appropriate technologies for implementation of specified satellite communication systems

CO3 Analyse and evaluate a satellite link and suggest enhancements to improve the link performance.

CO4 Select an appropriate modulation, multiplexing, coding and multiple access schemes for a given satellite communication link.

CO5 Specify, design, prototype and test analog and digital satellite communication systems as per given specifications.

Embedded Systems:

CO1 Identify the hardware and software components of an embedded system

CO2 Choose appropriate embedded system architecture for the given application

CO3 Write programs for optimized performance of an embedded system and validate

Optical Fiber Communication:

- CO1 Identify and characterize different components of an Optical Fiber Communication link.
- CO2 Analyze optical source, Fiber and Detector operational parameters
- CO3 Compute optical fiber link design parameters
- CO4 Understand WDM, Optical Amplifiers, Optical Switching and networking technology concepts.

Cellular and Mobile Communications:

- CO1 Understand the evolution of cellular communication systems upto and beyond 3G
- CO2 Design a cellular link and estimate the power budget.
- CO3 Choose proper multiple accessing methods depending on channel model
- CO4 Identify traffic channels for call processing
- CO5 Calculate key performance metrics of a cellular communication system.

LINEAR CONTROL SYSTEMS:

- CO1 Analyze electromechanical systems using mathematical modeling
- CO2 Determine Transient and Steady State behavior of systems using standard test signals
- CO3 Analyze linear and non-linear systems for steady state errors, absolute stability and relative stability
- CO4 Design a stable control system satisfying requirements of stability and reduced steady state error

COMMUNICATION SYSTEMS:

- CO1 Understand different modulation and demodulation schemes for analog communications.
- CO2 Design analog communication systems to meet desired application requirements
- CO3 Evaluate fundamental communication system parameters, such as bandwidth, power, signal to quantization noise ratio etc.
- CO4 Elucidate design tradeoffs and performance of communications systems.

MICROPROCESSOR SYSTEMS:

- CO1 Develop basic understanding of microprocessor architecture.
- CO2 Design Microprocessor and Microcontroller based systems.
- CO3 Understand C, C++ and assembly language programming
- CO4 Understand concept of interfacing of peripheral devices and their applications

ELECTRONIC MEASUREMENTS AND INSTRUMENTATION:

- CO1 Apply knowledge of instruments for effective use
- CO2 Select suitable instruments for typical measurements.
- CO3 Identify various transducers to measure strain, temperature and displacement.
- CO4 Understand data acquisition system and general purpose interfacing bus.

B.Tech- Mechanical Engineering:

Manufacturing Process

- CO1.** Understand and analyze foundry practices like pattern making, mold making, Core making and Inspection of defects.
- CO2.** Understand and analyze Hot and Cold Working, Rolling, Forging, Extrusion and Drawing Processes.
- CO3.** Understand different plastic molding processes, Extrusion of Plastic and Thermoforming
- CO4.** Understand different Welding and joining processes and its defects
- CO5.** Understand, Design and Analyze different sheet metal working processes

CO6. Understand the constructional details and Working of Centre Lathe

Engineering Thermodynamics:

CO1. Will able to Apply various laws of thermodynamics to various processes and real systems.

CO2. Apply the concept of Entropy, Calculate heat, work and other important thermodynamic properties for various ideal gas processes.

CO3. Estimate performance of various Thermodynamic gas power cycles and gas refrigeration cycle and availability in each case.

CO4. Estimate the condition of steam and performance of vapour power cycle and vapour compression cycle.

CO5. Estimate Stoichiometric air required for combustion, performance of steam generators and natural draught requirements in boiler plants.

CO6. Use Psychrometric charts and estimate various essential properties related to Psychrometry and processes

Material Science:

CO1. Understand the basic concepts and properties of Material.

CO2. Understand about material fundamental and processing.

CO3. Select proper metal, alloys, nonmetal and powder metallurgical component for specific requirement

CO4. Detect the defects in crystal and its effect on crystal properties.

CO5. Evaluate the different properties of material by studying different test

CO6. Recognize how metals can be strengthened by cold-working and hot working

Strength of Materials:

CO1. Apply knowledge of mathematics, science for engineering applications

CO2. Design and conduct experiments, as well as to analyze and interpret data

CO3. Design a component to meet desired needs within realistic constraints of health and safety

CO4. Identify, formulate, and solve engineering problems

CO5. Practice professional and ethical responsibility

CO6. Use the techniques, skills, and modern engineering tools necessary for engineering practice

Fluid Mechanics:

CO1. Use of various properties in solving the problems in fluids

CO2. Use of Bernoulli's equation for solutions in fluids

CO3. Determination of forces drag and lift on immersed bodies

Kinematics of Machines:

CO1. Identify mechanisms in real life applications.

CO2. Perform kinematic analysis of simple mechanisms.

CO3. Perform static and dynamic force analysis of slider crank mechanism.

CO4. Determine moment of inertia of rigid bodies experimentally.

CO5. Analyze velocity and acceleration of mechanisms by vector and graphical methods.

Operation Research:

- CO1.** Identify and develop operational research models from the verbal description of the real System or production system.
- CO2.** Understand the mathematical tools that are needed to solve optimization of engineering and production problem
- CO3.** Develop a report that describes the model and the solving technique, analyze the results and propose recommendations in language understandable to the decision making processes in Management Engineering

Machine Drawing

- CO1.** Orthographic projections and sectioned views of the machine components.
- CO2.** Assembly drawings of rigid and flexible couplings, joints and their sectional views.
- CO3.** Threaded fasteners, riveted joints and drawings of engine sub assemblies.

Internal Combustion Engines:

- CO1.** Engines classification and applications (propulsion, power production, cogeneration)
- CO2.** Performance criteria, sizing and influence of atmospheric conditions. Gas exchange processes, supercharging and turbocharging. Formation, characteristics, vaporization and combustion of sprays.
- CO3.** Combustion in Spark-Ignition and Compression-Ignition engines. Classical and alternative fuels
- CO4.** P-theta and P-V diagrams -Heat release rate. Pollutant formation and control: NO_x, CO, HC etc. particulates. Engine heat transfer and cooling systems

Heat and Mass Transfer:

- CO1.** Understand the basic laws of heat transfer.
- CO2.** Account for the consequence of heat transfer in thermal analyses of engineering systems.
- CO3.** Analyze problems involving steady state heat conduction in simple geometries.
- CO4.** Develop solutions for transient heat conduction in simple geometries.
- CO5.** Understand the fundamentals of convective heat transfer process. I.e. Natural, forced and mixed convection in various type of flow. i.e. internal and external flow.
- CO6.** Analyze heat exchanger performance by using the method of log mean temperature difference. and heat exchanger performance by using the method of heat exchanger effectiveness.
- CO7.** Calculate radiation heat transfer between surfaces.
- CO8.** To solve complex problems where heat and mass transfer processes are combined with chemical reactions, as in combustion

Machine Design:

- CO1.** Understand the fundamental scientific principles of mechanical design (stress, strain, material properties, failure theories, fatigue phenomena, fracture mechanics) and their importance and use in design analysis
- CO2.** Develop practical experience with the function, design and analysis of actual machine components including prediction of their life and failure
- CO3.** Practice systematic approaches to mechanical design and analysis procedures

Project:

CO1: Review the literature and develop solutions for framed problem statement.

CO2: Implement hardware and/or software techniques for identified problems.

CO3: Test and analyze the modules of planned project.

CO4: Write technical report and deliver presentation.

CO5: Apply engineering and management principles to achieve project goal

B.Tech- Electrical & Electronics Engineering

Basics of Electrical Engineering:

CO1: Students will gain knowledge regarding the various laws and principles associated with electrical systems.

CO2 : Students will gain knowledge regarding electrical machines and apply them for practical problems.

CO3 : Students will gain knowledge regarding various types' semiconductors.

CO4 : Student will gain knowledge digital electronics.

CO5 : Student will gain knowledge on electronic systems.

CO6 : Students will acquire knowledge in using the concepts in the field of electrical engg. Projects and research.

Circuit Theory:

CO1: To analyze behavior of basic circuit elements and to apply concept of mesh and node analysis in circuit theory.

CO2: Apply various network theorems to determine the circuit response / behavior.

CO3: To apply transformation of a network to analyze time domain , differential eq.

CO4: To study necessary conditions for driving point functions , transfer function for their application to a given network for analyzing circuit design.

CO5: To analyze the sinusoidal steady state for different electric network and apply concepts of Fourier series for analyzing non sinusoidal periodic waveforms.

Electrical Power Generation:

CO1: To impart knowledge on arrangement, construction and working of thermal and hydro power plant.

CO2: To impart knowledge on arrangement, construction and working of nuclear and diesel power plant.

CO3: Students will be able to estimation of solar radiation and their constants for power generation in different technologies.

CO4: Students will be able to understand the principles of electrical generation with wind energy and terminology.

CO5: Students will be able to learn to different technique of conversion of biomass. biofuels, geothermal energy and MHD power generation.

Electrical Measurement and Measuring Instruments:

CO1: Get ability use, measure and analysis the instruments.

CO2: Calculate all the parameters related to measurements.

CO3: Understand about different instruments that are used for measurement purpose.

CO4: Identify the appropriate instruments for measurement of different quantities.

CO5: Understand various transducer and sensor.

CO6: Understand measurement of various parameters of frequency.

Electrical Machine -I:

CO1: Understand electrical principle, laws, and working of DC machines.

CO2: Analyze the construction and characteristics and application of various type of DC generators.

CO3: Analyze the construction and characteristics and application of various type of DC motors and testing of motors according to Indian standard.

CO4: Understand electrical principle , laws, and working of 1 phase transformer and losses . and also conduct various test on the transformer.

CO5: Understand electrical principle , laws, and working of 3 phase transformer and losses . and also conduct various test on the transformer.

CO6: Analyze the transformer and convert 3 phase transformer to multi phase transformer.

Electromagnetic Field Theory:

CO1: Apply vector calculus in orthogonal coordinate system.

CO2: Analyze behavior of static electric fields in standard configurations.

CO3: Analyze behavior of dynamic electric fields in standard configurations.

CO4: Analyze behavior of static magnetic fields in standard configurations .

CO5: Analyze behavior of dynamic magnetic fields in standard configurations.

CO5: Describe and analyze electromagnetic wave propagation in free space.

Control System:

CO1: . Students will be able to learn the basics of various types of control systems and automatic systems.

CO2: Students will be able to build the mathematical model of system from differential equation and vice versa and shall know the better effects of feedback due to parameter variations.

CO3: Students will be able to apply the basic knowledge to formulate the input output relationship of various component used in control system and their applications in building control system.

CO4: Students will be able to perform and study a time domain analysis of control system and different performance measures and finally know about behavior of the system.

CO5: Students will be able to learn the concept of stability , poles and zeros , using routh Hurwitz criteria and relative stability by bode plot, polar plot, Nyquist plot and be able to design and analyze the given system in frequency domain.

CO6: Students will be able to build state space model of system in different forms.

Analog and Digital Electronics

CO1: Understand the basics of opamp and its characteristics.

CO2: Apply the basic knowledge of opamp in developing various linear , non linear application of opamp.

CO3: Learn about the other linear IC's like 723,78**,79**,555 timer, 565 PLL and their applications.

CO4: Understand the digital characteristics of various logic circuits like NMOS, CMOS, TTL, ECL.

CO5: Design various combinational circuits and hence can develop more complicated once.

CO6: Analyze sequential circuit and can apply the knowledge of flip flops in designing more complicated circuits.

Microprocessor and Microcontroller:

CO1: Learn internal organization of some popular microprocessor / microcontroller.

CO2: Impart the knowledge about the instruction set.

CO3: Understand the basic idea about data transfer schemes and its applications.

CO4: Learn hardware and software interaction and integration.

CO5: Learn the design of microprocessor / microcontroller base system.

Electrical Drives:

CO1: Students will be able to understand definition, scope, objectives, and limitation of electric drives, power transistor and SCR.

CO2: Student will be analyze the construction and characteristics and application of D.C. motor .

CO3: Students will be able to analyze the construction and characteristics and application of three phase induction motor .

CO4: Students will be able to analyze the speed control methods of A.C. and D.C. motor .

CO5: Students will be able to analyze the construction and characteristics and application of sensor, transducer and switches. Students will be able to analyze the industrial applications of electric drives.

Electrical Machine II:

CO1: To impart the knowledge on fundamental of AC rotating machine

CO2: To impart the knowledge on constructional details, principle of operation of 3 phase alternator and synchronous motor

CO3: To impart the knowledge on constructional details, principle of operation, performance, starter, speed control and braking of 3 phase induction motor.

CO4: To impart the knowledge on constructional details, principle of operation, type of 1 phase induction motor and special machine.

Transmission and Distribution of Electrical Power:

CO1: Students will be able to learn the basics of various fundamentals of electrical power generation , transmission & distribution.

CO2: Students will be able to learn transmission line parameters, their calculations also the effects on transmission lines & its effects on the communication system.

CO3: Students will be able to learn electrical characteristics of transmission line such as types of transmission lines, various effects on transmission & per unit representation of power system.

CO4: Students will be able to learn load flow studies and its equation, Comparison of various methods like GS & NR.

CO5: Students will be able to learn Mechanical design along with the types of insulators also the knowledge of voltage distribution across the string and introduction to HV, LV and EHV.

CO6: Students will be able to learn information regarding conductors and insulation, different types of underground cable parameters.

Power Electronics:

CO1: To illustrate the construction, characteristics of thyristor family and understand the basic principle of operation of SCR.

CO2: To illustrate the operation of various triggering circuits for series and parallel operation of SCR's and various protection circuits of thyristors.

CO3: To analysis and design AC/DC rectifier circuit.

CO4: To analysis and design DC/AC inverter circuit.

CO5: To analysis and design DC/DC converter circuit. 6. To examine different applications of power converters.

Computer Application in Power System:

CO1: Students will be able to learn the applications of transformer and induction motor and application regarding representation using piece wise linearization and least square error method.

CO2: Students will be able to formulate the mathematical modelling of transformer design, output equation, design dimension of core and yoke.

CO3: Students will be able to learn the fundamentals of electrical circuits and thermal circuits of cooling method.

CO4: Students will be able to learn the basics of induction motor stator design, electrical and magnetic loading, types and design of winding.

CO5: Students will be able to learn the concept of air-gap length design, mmf calculations, magnetizing components, etc.

CO6: Students will be able to learn the mathematical modelling of core loss from design data, winding resistance and leakage reactance from designed data also parameters effect on performance.

Power System Operation an Control:

CO1: Students will be able to make students express Economic operation of power system and importance of LFC control.

CO2: Students will be able to allow students discuss about thermal and power plants operation in meeting the load demand optimally. (State and central wide installation).Also expressing importance of reactive power control through seminars.

CO3: Students will be able to improve student's ability in solving problems (numerical problems at present) by posing different problem models related to Economic Load Dispatch, Load Frequency Control and reactive power control.

CO4: Students will be able to apply their knowledge in PSOC for competitive exams like GATE, IES, and Public sector etc.

CO5: Students will be able to discuss single area load frequency control and two area load frequency control.

CO6: Students will be able to model and design turbine and Automatic controller.

CO7: Students will be able to express variation of frequency in the power system with varying load.

Switch Gear and Protection:

CO1: Theory & application of main components used in power system protection

CO2: Protection systems used for electric machines, transformers, bus bars, transmission lines.

CO3: Theory, construction, and applications of main types of circuit breakers.

CO4: Design the protection systems needed for each main part of a power system

CO5: Theory and construction of static relay with application

Digital Signal Processing:

CO1: Represent discrete-time signals analytically and visualize them in the time domain.

CO2: Understand the meaning and implications of the properties of systems and signals.

CO3: Understand the Transform domain and its significance and problems related to computational complexity.

CO4: Specify and design any digital filters using MATLAB

Power System Stability:

CO1: Explain the various power system instabilities and dynamics in power systems.

CO2: Apply and explain different methods for analyzing power system stability.

CO3: Create mathematical models for dynamic and stability analysis of power systems.

CO4: Explain different power system controls, and their impact on the system stability.

CO5: Demonstrate how the transient stability of a power system can be analyzed by using equal area criterion.

CO6: Analyze electromechanical modes in power systems.

Project-I:

CO1: Identify and Finalize problem statement by surveying variety of domains.

CO2: Perform requirement analysis and identify design methodologies

CO3: Present technical report by applying different Simulation tools and Evaluation metrics.

Project-II:

CO1: Review the literature and develop solutions for framed problem statement.

CO2: Implement hardware and/or software techniques for identified problems.

CO3: Test and analyze the modules of planned project.

CO4: Write technical report and deliver presentation.

CO5: Apply engineering and management principles to achieve project goal

B.Tech- Civil Engineering:

Fluid Mechanics- 1

CO 1. Determine pressures and forces on submerged bodies.

CO 2. Analyze flow rates, velocities, energy losses and momentum flux for fluid system

CO 3. Measure and describe fluid flow phenomena.

CO 4. Set up a relation among various parameters based on dimensional analysis and model study.

Rock Mechanics & Engineering Geology

CO 1. Learn geology and its types, various features like fault, fissures, weathering etc., minerals, rocks, and rock formations in relation to civil engineering structures.

CO 2. Understand various techniques to determine engineering properties of rock set.

CO 3. Understand various techniques to analyze and to made possible solutions for various Geological Engineering problems.

Strength of Material

- CO 1.** Apply the linear laws of elasticity as related to stress and strain.
- CO 2.** Understand the concept of a complex stress system.
- CO 3.** Understand of the behavior of columns and struts under axial loading.

Surveying

- CO 1.** Understand various methods and techniques of surveying and its applications (leveling, compass survey, contouring and curve settings etc.)
- CO 2.** Apply the concept of Tachometry in surveying difficult and hilly terrains to obtain the topographical map of area.
- CO 3.** Ability to use survey instruments in carrying out survey, collect data, write reports and able to perform required calculations to achieve the objective.

Building Material & Construction

- CO 1.** Extend the knowledge about the characteristics, sources and defects in various materials.
- CO 2.** Design and test the materials either in the laboratory or in the field before actual use at the site.
- CO 3.** Attain the knowledge of different components of building, their classification, materials and methods of construction and causes of their failures.
- CO 4.** Know the various services to be provided and the defects in the building along with the remedial measures for proper maintenance of the buildings.

Geomatics Engineering

- CO 1.** Develop firm understanding of remote sensing and data analysis from aircraft and satellite sensors. Manipulate and represent geographical data.
- CO 2.** Demonstrate a firm understanding of GPS for navigation and resolving the location related problems.
- CO 3.** Apply the electronic technology for surveying work.

Construction Machinery & Works Management

- CO 1.** Devise a plan and manage construction project and know the time value of money.
- CO 2.** Plan project by various methods finding the time estimates and controlling the projects while deterring and flowing the critical path.
- CO 3.** Determine minimum total cost in minimum time by conducting a crash programme and hence updating and rescheduling a project.
- CO 4.** Make aware of various construction equipment

Design of Concrete Structure

- CO 1.** Understand the properties and role of various constituent materials used in concrete making.
- CO 2.** Understand the properties of concrete and various design mix techniques for concrete.
- CO 3.** Apply the fundamental concepts, techniques in analysis and design of reinforced concrete elements i.e. beam & slab.
- CO 4.** Apply the design principles by undertaking simple design examples.

CO 5. Apply the various codal requirements related to RC members i.e. slab & beam.

Fluid Mechanics-II

CO 1. Identify and analyze the appropriate flow and subsequent effect in field

CO 2. Analyze the effect of wind and water if any civil structure is placed in flowing fluid

CO 3. Calculate the resistance forces of fluid on structure and select appropriate technique to minimize it.

CO 4. Analyze forces and design most economical open channel.

Irrigation Engineering

CO 1. Demonstrate the concepts, techniques and modernization of Irrigation.

CO 2. Plan, design and execute by applying various concepts in the irrigation structures.

CO 3. Analyze and manage irrigation and water resource system for sustainable development by applying managerial skills.

Structure Analysis –1

CO 1. Visualize the concepts of loads, supports and displacements.

CO 2. Analyze statically determinate structural systems.

CO 3. Choose a suitable method and technique for determination of structural displacement and force resultants.

CO 4. Visualize the effect of loads, rolling loads and/or reactions, support displacements and temperature on the structural response

CO 5. Utilize the concept of influence lines for deciding the critical forces and sections while designing.

Design of Steel Structures-I

CO 1. Understand and appreciate various aspects of steel construction like different types of steel sections, their specifications, advantages of steel construction etc.

CO 2. Analyze and design various types of steel connections using rivets, bolts and weld.

CO 3. Design basic elements of a steel building like beam, column, and column bases etc. for given conditions and loading.

CO 4. Estimate 'design loads' for a roof truss and then be able to design its various components like top chord members, bottom chord members, web members, purlins etc

Geotechnical Engineering

CO 1. To understand the origin of soil and to identify different types of soil.

CO 2. To understand the various physical and engineering characteristics of different types of soil.

- CO 3.** To understand the concept of slope stability.
- CO 4.** To appreciate the use of modern technology in the field of geotechnical engineering.

Structural Analysis-II

- CO 1.** Distinguish statically determinate and redundant structural systems.
- CO 2.** Choose a suitable method for the analysis of structural system (pin-jointed as well as rigid jointed) while designing.
- CO 3.** Visualize the effect of loads and/or reactions, support displacements and temperature on the structural response.
- CO 4.** Utilize the concept of influence lines for deciding the critical forces and sections while designing.

Transport Engineering-I

- CO 1.** Understand the importance & characteristics of road transport for geometric design of various roads with proper alignment based on planning principles, survey data, economics & finance data.
- CO 2.** Recognize the knowledge of highway materials & construction of various types of roads and identify the problems associated with roads & remedies for same.
- CO 3.** The traffic characteristics, interpretation of traffic data & its uses, traffic safety & various control measures and traffic environment interaction for safe & healthy environment.

Environmental Engineering – I

- CO 1.** Identify various water demands and select suitable source of water.
- CO 2.** Demonstrate a firm understanding of various water quality parameters.
- CO 3.** Generalize relevant design criteria, procedures and methods for various water treatment processes.
- CO 4.** Describe structure of drinking water supply system, water transport and its distribution.

Design of Concrete Structures-II

- CO 1.** Design various sub-structure components like isolated footing, combined footing, retaining walls, along with relevant IS code requirements.
- CO 2.** Design various super-structure components like stairs, columns, continuous beams, along with relevant IS code requirements.
- CO 3.** Apply the concepts of structure design to special structural elements like curved beams, domes, water retaining structures, along with relevant IS code requirements.

Design of Steel Structures-II

- CO 1.** Consider various primary loads, load combinations for obtaining a worst design load.

- CO 2.** Plan the structural framing of industrial buildings and bridges from the given data/design constraints.
- CO 3.** Apply the concepts of structural design to obtain suitable member sizes/sections.
- CO 4.** Prepare and deliver rough sketches to the draftsman.

Disaster Management

- CO 1.** Identify various types of disasters, its causes, effect & mitigation of each and describe the various important phases of disaster management cycle having concern of vulnerability & risk for mankind and need of emergency management system to tackle the problems.
- CO 2.** Understand the role of media, various agencies, and technology for the capacity building for effective disaster management & preparedness for future through various case studies.
- CO 3.** Understand the importance of integration of public policy and how planning & design of infrastructure, community based approach and various ecological & sustainable models can be used for effective disaster management.

Irrigation Engineering-II

- CO 1.** Analyze the structures for seepage and uplift pressure.
- CO 2.** Understand the functioning of Diversion Headwork and use of energy dissipation devices.
- CO 3.** Envisage the selection of type of fall and outlet and choice of different cross drainage works according to situation.
- CO 4.** Utilize the concept of hydraulic design in the devising the water distribution system, regulators, falls, outlets and weirs of irrigation network.

Transportation Engineering – II

- CO 1.** Functions of components of railway track
- CO 2.** Apply existing technology to the design, construction, and maintenance of railway physical facilities.
- CO 3.** Aware of the current international technology relative to Railway Engineering.
- CO 4.** Develop an awareness of major issues and problems of current interest to the Airport Engineering.

School of Management

**Programme Outcomes (POs), Programme Specific
Outcomes (PSOs) & Course Outcomes (POs)**

Hotel Management

Programme Outcomes (POs):

BHMCT:

PO1: Technical Knowledge of Hotel Management (core subjects) and Practice (applications of the subjects in profession).

PO2: Hands-on practical training on functioning of the hotel, equipments, simulated software for hotel operations.

PO3: To impart knowledge about the Professional Integrity to practice the profession of Hospitality personnel.

PO4: Providing care to the guests.

PO5: Development of Team spirit and leadership qualities.

PO6: Effective verbal and non-verbal communication while dealing with guests and peers.

PO7: Brainstorming of the potential problems pertaining to technical, cognitive and communicative skills and their solutions by mentors.

PO8: Placement of Students/ Self-employment.

PO8: Placement of Students/ Self-Employment.

Programme Specific Outcomes (PSOs):

Hotel Management is the ideal programme for students with an international drive, entrepreneurial flair, commercial insight and a service –minded approach.

In addition to management skills, considerable attention is being paid to professional skills and theory in order to help you develop the right attitude for the industry.

Programme Structure

- i. This program is a whole time program of the Maharaja Agrasen University
- ii. This is an intensive program of study of 4 academic sessions.

- iii. The program is divided into eight semesters and there shall be an examination at the end of each semester.
- iv. Each semester shall comprise of courses as indicated in course structure each of three/ four hours per week equivalent teaching obligation and equal amount of self study. Projects, exercises/case studies and assignments will be an integral part of the pedagogy.

The students after graduating have a wide array of options as below:

As Employee:

- a) **Hotels:** Students keen to make their career in Hospitality Industry have the following job profiles:
 - i) **Food Production :** As Production trainee, supervisors, managers etc.
 - ii) **Food & Beverage Service:** Serving the guest with necessary food and beverage items.
 - iii) **Housekeeping:** To assure that the hotel is maintaining conditions and the quality of standards is in accordance with the global norms.
 - iv) **Front office:** Providing the services and product that meet the guest requirement pertaining to accommodation.
 - v) **Marketing:** As sales representatives. Freshers are inducted as trainee in the Business Development Team or Marketing and Sales Representatives. They are generally promoted as Area Sales Manager, Regional Sales Manager and Vice President etc.
- b) **Restaurants:** Students can join various positions in restaurant industry that is growing rapidly.
- c) **Retail:** As retail specialist in the various section in retail sector.
- d) **Consultant:** Students can play a crucial role in setting up a hotel or restaurant by providing right consultancy.

As Entrepreneur:

- a) **Own a hotel/restaurant/cafe:** Students after graduating may start their own venture related to hospitality sector
- b) **Set up a base kitchen Unit:** After passing out, the students can open their own food production unit and start catering business.

Higher Education:

Students after BHMCT, can pursue masters in Hotel Management, MBA and Masters in Tourism to find job opportunities in research, managerial and advisory options in Hotel industry or academic institutions.

Course Outcomes (Cos):

BHMCT:

This course is designed to provide an understanding of the Service Industry & its origin, clear & complete guidelines on service basics, skill building among the students to achieve customer delight, advanced and practical inputs on organizing/planning/executing & managing Restaurant operation, “live” industry practices are incorporated for a “hands on” student understanding.

By the end of this course the student should be able to:

CO1: Explain the growth of the Hotel Industry worldwide.

CO2: Exhibit the ability to organize & explain how different types of Outlets meet the needs of different guests.

CO3: Analyze the range of services provided by the Hotels to meet guest expectations.

CO4: Demonstrate a range of operational skills for specific activities.

CO5 Compare the components of different types of meal & devise a classical menu

Travel and Tourism Management

Programme Outcomes (POs):

MTTM:

PO1: Technical Knowledge of Travel & Tourism Management (core subjects) and Practice (applications of the subjects in profession).

PO2: Hands-on training on designing & functioning of Travel Itineraries, Tour Costings and Tour Operations.

PO3: To impart knowledge about the Professional Integrity to practice the profession of Travel personnel.

PO4: Development of Team spirit and leadership qualities.

PO5: Familiarization with Tourism products, Destinations around the world.

PO6: Effective verbal and non-verbal communication while dealing with clients and primary operators.

PO7: Brainstorming of the potential problems pertaining to technical, cognitive and communicative skills and their solutions by mentors.

PO8: Placement of Students/ Self-employment.

Programme Specific Outcomes (PSOs):

The MTTM (Masters in Travel & Tourism) is the ideal programme for those graduate students who wish to travel and explore. The travel industry is one of the most competitive and innovative industries in the world with international destinations all vying for top spot. This ensures that new creative ideas and services are constantly being developed to keep up with tourist's needs in order to stay ahead of the competition.

Programme Structure

Masters of Travel & Tourism Management (MTTM) 2 years / 4 Semesters.

There shall be 8 subjects in each semester. Subjects may consist of lecture class, tutorials, field work and practicals. Appropriate credits are allotted for each component depending upon its importance as mentioned above.

There shall be a project report and Viva at the end of II, III and IV semester. The evaluation of the Field Trip Report will be done in Second Semester, similarly the Summer Training Report & Outdoor Learning Programme (OLP) report will be evaluated in the third semester. All the students shall prepare and submit a Project Report on the concerned subject of Travel/Tourism for which a study tour/On the Job Training/field visit/ industrial visit has been conducted.

TEACHING SCHEDULE:

The course is designed on LTP model (Lecture + Tutorials + Practical) with necessary weightage for all these three components.

For each subject, there shall be lecture class, tutorials and practicals (LTP) where ever necessary. The details of lecture class, tutorials and practicals (LTP) are given against each subject in the schedule given below.

The students after post-graduating have a wide array of options as below:

As Employee:

- e) **Team Associates in Travel Agency:** Students after completing the course can pursue their career in Travel agency as Team Associates or travel executives or Vacation Planners.
- f) **DTDO's:** Students can join in government jobs on the profile of District Tourism Development Officer.
- g) **Event Managers:** Students can join various positions in event management companies that is growing rapidly.
- h) **Adventure Tour Operator:** As Adventure Tourism specialist in the different adventure companies.
- i) **Ground Operator:** Students can play a crucial role in setting up a hotel or restaurant by providing right consultancy.

As Entrepreneur:

- c) **Own a Travel Agency:** Students after post graduating may start their own venture related to Travel & Tourism sector such as Travel Agency, Camping Site, Adventure Tour Operator.
- d) **As a Local/ Linguistic Guide:** After passing out, the students can provide their services as linguistic guide and local ground operator.
- e) **As an Event Manager:** After completing the programme the students can be a goof event manager and open their own business in MICE (Meetings, Incentives, Conventions and Events) Industry.

Higher Education:

After doing MTTM, students can pursue Doctoral Programme in Tourism Administration to find job opportunities in research, managerial and advisory options in Travel industry or academic institutions.

Course Outcomes (Cos):

MTTM:

This course is designed to provide an understanding of the Tourism Industry, its origin, clear & complete guidelines on basics, skill building among the students to achieve customer delight, advanced and practical inputs on organizing/planning/executing & managing Tour operations,

By the end of this course the student should be able to:

CO1: Explain the origin & growth of the Tourism Industry worldwide.

CO2: Operate and handle queries on GDS systems like (Amadeus, Galileo etc.)

CO3: Exhibit the ability to organize & explain how different types of Outlets meet the needs of different guests.

CO4: Demonstrate a range of operational skills for specific activities.

Bachelor & Master of Business Administration

Programme Outcomes (Pos)

Master of Business Administration

After studying this course, the student will be able to:

PO1: Demonstrate the ability to integrate tools and concepts from multiple business areas (Accounting, Marketing, Management Information Systems, Organizational Behavior, Finance, Economics, and Operations Management) to solve day-to-day managerial business problems.

PO2: Demonstrate the verbal and written communication skills required of executive-level employees

PO3: Demonstrate leadership ability and team-building skills through class exercises, projects and summer internship experiences.

PO4: Evaluate and integrate ethical considerations when making business decisions

PO5: Assess global opportunities and challenges for business growth

PO6: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO6: Create synergies amongst the most diverse set of variables and the ability to continuously learn, extemporize, acclimate, motivate, excel and grow.

PO7: Critically synthesize and analyze information for problem solving in business situations.

Bachelor of Business Administration

PO1: Apply knowledge of Management theories and practices to solve business problems.

PO2: Ability to develop ethical and value-based aspects of Business

PO3: To make students develop the skills to actively participate in workshops, seminars and internship programmes.

PO4: Brainstorming of the potential problems pertaining to cognitive and communicative skills and their solutions by mentors.

PO5: Enhance the coordination among students to work in a team through participation in Competitions, Case studies and various other co-curricular and extracurricular activities.

PO6: Explore and understand specific issues relating to workplace such as time management, discipline, workplace culture, teamwork, giving and receiving feedback, and achieving balance in one's life in a multidisciplinary environment.

Programme Specific Outcomes (PSOs)

MBA

Master of Business Administration is a two year programme divided into four semesters. The students are introduced to the basics of Accounting, Economics, Organisation Behaviour, Business Communication, Business Statistics, Marketing management, Financial Management, Human Resource Management, Business Research Methodology in the first year to enrich their knowledge on the various functional areas of Management. This is followed by 45 days On- the-job training or Summer Internship Programme in intended to be a six to eight week intensive in an Industry to enable students to gain exposure to bridge the gap between Industry and Academia. In the second year the students study the Elective courses which provide them knowledge in the domains of their professional interest. In the second year, the students need to develop a project research report using statistical tools. This helps the students to gain knowledge of critical skills. The specific outcomes of the programme contribute in enriching the knowledge in following ways:

PSO of Specialization 1 (Marketing Management)

This course is designed to give an introduction to the theory and practice of marketing. It would enable the students to understand how the dynamics of the market forces create an impact in the market. At the end of the course, Students would be able to comprehend the holistic marketing efforts to develop, design and implement marketing programs. They can acquire a comprehensive knowledge about products, brands, services, e-marketing etc.

PSO of Specialization 2(Human Resource Management)

This course will help the students to gain an insight into various Human Resource Practices, Appraisal System, Organisation Development, Recruitment and selection practices. The student will also learn various discretionary benefits to be provided to an employee in the real time work environment.

PSO of Specialization 3(Financial Management)

These courses will enable the students to apply the knowledge of Accounting standards, Financial tools, Financial performance, investing and dividend decisions that impact the growth of the firm. The students are able to accumulate better knowledge of Banking and Insurance products. The course will also help to identify the various avenues of Investment in view of risk and return.

Programme Specific Outcomes of Bachelor of Business Administration

The main objective of this programme is intended to develop critical thinking on the functional areas of Business Administration. The programme includes courses like management, commerce, banking, economics, industrial psychology, law, mathematics, statistics, accounting, communication, computer application and accounting software. These courses are dealt in detail and not only help the students to gain basic understanding of the subject but learn conceptual and analytical abilities. The programme is designed with an objective to provide ample scope for practical exposure to the problems and opportunities in real business. The two project studies one practical and the other theoretical as well as the mandatory requirements of industrial visits and resultant report presentation provides a cutting edge to this undergraduate programme.

BBA programme has been designed to prepare graduates for attaining the following specific outcomes:

- **Critical Thinking Skills:** Students are able to define, analyze, and devise solutions for various business problems and issues using cohesive and logical reasoning patterns for evaluating information, materials, and data.
- **Communication Skills:** Communicate in a variety of domains, including writing, speaking, listening and reading, while respecting the impact of technology on effective communication.

- **Technology Skills:** Students learn to use different tools for making effective presentations. By getting exposure to Advanced Excel/Spreadsheets will help them learn to use data in effective decision-making in a business.
- **Entrepreneurship and Innovation:** Students can demonstrate the fundamentals of creating and managing innovation, new business development, and high-growth potential entities.
- **Business Knowledge:** Students can integrate knowledge, skill and attitude that will sustain an environment of learning and creativity among them with an assurance for good careers.

Course Outcomes (Cos): MBA

MARKETING

CO1: To Understand the impact of changing global, Political, Economic, Competitive, Environmental, Cultural and Social Systems on marketing strategy development.

CO2: To understand the dynamic of the global business environment from a competitive and economic perspective.

CO3: To develop comprehensive strategic and tactical plans for an organization and work independently and collaboratively in inter and multidisciplinary and diverse environments.

BUSINESS LAWS AND ETHICS

CO1: To ensure compliance of legal formalities with values and ethics in the process of Business administration, Governance and corporate social responsibility.

CO2: To be familiar with basic legal framework on special contracts; and conversant with rights, duties and obligations of the parties concerned under each of the Special Contracts.

CO3: To be familiar with provisions with regard to performance of a contract and also to be conversant with circumstances which lead to Breach of contract and remedies in the event of breach of a contract.

CO4: To understand from practical perspective how awareness of Consumers rights for getting protection from defects of goods and deficiencies from services is brought out in the society and community

BUSINESS COMMUNICATION

CO1: It gives an understanding of the “Process of Communication in an organization” It will help them to identify the ‘Barriers of Communication’ and help them to enhance their presentations skills

CO2: It administers an understanding of the “Framework for Managing Investor Relations, & ways and means of Managing Power” and enable the students to augment their report writing skills

IT APPLICATIONS FOR MANAGEMENT

CO1: To identify various types of Information System for Business and apply Information Systems in business

CO2 Define databases & identify types of Databases and understand the need for Computer Security & Security Mechanisms

CO3: Learn about E-Commerce & its Applications and learn the Process of E-payments and emerging trends in Computing

HUMAN RESOURCE MANAGEMENT

CO1: Understand and apply the policies and practices of the primary areas of HRM including staffing, training and compensation.

CO2: Understand the importance of HR’s and their effective Management in Organizations.

CO3: Outline the nature and sources of conflict and explain the different strategies and approaches used in the resolution of conflict.

FINANCIAL MANAGEMENT

CO1: Understand the role of the financial manager in growth of the firm by considering the agency relationship.

CO2: Gain the knowledge on application of different techniques of capital budgeting under riskless and risky conditions for the investment decisions.

CO3: Build the optimum capital structure to take the optimum financing decisions. Gain the knowledge on the different concepts of cost of capital.

CO4: Understand the different methods of corporate restructuring and the principles of good governance.

INTERNATIONAL BUSINESS

CO1: Understanding cultural and political environment in the light of International trade theories.

CO2: What is the rationale for government intervention in the forms of trade regulation? Understanding major trading blocks: EU, NAFTA, ASEAN, SAARC.

CO3: To gain knowledge of structure and functions of TRIPS, TRIMS, WTO.

CO4: Differentiate the various global market entry strategies- Exporting, Licensing, Franchising etc.

FINANCIAL MARKETS AND SERVICES

CO1: Know about the financial market structure and participants in the markets and gain knowledge on the different financial services which are available in India.

CO2: Know the role of merchant bankers in providing the financial and non financial services.

CO4: Understand the Hire purchase and Lease assistance to micro small, small, medium and large scale business units.

CO5: Understand the different financial services like factoring, credit rating methods

RETAIL MANAGEMENT

CO1: The role and relevance of retail Management Types and trends of retailing

CO2: The difference between the organized and unorganized retail sector and CRM Process in retailing and legal compliances

CO3: The role and importance of international retailing, Retail pricing strategies, Retail segmentation and relationship marketing

FINANCIAL RISK MANAGEMENT

CO1: Identify the different sources of risk affecting the companies and to state the different risk management approaches.

CO2: Integrated approach to corporate risk management. The types of players in derivatives markets.

CO3: Understanding of Different types of products available in derivatives market. Valuation of futures & forward contract.

COMPENSATION MANAGEMENT

CO1: Gain knowledge of different components of compensation

CO2: Understand different monetary and non-monetary benefits of compensation Identify international components of compensation

CO3: Understand various factors required to design compensation Acquire the knowledge of different work schedules.

RESEARCH METHODOLOGY

CO1: Ability to prepare students for quality research and publication and to inspire for writing research papers for seminars, conferences, research journals.

CO2: Capable to orient towards the importance of research in the field of humanities.

OPERATIONS RESEARCH

CO1: Ability to take better and quicker decision and to coordinate all the decision of the organization.

CO2: Ability to control his subordinates and to improve the productivity of the organization.

COURSE OUTCOMES: - BBA

PRINCIPLES OF MANAGEMENT

CO1: To evaluate the global context for taking managerial actions of planning, organizing and controlling and assess global situation, including opportunities and threats that will impact management of an organization..

CO2: To integrate management principles into management practices and to analyse managerial practices and choices relative to ethical principles and standards.

BUSINESS MATHEMATICS:

CO1: Acquire knowledge about basic of Algebra linear and quadratic equation. Ability to calculate Bills and payroll system of different department and branches

CO2:To acquire knowledge about solving problems related to law operation and compound interest.

BUSINESS ACCOUNTING

CO1: Ability to demonstrate knowledge in setting up a computerized set of accounting books for profit entity.

CO2: Ability to demonstrate knowledge of various advanced accounting issues related to Financial Accounting within a global and or ethical framework

CO3: Proficient to apply accounting concepts and methods to interpret financial statements for evaluating the financial position and performance of organizations

MICRO ECONOMICS

CO1: Design competitive strategies including costing, pricing, product differentiation, and market environment according to the natures of products and the structures of the markets.

CO2: Understand the four basic market models of perfect competition, monopoly, monopolistic competition, and oligopoly, and how price and quantity are determined in each model.

CO3: Derive the equilibrium conditions for cost minimization and profit maximization. Analyze the demand and supply conditions and assess the position of a company

BUSINESS COMMUNICATION

CO1: Ability to develop importance of communication in personal/professional life and achieve efficiency in understanding the opportunities in the field of communications

CO2: Acquire competence in oral, written and non verbal communication and capable to rectify common mistake of communication

INTRODUCTION TO COMPUTERS

CO1: Understand the fundamental hardware components that make up a computer's hardware and the role of each of these components

CO2: Describe some examples of computers and state the effect that the use of computer technology has had on some common products.

FINANCIAL MANAGEMENT

CO1: Development of aptitude to analyze financial statements using standard financial ratios of liquidity, activity, debt, profitability, and market value.

CO2: Acquire the expertise of measures of cost of capital and financial leverage to form long-term financial policies for business and acquire knowledge of capital investment decisions and financial policies to business valuations.

MACRO ECONOMICS

CO1: Understand the implications of interference in a market economy, including government policy

CO2: Understand the roles of fiscal and monetary policy in fighting recessions & inflation and also understand factors that contribute to and detract from long-term economic growth.

ORGANIZATIONAL BEHAVIOUR

CO1: Acquire the knowledge of organization in students helpful to them to make their careers in business firms.

CO1: Develop the professional skills to handle the departments in any of the business organizations and create career opportunity to adjust as the business managers in national and international firms.

COST AND MANAGEMENT ACCOUNTING

CO1: Develop and demonstrate the need for a balance between financial and non-financial information in decision making, control and performance evaluation applications of management accounting;

CO2: Acquire the knowledge to evaluate complex ideas and tolerate ambiguity in managerial and organizational problem-solving.

BUSINESS STATISTICS

CO1: Capable to analysis for any product, even financial products and analyse to compare alternative scenarios.

CO2: Ability to use in statistics or summarizing the data and acquire knowledge of market research and product development.

HUMAN RESOURCE MANAGEMENT

CO1: Demonstrate an understanding of the human resources management process and its importance to organizational effectiveness.

CO1: Acquire an understanding of processes and tools commonly used to attract, develop and retain a high performance workforce and to identify and appreciate the significance of the ethical issues in HR.

MARKETING MANAGEMENT

CO1: Ability to Getting information regarding demand and Planning production accordingly.

CO2: Availability of various products for use and reduction in distribution cost.

PRODUCTION & OPERATIONS MANAGEMENT

CO1: Acquire to understand about industries operates his day to day operations and ability to elimination of wastage of time, labour and money.

CO2: Acquire competence in handling inventory and supply chain management.

BUSINESS LAWS

CO1: Develop the understanding in students to create and kind of business contract and acquire skill in students to handle the legal matters related with the business.

CO2: Proficiency to make partnership agreements as the laws and regulations of companies act.

QUALITY MANAGEMENT

CO1: Acquire knowledge about how to improve the business operations and productivity and to learn how to reduce cost and use the scarce resources.

CO2: Capable to achievement of stability and reliability regarding the techniques, equipment, and resources being used in a project.

FOUNDATIONS OF INTERNATIONAL BUSINESS

CO1: To identify and evaluate the complexities of international business and globalization from home versus host-country, and regional, cultural perspectives.

CO2: Ability to analyze the relationships between international business and the political, economic, legal and social policies of countries, regions and international institutions.

MANAGEMENT INFORMATION SYSTEM

CO1: Understand the leadership role of Management Information Systems in achieving business competitive advantage through informed decision-making.

CO2: Apply Management Information Systems knowledge and skills learned to facilitate the acquisition, development, deployment, and management of information systems.

ENVIRONMENT STUDIES

CO1: Ability to work and learn effectively and constructively as a member of a team at field stations or in remote environmental sites on land or at sea.

CO2: Ability to apply quantitative reasoning skills to environmental problems including basic calculations related to energy, water, and air issues and the use of statistical methods in data analysis and argumentation

BUSINESS ENVIRONMENT

CO1: Ability to demonstrate progressive learning in the elements of managerial decision making, including planning, directing and controlling activities in a business environment.

CO2: Ability to use personal and ethical frameworks to help them respond to ethical dilemmas. Acquire knowledge of strong organizational skills and a capacity for responsive and timely work.

PROJECT MANAGEMENT

CO1: Acquire the knowledge to conduct project planning activities that accurately forecast project costs, timelines & quality and develop a strong working knowledge of ethics & professional responsibility.

CO2: Capable to demonstrate effective organizational leadership & change skills for managing projects, project teams & stakeholders.

ADVERTISING AND SALES MANAGEMENT

CO1: Analyze the expanding environment of media and communication techniques and to assess the strengths, weaknesses, opportunities and threats (SWOT) of different kinds of promotional campaigns.

CO2: Examine the importance of market segmentation, position and action objectives to the development of an advertising and promotion program.

MARKETING RESEARCH

CO1: Ability to determine customer attitudes and preferences and also capable to learn about competitive products

CO2: Acquire knowledge of Test product features and proficient to determine market size and growth potential

CORPORATE STRATEGY

CO1: Acquire the knowledge of Strategic research - identifying, gathering, and verifying relevant data.

CO2: Develop expertise of evaluating and analyzing facts to identify opportunities and threats in the external environment and strengths and weaknesses within the organization (i.e., perform a situation/SWOT analysis).

SERVICES MARKETING

CO1: Acquiring the knowledge to understand the synergy of marketing helpful to create service productivity.

CO2: Capable to understand the service leadership and culture. and develop the professional skills to become the marketing manager.

Bachelor & Master of Commerce

Programme Outcomes (Pos):

Bachelor of Commerce (G)

- PO 1: Three years of Bachelors in Commerce program prepares students in the in the fundamentals of Commerce and Finance.
- PO 2: The curriculum focuses on number of specializations that endow students to face to face the modern-day challenges in commerce and business.
- PO 3: This program gives practical exposure to the students that make this program more value based
- PO 4: The all-inclusive outlook of the course offer a number job oriented courses ensures that students are trained into up-to-date knowledge.
- PO 5: Program demonstrates knowledge of key concepts underlying quantitative decision analysis
- PO 6: Program demonstrate a knowledge of economic theory as it relates to markets, firms, government policy, and resource allocation
- PO 7: Program equip the students with basic mathematical and statistical skills necessary for analysis of a range of problems in economics, actuarial studies, accounting, marketing, management and finance
- PO 8: Students learn interpersonal skills and gains an ability to exert in teams with better communication

Programme Specific Outcomes (PSOs):

The Bachelor of Commerce aims to provide students with the knowledge, tools of analysis and skills with which to understand and participate in the modern business and economics world, to prepare them for subsequent graduate studies and to achieve success in their professional careers. The emphasis is on development of skills required in the industry, research and higher educational fields. It will make the students able to perform professionally with social, cultural and ethical responsibility as an individual as well as in multifaceted teams with positive attitude. By virtue of the training they can become an Manager, Accountant , Management Accountant, cost Accountant, Bank Manager, Auditor, Company Secretary, Teacher, Professor, Stock Agents, Government jobs etc.,

- PSO 1 Demonstrate progressive affective domain development of values, the role of accounting in society and business
- PSO 2 Learn relevant financial accounting career skills, applying both quantitative and qualitative knowledge to their future careers in business.

- PSO 3 Students will learn relevant managerial accounting career skills, applying both quantitative and qualitative knowledge to their future careers in business.
- PSO 4: Students will be able to recognize features and roles of businessmen, entrepreneur, managers, consultant, which will help learners to possess knowledge and other soft skills and to react aptly when confronted with critical decision making
- PSO 5: Students will acquire the skills like effective communication, decision making, problem solving in day to day business affairs
- PSO 6: Demonstrate progressive learning of various tax issues and tax forms related to individuals. Students will be able to demonstrate knowledge in setting up a computerized set of accounting books
- PSO 7: Students can also acquire practical skills to work as tax consultant, audit assistant and other financial supporting services..
- PSO 8: Students will be able to prove proficiency with the ability to engage in competitive exams like CA, CS, ICWA and other courses
- PSO 9: Students will involve in various co-curricular activities to demonstrate relevancy of foundational and theoretical knowledge of their academic major and to gain practical exposure.
- PSO 10: Students will gain thorough systematic and subject skills within various disciplines of commerce, business, accounting, economics, finance, auditing and marketing
- PSO 11: Students will be able to do higher education and advance research in the field of commerce and finance.

Course Outcomes (Cos):

Subject Name: Business Organisation and Management

- CO 1** Use business terms and concepts when communicating.
- CO 2** Explain the financial concepts used in making business decision.
- CO 3** Use effective communication skills to promote respect and relationship.
- CO 4** Utilize information by applying a variety of business and industry software and hardware to major business function.
- CO5** Demonstrate a basic understanding of business management.

Subject Name: Financial Accounting

- CO1** Described various accounting concepts and double entry system of book keeping.
- CO2** Understands on how to deal with adjustments in Final accounts and also about preparation of accounting books for Non-Profit Organization.
- CO3** Acquired knowledge on various types of errors and on how to rectify those errors.
- CO4** Describe about preparation of Bank Reconciliation statement.

CO5 Calculation of Depreciation under Straight line and Write down value method.

CO6 Determination of insurance claim on fire accident.

CO7 Determination of profit / loss under Statement of affairs and Conversion method for the concerns having singly entry system of book keeping.

Subject Name: Computer Fundamentals

CO 1 Understand the meaning and basic components of a computer system.

CO2 To learn generation, classification and application of computers.

CO 3 Knowledge of computer equipment, including both hardware and software.

CO 4. To learn input devices and output devices in detail.

CO5. To learn memory and its types in detail.

CO 6. Introduced students to information, its need, use, characteristics and level of information.

CO7. Use word-processing software (MS-Word) to solve basic information systems problems.

Subject Name: Business Communication

CO1 Described about principles of effective communication.

CO2 Classifying the different kinds of business letters and its purpose.

CO3 Acquired knowledge about requirement of different types of correspondence and how to write the same.

CO4 Analyses and preparation of reports & minutes of meeting.

CO5 Described different forms of communication, its importance & need– Fax, E-mail etc.

Subject Name: Business Economics

CO1 Understand the scope and importance of business economics.

CO2 Describe about demand, supply concepts and demand forecasting.

CO3 Understand the concept of law of diminishing marginal utility and indifference curve.

CO4 Describe about variable proportion, law of returns to scale, BEP and economies of scale.

CO5 Understand about market structure and Price and output determination of different market.

Subject Name: Fundamentals of Money and Banking

CO 1 Students will understand the role of money and banks in the broader economy.

CO 2 Specifically, students should gain an understanding of the unique role of banks in the financial system.

CO 3 Students will also learn the relevance of the Federal Reserve and related central banking topics, including the causes, policy responses, and lessons associated with the current financial market crisis

Subject Name: Quantitative Techniques

- CO1.** Demonstrate the role of quantitative techniques in the field of business/industry, illustrate different types of equations, solve equations and system of equations, understand the concept of sets, illustrate and apply basic set operations.
- CO2.** Explain the rules for calculating derivatives, uses and application in calculating inter-relationship among total, marginal and average cost and revenue, calculate maxima, minima, elasticity, decide the optimal level of production for a firm.
- CO3.** Demonstrate the rules for calculating integration, describe the importance and application of integration in consumers' and producers' surpluses, total revenue and cost.
- CO4.** Illustrate matrix operation, minors, cofactors, use cofactor method to find inverse of a matrix, use Cramer's rule to solve systems of equations.
- CO5.** Demonstrate knowledge of basic concept of linear program, duality, capacity to solve linear programming problems', familiar with the basic techniques most commonly used in economic problems.

Subject Name: Advanced Financial Accounting

- CO1** Described about preparation of branch accounts, inter branch and head office accounts.
- CO2** Acquired knowledge on preparation of departmental accounts with respect to apportionment of overheads.
- CO3** Calculation of interest on hire purchase and installment system.
- CO4** Described about new profit sharing ratio and calculation of profit during admission of a new partner and retirement of partner.
- CO5** Computing the accounting treatment during death of a partner and dissolution of a partner.

Subject Name: Environment Science

- CO1** Understand the concepts and methods from ecological and physical sciences and their application in environmental problem solving
- CO2** Appreciate the ethical, cross-cultural, and historical context of environmental issues and the links between human and natural systems.
- CO3** Apply systems concepts and methodologies to analyze and understand interactions between social and environmental processes.

CO4 Reflect critically about their roles and identities as citizens, consumers and environmental actors in a complex, interconnected world.

Subject Name: Mercantile Law

CO1 Understand the legal rules regarding contract.

CO2 Knowledge on rules necessary for legal enforcement.

CO3 Awareness of rules regarding signing of the contract.

CO4 Describe about different kinds of performances of the contract.

CO5 Identification of rules and regulations of sale of goods act and Partnership Act.

Subject Name: Corporate Accounting

CO 1 Enabling the students to understand the features of Shares and Debentures

CO 2 Develop an understanding about redemption of Shares and Debenture and its types

CO 3 To give an exposure to the company final accounts

CO 4 To provide knowledge on Goodwill

CO 5 Students can get an idea about internal reconstruction

Subject Name: E- Commerce

CO1 Understand the concept of E-Commerce and Describe the opportunities and challenges offered by E-Commerce

CO2 Able to handle electronic payment technology and requirements for internet based payments

CO3 Understand the categories of E-Commerce and understand the different applications of E-Commerce

CO4 To understand and identify security issues of E-Commerce **CO-V** Understand the concept of WEB Based Business Understand the M-Commerce applications

Subject Name: Organizational Behaviour

CO 1 To equip the students with the basic idea and introduction on organizational behavior as a concept

CO 2 To give a light on the concept and difference theories on motivation

CO 3 Explain and helps the students to gain more knowledge on Group Behavior

CO 4 To introduce the concept of leadership

CO 5 Understand the concept of conflict management

Subject Name: Banking Theory Law And Practice

- CO1 Understand and aware about the process of banking.
- CO2 Comprehend the knowledge about growth of the Indian banking system.
- CO3 Describe the functions of RBI.
- CO4 Grasp about E-Banking in detail.

Subject Name: Income Tax

- CO1 To equip the students with thoughts and points on assessment of firms
- CO2 Impart knowledge on the provisions of Income tax law and practice and make students compute the assessment practices under the various heads of income.
- CO3 Acquire knowledge about taxation, Rates of tax & Residential status.
- CO4 Described about the provisions of salary income, House property & business or profession and their computation.
- CO5 Enhance assessment of Individuals filing of returns and PAN.
- CO 6 Understand the concept of deductions under the section 80C.

Subject Name: Cost Accounting

- CO1 Understand the concepts of cost accounting and to expertise in presenting cost center & profit center.
- CO2 Proficiency in preparing cost sheet with & without stock adjustment.
- CO3 Gain expert knowledge on Materials cost and its methodologies.
- CO4 Computation of wages under different methods of wage payment.
- CO5 Explore in depth knowledge on classification of overheads.

Subject Name : Principles of Auditing

- CO1 Described about the concept of auditing, types and methods of auditing.
- CO2 Acquired knowledge about vouching of cash & credit transaction, verification of assets & liabilities.
- CO3 Described about preparation of different methods & auditors responsibility regarding depreciation & reserves.
- CO4 Comprehend the knowledge about appointment of different types of auditor, their rights and duties.
- CO5 Acquired knowledge about audit in EDP environment.

Subject Name: Corporate Law

- CO 1 Know about the concept of company and shares.
- CO2. Know about the company law in the India.

CO3. Understand the use of the memorandum of association and article of association in a company, they also learn from this course.

CO4. Use of prospectus in a company.

CO5. Understand the relationship between company and debenture holders.

Subject Name: Business Ethics and Corporate Governance

CO 1 Compare and analyse the corporate governance issues involved in business and the workplace

CO2. Compare and analyse the role of stakeholders and corporate managers' moral obligations in business decision making.

CO3. Apply regulatory requirements to develop appropriate board and committee functions and structures.

CO4. Apply corporate governance best practice principles and recommendations to achieve appropriate business practice.

CO5. Analyse and explain economic, social and environmental sustainability issues relating to business practice

Subject Name: Business Environment

CO1 Describe the concept of different types of environment.

CO2 Gained knowledge on business and strategic decision.

CO3 Acquired knowledge on provisions of Indian constitution pertaining to business.

CO4 Comprehend the knowledge about the social responsibility of business.

CO5 Acquired knowledge about GDP, Financial environment, RBI stock exchange, IDBI, NBFC.

Subject Name: Management Accounting

CO 1 To enlighten the students thought and knowledge on management Accounting

CO 2 Helps to give proper idea on financial statement analysis in practical point of view

CO 3 To introduce the concept of fund flow and cash flow statement

CO 4 To provide knowledge about budget control keeping in mind the scope of the concept

CO 5 To develop the know-how and concept of marginal costing with practical problems

Subject Name: Indian Economy

CO1 Understand the Economic development and economic growth.

CO2 Describe about poverty, population and unemployment.

CO3 Acquired knowledge about the agriculture and Public distribution System.

CO4 Describe about the small scale, large scale and cottage industries.

CO5 Understand about the 1 to 12th five year planning in India.

Subject Name: Operation Research

CO1 Describe the Concept of Operation Research.

CO2 Analyse the various techniques of solving problem.

CO3 Calculation of LPP and its limitations.

CO4 Applications of LPP in business and the students will be able to solve Problems using simplex method.

CO5 Computation of transportation problem and application of Game theory.

Subject Name: Entrepreneurship

CO1 To aiming to develop students about Entrepreneurship development

CO2 To create an awareness on various Entrepreneurship Development Programme

CO3 To enable them to understand project formulation

CO4 To familiarize the students with EDP schemes

CO5 To give an introduction about MSME, EDI and other training institutes in Entrepreneurship

Subject Name: Security Analysis and Portfolio Management

CO1 To help them to understand security analysis

CO2 To create awareness about risk and return of different investments

CO3 To enlighten the evolution of securities and derivatives

CO4 To make them understand the investment decisions and portfolio performance

PROGRAMME OUTCOMES (POS):

M.Com

PO1: the program will help students to develop business insight, managerial skills and abilities and become capable of maintaining business accounts.

PO2: student will be able to communicate effectively both in terms of corporate world as well as at social interaction.

PO3: the programme will induce entrepreneurship spirit among students and encourage them to participate effectively in business, social and civic issues eventually leading to national development.

PO4: the programme will develop the ability to think critically and independently translating into a well developed personal value system.

PO5: the programme will focus on the knowledge and skills that will be demonstrated in the programme.

PO6: the programme will develop the ability to explain, apply, interpret, create, design to make concrete and explicit the actions and behaviours that a student should be able to demonstrate.

PROGRAMME SPECIFIC OUTCOMES

M.com

PSO1: student will be able to understand the role of businessmen, entrepreneurs and managers. Also the students are able for critical decision making.

PSO2: programme provides learning environment to the students through which students can be made aware of the global and national outlook of the economy.

PSO3: the students will be benefited with the skills necessary for effective communication and decision making technique which are useful in day to day business problems.

PSO4: through this programme the students will engage in various co-curricular activities. The programme can also exhibit their theoretical knowledge and gain practical exposure to corporate world.

PSO5: students can also attain practical skills/ 'knowledge to work as tax consultants, audit assistant etc.

PSO6: the programme provides platform for the researchers to get new dimensions for the economy.

PSO7: students will be able to go for higher education and advance research in the field of commerce and finance.

PSO8: students are able to understand and develop logical, ethical and professional behaviour.

PSO9: the programme also helps the students to demonstrate specialised skills, knowledge and ability to nurture them for tackling the different situations of the life for their overall development.

COURSE SPECIFIC OUTCOMES

ACCOUNTING FOR MANAGERIAL DECISION

CO1: this subject provides detailed insight into accounting regulations and accounting aspects of companies.

CO2: to know about the stages and process of standard setting by ICAI in India along with the compliance and applicability of accounting standards in India.

CO3: to understand the budgets and also gain knowledge about various type of budgets and budgetary control.

CO4: To learn about the financial status with the help of ratio analysis and also understand the concept of cost –volume profit analysis and decision making in Accounting and reporting

CO5: it also covers contemporary issues in accounting: Price level accounting; Value chain analysis; Activity-based costing; Quality costing; Kaizen Costing Target and life cycle costing.

BUSINESS STATISTICS

CO1: the subject will enable students to understand correlation and regression analysis, Probability distribution: Binomial, Poisson and normal distribution.

CO2: Will learn the Hypotheses testing, Sampling tests – Large and small Sample tests – Z-Test, T-Test.

CO3: The course will help students to understand parametric and Non-Parametric tests. Chi Square Test: Independent of Attributes & Test of Goodness of fit.

CO4: course will enable the students to understand concepts of Type I& Type II errors, Level of Significance, Confidence Interval, Acceptance & Critical Regions, One tailed & two tailed test.

MANAGERIAL ECONOMICS

CO1: this will enable the students to understand the meaning and nature of managerial economics and theories of consumer choice.

CO2: the course will acquaint the student with cost theory and estimation, Economic concept of cost. Types of markets and characteristics of different market structures;

CO3: this will also enable the students to understand the nature and phases of a Business cycle, Inflation, Inflation in terms of demand-pull and cost-push factors, Effects of inflation. Monetary and Fiscal Policy.

CO4: this will also enable students to understand the various macroeconomic indicators.

COMPUTER FUNDAMENTAL FOR BUSINESS

CO1: to know the basics of computer system, computer software & hardware and information processing system.

CO2: to understand the Number System: Bit, Byte, Binary, Decimal, Hexadecimal, and Octal Systems, Conversion from One System to the other.

CO3: To learn about computer network & communication: network types, network topologies, network communication devices, physical communication media, OSI, network protocol (TCP/ IP), internet and its applications: E-mail, TELNET, FTP, World Wide Web, internet chatting.

CO4: to learn about Word Editing Features, Formatting Features, Saving, Printing, Table Handling, Page Settings, and Spell-Checking.

CO5: to gain knowledge of Spreadsheet: Workbook, Worksheets, Data Types, Operators, Cell Formats, Freeze Panes, Editing Features, Formatting Features, Creating Formulas, using Formulas, Sorting, Filtering, Functions, Charts and Graphs.

CO6: Presentation Graphics Software: Templates, Views, Formatting Slide, Slides with Graphs, Animation, Using Special Features, Presenting Slide Shows.

ENTREPRENEURSHIP DEVELOPMENT

CO1: To know the basics of Entrepreneurship, Factors & Problems (Operational and Non-Operational) and Obstacles.

CO2: To understand the Theories of Entrepreneurship, Schumpeter's, Ducker's and Walker's views on Entrepreneur.

CO3: To learn about the converting business opportunities into reality, feasibility Report and analysis, Entrepreneurial Problems.

CO4: To be familiar with External Environment Analysis, Venture Capital, entrepreneurship Development Programmes in India.

BUSINESS ENVIRONMENT

CO1: systematically explores the external environment: legal & regulatory, macroeconomics, cultural, political and technological.

CO2: to know the Economic Environment, industrial policy, an overview of five year plans and Niti Aayog, fiscal policy, RBI- Role and functions, monetary policy, EXIM policy, public sector and economic development, New economic policy: Economic reforms , and also an introduction to Special Economic Zones (SEZs).

CO3: discuss the supply and demand theory and its impact on insurance.

CO4: explain the effects of government policy on the economic environment.

CO5: discussing the Stock Exchanges, Role and functions of SEBI as regulator of financial markets.

MANAGEMENT PROCESS & ORGANIZATIONAL BEHAVIOUR

CO1: to discuss and communicate the evaluation of management and Emergence of Management Thought – Classical, Neo-Classical and Modern Theories and how it will affect future managers.

CO2: to identify and explain Planning and Decision Making Process, Creativity in Decision Making Techniques and also identify some skills required for the contemporary management practices.

CO3: to have the in-depth understanding of the process of motivation and theories of motivation.

CO4: to know the various leadership styles to anticipate the consequences of each leadership style.

CO5: to make the students to practice the process of management functions: Planning, organizing, staffing, directing and controlling.

CO6: to discuss Organizational Behaviour and Models of OB, Contributing Disciplines to OB: Emerging Challenges for OB, Foundations of Individual Behaviour, understanding of Attitudes, perception, Personality, and Learning.

STRATEGIC FINANCIAL MANAGEMENT

CO1: will enable the students to understand the financial policy and strategic planning, risk and uncertainty.

CO2: to explain financial strategy for capital structure, strategy for shareholders value maximization.

CO3: the course will acquaint the students with the expansion and restructuring: merger and amalgamations, divestment strategy and evaluation of merger proposal.

CO4: the course will help students to understand the leasing, venture capital, fiscal incentives and capital rationing.

CO5: it will make students to understand the financial strategy, corporate strategy and shareholder value creation.

MARKETING MANAGEMENT

CO1: to know the concept of Marketing and various problems in marketing

CO2: the course will enable students to understand the basis for market segmentation, branding, trade mark and product life cycle.

CO3: it will make student familiar with Price strategies, distribution channels and also the factors affecting choice of distribution channels.

CO4: to learn the strategies for new product planning and development branding, packaging, labelling and pricing decision strategies.

CO5: to ensure the students to understand the product promotion techniques and various issues and complexities advertising.

BUSINESS RESEARCH METHODS

CO1: to understand a meaning and concept of research design.

CO2: the students will be able to identify the process of designing a research study from its initiation to the report.

CO3: the course make student familiar with ethical issues in research.

CO4: to explain the sampling techniques, methods and hypothesis testing. t-test, Z-test, chi square test.

CO5: student should know the analysis of variance; factor analysis, cluster analysis, report preparation and presentation, use of computers in research, essential qualities of research report.

HUMAN RESOURCE MANAGEMENT

CO1: the subject makes students aware of basic aspects of human resource management to understand the functioning of human resource management in an organizational setting.

CO2: it enables students to understand the importance and scope of Human Resource Management in India.

CO3: students will be able to understand the concept of Recruitment and Selection- Sources of Recruitment, Selection Process, Test, Types and methods of Methods of Training.

CO4: to gain an insight about the wages and salary Administration, Wage Boards and Pay Commission, Wage Incentive, Fringe Benefits, Employees Welfare, Safety and Health Measures, Redressal of Grievances.

CO5: to understand the TQM Quality circles and Quality control, Quality of Work Life, Work Life Balance.

CO6: to make student able to develop strategic action plans about HRM, Industrial Relations, Parties to Industrial relations. And also Trade Union, Problems of Trade Unions, Causes for Industrial Disputes, Settlement of Industrial Disputes.

FINANCIAL MANAGEMENT

CO1: course will enable the students to understand the meaning and nature of financial management and also the concept of cost of capital.

CO2: this will acquaint students with the leverages, capital structure and dividend decisions.

CO3: it will help students to understand the detailed concept of capital budgeting decisions with its various methods and risk analysis pertaining to capital budgeting decisions.

CO4: will enable the students to understand the concept of corporate and financial restructuring.

INTERNATIONAL BUSINESS ENVIRONMENT

CO1: will enable the students to understand the meaning and nature of international business environment, international trade and protection.

CO2: will acquaint the students with the international factor movements, multinational firms and FDI, Political economy of trade, WTO.

CO3: will help students to understand the international macroeconomics, National income accounting and balance of payments.

CO4: it will enable the students to understand the concept of international monetary system and international capital markets.

CO5: student will acquire the knowledge of International Economic Environment, Institutional support to International business- UNO, IMF, World Bank, UNCTAD, International financial environment, International Monetary System, Management of risk in foreign exchange markets; Foreign Direct Investment.

CO6: Will acquaint the students with the International Economic Cooperation and Agreements, SAARC, SAPTA, Indo-Lanka Free Trade Agreements, NAFTA.

CO7: Will help students to gain understanding pertaining to IMF, WB, ADB, UNCTAD, IMODO and WTO.

SECURITY ANALYSIS AND PORTFOLIO MANAGEMENT

CO1: students will gain a comprehensive understanding of the concept of security portfolio management

CO2: course caters the needs of the industry by providing the skilled students who are able to take managerial decisions by implementing qualitative techniques and operational research.

CO3: students will gain skills of building portfolio with the help of Markowitz's model, Sharpe's Index Model and capital assets pricing model.

CO3: students will understand the techniques of portfolio performance evaluation.

CO4: student will acquire the knowledge of Capital Market Theory: CAPM theory, Assumptions, CAPM Model. Portfolio Revision and Evaluation, strategies of portfolio revision, constrain in portfolio revision.

CO5: student will understand the Fundamental Analysis & Technical Analysis Economic Analysis Industry.

PROJECT MANAGEMENT

CO1: The course will emphasize on imparting the knowledge, skills, tools and techniques involved in carrying out project.

CO2: manage the scope, cost, timing and quality of the project.

CO3: make students aware about Concepts of Project Management, Meaning and definition of Project, characteristics of a project, Project Life Cycle Phases, Role of a Project Manager, The Planning Process: Work Breakdown Structure, Cost Planning – tools & techniques, cost estimation, Time Planning – tools & techniques.

CO4: will enable student to understand the Project Appraisal: Technical Feasibility, Economic Feasibility, Financial Evaluation, Appraisal Under Risk and Uncertainty, Sensitivity Analysis, Social Cost Benefit Analysis: Rationale, Fundamentals of Shadow Pricing, Basic approaches to Social Cost Benefit Analysis to achieve project success.

CO5: course will emphasize on efficient utilisation of technology; Graphic Presentation of Project Scheduling: Graphic representation of project activities, Network Analysis, Network Techniques: PERT and CPM. Resource Allocation, Overview of MS-Project 2000.

CO6: will enable the student to understand the Project Control: Project direction, co-ordination & control, project cost evaluations & cost control, Interface with industrial sickness, project monitoring & MIS.

FINANCIAL SERVICES

CO1: this course gives students an insight about Indian Financial System and its history, operating procedure and its relevance in Import & Export.

CO2: course will enable students to make an insight in Mutual funds and AMCs: Concept, origin and growth of mutual funds, Constitution & management of MFs - Sponsors, Trustees, AMCs, and custodians, credit rating agencies in India and International credit rating agencies.

CO3: will enable concept and development of leasing, business, difference between leasing & hire purchase, types of leasing business, advantages to lessor and lessee, Tax aspect of leasing.

CO4: course will emphasize on concepts and characteristics of venture capital, venture capital in India, guidelines for venture capital.

CO5: make students aware about Origin and development of merchant banking in India scope, organizational aspects and importance of merchant bankers, guidelines of SEBI w.r.t. Merchant bankers.

CO6: make students to understand the debt Securitization, development of factoring types & importance, procedural aspects in factoring, financial aspects, prospects of factoring in India and Plastic Money: Concept and different forms of plastic money - credit and debit cards, pros and cons.

INTERNATIONAL FINANCIAL MANAGEMENT

CO1: to provide an introduction to international finance theory exchange rate determinants, foreign exchange exposure, foreign exchange markets, interest rate parity.

CO2: to provide an insight to Theories of International business, international business methods, recent changes and challenges in IFM.

CO3: to enable the students to understand International Financial Management Globalization of International Financial Management.

CO4: to develop International Capital Budgeting: Net Present Value and its drawbacks, Adjusted Net Present Value, analysis of international capital budgeting, Direct Investments, Foreign exchange risk and its impact on capital budgeting.

CO5: will enhance the knowledge of Bond Financing, Loan Financing, Securitized Financing (GDR and ADR).

CO6: to teach students international CAPM and cost of capital of a Foreign Investment, the capital structure of MNCs, cost of capital in segmented versus integrated markets.

CO7: to make student to understand Export - Import bank of India, Financing in the short-term and in the long -term, managing net working capital.

SERVICE MARKETING

CO1: to understand the importance of services and the seven Ps of services.

CO2: demonstrate knowledge about service design, service quality, and the gaps model of service quality.

CO3: Better understanding of the demand and capacity management, yield management.

CO4: understand the concept of Employees' Role in Service Delivery; Customers' Roles in Service; Delivering Services through International and Electronic Channels, Managing Demand and Capacity, Integrated Services Marketing Communications; Pricing of services.

FINANCIAL DERIVATIVES

CO1: To make students to understand genesis of derivatives trading by tracing its historical development, types of traded derivatives products, regulation and policy

developments, trend and growth, future prospects and challenges of derivative market in India

CO2: will enable students to know the Swaps, Structure of Swaps, Interest Rate Swaps, Currency Swaps, Commodity Swaps, Swap Variant Swap Dealer Role, Equity Swaps, Economic Functions of Swap Transactions - FRAs and Swaps.

CO3: demonstrate critical thinking along with analytical and problem solving skills in the context of derivatives pricing and hedging practice.

CO4: exhibit an understanding of pricing forwards, futures and options contracts.

CO4: Explain Option Markets in India on NSE and BSE. Option Pricing – Intrinsic Value and Time Value- Pricing at Expiration – Factors Affecting Options pricing- Put-Call Parity Pricing Relationship- Pricing Models

INTERNATIONAL MARKETING MANAGEMENT

CO1: the course provides the knowledge about International Marketing Environment to the students.

CO2: To know the concept of International Marketing, problems in international marketing and ways to be international.

CO3: To understand the external marketing environment and different International market entry strategies.

CO4: To be familiar with different techniques of foreign market selection, their segmentation, positioning.

CO5: How to make successful International Marketing Plan, Organising and controlling, evaluating the Impact of globalisation.

CO6: To learn the New Product planning & development, branding, Packaging and Labelling, Pricing Decisions and Strategies.

CONSUMERS BEHAVIOUR

CO1: students will gain a comprehensive understanding regarding consumer behaviour, techniques, process and develop the understanding of the consumer behavior.

CO2: student will understand about the Consumer Behavior& Marketing, Stages in Marketing, Application of Consumer Behavior Science, Changing Role of Product, Marketer and Consumer.

CO3: student will understand about the Learning Theories: Stimulus Response Theory, Generalization, Cognitive Learning Theory, and Branding. Attitude Formation of Attitude, Attitude Motivate, Role of Influences- Influences of Family, Influence of Groups & Peers, Influence of Media.

CO4: student will learn about the Concept of Motivation – Motivation Process, Positive & Negative Motivation – Integrity of Motivation – Hierarchy of Needs – Emerging Concept of Involvement, and External Determinants of Buying Behavior: Family, reference group and social class; Influence of culture; Sub-cultural aspects of consumer behavior, Models of buyer behavior.

CO5: will enable the students to learn about Consumer Protection: Role of Government, Consumer Protection Legislation in India, Role of Media – Ethics in Business and its relevance to the study of Consumer Behavior.

CORPORATE PERFORMANCE MEASUREMENT

CO1: this course introduces students to the types of managerial information used to effectively and efficiently run the business.

CO2: student will know about the performance goals and incentives and the use of diagnostic tools and control and performance measurement using Economic Value Added (EVA); Comparison between Return on Investment (ROI) and EVA methodology of measuring performance

CO3: student will aware about how to measure the Corporate Performance through Balanced Scorecard and its value creation potential;. Rationality behind balance score card; performance dimensions of the balance score card; Throughput Accounting.

CO4: student will learn about Information Systems aspects of management control; Control-needs of Information flow.

CO5: student will gain the knowledge of Management Control System and its applications; Responsibility Accounting-Meaning and Methodology, types of responsibility centres.

CO6: student will become familiar with organizational structure of responsibility centres; objectives and methods of transfer pricing, pricing corporate services and administration of transfer pricing.

School of Pharmacy

**Programme Outcomes (POs), Programme Specific
Outcomes (PSOs) & Course Outcomes (POs)**

Programme Outcomes (POs):

B. Pharm:

PO1: Technical Knowledge of Pharmaceutical Science (core subjects) and Practice (applications of the subjects in profession).

PO2: Hands-on practical training on sophisticated analytical instruments, biomedical devices, simulated software for animal studies, drug designing through CADD.

PO3: To impart knowledge about the Code of Conduct and Professional Integrity to practice the profession of Pharmacy.

PO4: Providing Pharmaceutical care to the consumers.

PO5: Development of Team spirit and leadership qualities.

PO6: Effective verbal and non-verbal communication while dealing with professional clients and peers.

PO7: Brainstorming of the potential problems pertaining to technical, cognitive and communicative skills and their solutions by mentors.

PO8: Placement of Students/ Self-employment.

D. Pharm:

PO1: Technical Knowledge of Pharmaceutical Science (core subjects) and Practice (applications of the subjects in profession).

PO2: To impart knowledge about the Code of Conduct and Professional Integrity to practice the profession of Pharmacy.

PO3: Providing Pharmaceutical care to the consumers.

PO4: Effective verbal and non-verbal communication while dealing with professional clients and peers.

PO5: To impart knowledge about prescription handling and patient counseling.

PO6: To study the inventory control and Drug store management in the drug store/ Pharmacy of a hospital.

PO7: Brainstorming of the potential problems pertaining to technical, cognitive and communicative skills and their solutions by mentors.

PO8: Placement of Students/ Self-Employment.

Programme Specific Outcomes (PSOs):

B. Pharm:

Bachelor of Pharmacy is a four year degree programme divided in Eight semesters. The students are introduced to the basics of Organic, Physical, Inorganic and Medicinal Chemistry for the synthesis, analysis and instrumentation. Students are taught Anatomy, Physiology and Biochemistry to understand the structure, functions and composition of the human body. Knowledge of these basic subjects is essential for thorough understanding of the concepts and applications of Pathophysiology, Pharmacology and Biopharmaceutics which will help students to understand the fundamentals of Drug therapy and its disposition. The basics of Pharmaceutics are essential in understanding the principles of the technology involved in the manufacturing of different dosage forms, their physico-chemical properties, evaluation along with the sterilization techniques and microbiological assessment of formulations and active pharmaceutical ingredients (APIs) under aseptic conditions. The knowledge of Pharmacognosy is useful to identify the medicinal plants taxonomically, along with the methods of extraction and isolation of constituents from plant sources. Pharmaceutical Jurisprudence provides the insight of the regulatory norms of the national and international drug regulatory bodies. Pharmaceutical Management adds on the marketing and managerial skills in the graduating Pharmacy Students to explore their career in Pharma marketing, Product Development Team of the Pharmaceutical Industry.

The students after graduating have a wide array of options as below:

As Employee:

- a) **Pharmaceutical Industry:** Students keen to make their career in a Pharmaceutical Industry have the following job profiles:
 - i) **Production:** As Production trainee, supervisors, managers etc.
 - ii) **QC/QA:** To assure whether the Active Pharmaceutical Ingredients (APIs) used in formulations and the manufactured formulations passes the required quality standards as per the norms of USFDA (United States Food and Drugs Administration) or FDA of Govt. of India.
 - iii) **Microbiology:** To assure that the production area is maintaining aseptic conditions and the quality of air is in accordance with the norms of FDA.
 - iv) **Packaging and warehousing:** To assure that the finished products are packed, labeled and stored for delivery as per the statutory norms.
 - v) **Marketing:** As sales representatives. Freshers are inducted as trainee in the Business Development Team or Marketing and Sales Representatives. They are generally promoted as Area Sales Manager, Regional Sales Manager and Vice President etc.
- b) **Pharmacist:** In private and Government hospitals/ dispensaries, Government Pharmacists in Defence, Police etc.

- c) **Analyst:** As Government certified Analysts in Government Drug Testing Laboratories and Pharmaceutical industries.
- d) **Drugs Inspector:** Every state appoints Drugs inspector to inspect drug manufacturing premises, chemist retail and wholesale shops.

As Entrepreneur:

- a) **Own a Chemist/ Pharmacy Retail or Wholesale shop:** Students after graduating apply for Registration as Pharmacist in the State Pharmacy Councils and after seeking the Registration Certificate; they can apply for the license to open Pharmacy Retail or Wholesale Shop through Drugs Control Department (FDA of their state).
- b) **Set up a Pharmaceutical Manufacturing Unit:** After passing out B. Pharm., the students can apply to the FDA of their state to get the license to set up a Pharmaceutical manufacturing unit.
- c) **Set up a Contract Research Organization (CRO):** Students can set up their own CRO and get necessary approvals and certifications from the Government Accreditation/ Licensing Authorities to take up contract research projects.

Higher Education:

Students after B. Pharm., can pursue masters in Pharmacy (M. Pharm.), Management (MBA) and Law (LLB) to find job opportunities in research, managerial and advisory options in Pharmaceutical industry or academic institutions.

D. Pharm:

Diploma in Pharmacy is a Two-year programme divided in year wise fashion. The students are introduced to the basics of Anatomy, Physiology and Biochemistry to understand the concepts and applications of these subjects in Pharmacology and the fundamentals of Drug therapy. In Pharmaceutics, the students are taught the basics of writing and handling of prescription, understand prescription errors, manufacturing aspects of different dosage forms, sterilization techniques and microbiological assessment of formulations and active pharmaceutical ingredients (APIs) under aseptic conditions. The knowledge of Pharmacognosy is useful to gain knowledge about herbal drugs/ formulations. Pharmaceutical Jurisprudence provides the insight of the regulatory norms of the national and international drug regulatory bodies. A subject of Drug Store and Business Management explains the stock and inventory of the Drug Store along with the Marketing and Managerial skills. In Hospital and Clinical Pharmacy, the students are required to learn various skills like drug information, drug distribution and therapeutic drug monitoring for improved patient care. In clinical/ community pharmacy, students will be learning various skills such as dispensing of drugs, responding to minor ailments by providing suitable safe medication, patient counseling for improved patient care in the community set up.

The students after passing out D. Pharm programme, have the following placement options as below:

As Employee:

- a) **Pharmacist:** In private and Government hospitals/ dispensaries, Government Pharmacists in Defence, Police etc.
- b) **Technician:** In Pharmacy colleges, Pharmaceutical industry.

As Entrepreneur:

- c) **Own a Chemist/ Pharmacy Retail shop:** Students after passing out Diploma in Pharmacy apply for Registration as Pharmacist in the State Pharmacy Councils and after seeking the Registration Certificate; they can apply for the license to open Pharmacy Retail Shop through Drugs Control Department (FDA of their state).

Higher Education:

Students after passing D. Pharm., can pursue Bachelor of Pharmacy (B. Pharm.) under Lateral Entry seats.

Course Outcomes (Cos):

B. Pharm:

Pharmaceutics:

- CO1: To understand the basics of different dosage forms, pharmaceutical incompatibilities and pharmaceutical calculations.
- CO2: To understand various physicochemical properties of drug molecules in the designing of the dosage forms along with principles of chemical kinetics and stability testing of formulations.
- CO3: To understand the basic concepts and applications of biopharmaceutics and pharmacokinetics and bioequivalence along with their significance.

Pharmaceutical Chemistry:

- CO1: To understand the classification and nomenclature of organic compounds, structural isomerism, important physico-chemical properties, reactions and synthesis of these compounds.
- CO2: To know the sources of impurities and methods to determine the impurities in inorganic drugs and pharmaceuticals and understand the medicinal and pharmaceutical importance of inorganic compounds.
- CO3: To understand the principles of volumetric and electro chemical analysis, various volumetric and electrochemical titrations. Students develop analytical skills for the Qualitative and

Quantitative analysis.

CO4: To understand the chemistry of drugs with respect to their pharmacological activity, drug metabolic pathways, Structural Activity Relationship (SAR) of different class of drugs and synthesis of active pharmaceutical ingredients (APIs).

CO5: To understand the chromatographic separation, analysis of drugs and development of analytical methods.

Pharmacology:

CO1: To understand the gross morphology, structure and functions of various organs of the Human body.

CO2: To understand the molecular levels of the chemical process associated with living cells along with the principles of metabolism of nutrient molecules in physiological and pathological conditions.

CO3: To understand the pharmacological actions of different categories of drugs and the mechanism of drug action at organ system/sub cellular/ macromolecular levels for the prevention and treatment of various diseases.

Pharmacognosy:

CO1: To understand the taxonomic identification of medicinal plants.

CO2: To study the morphology and microscopy of crude drugs.

CO3: To understand raw material as source of herbal drugs from cultivation to herbal drug product along with the WHO and ICH guidelines for evaluation of herbal drugs.

Pharmaceutical Management and Regulatory Science:

CO1: To understand the marketing concepts, techniques and their applications in the pharmaceutical industry along with the know-how of marketing management in Sales and Product management.

CO2: To know about the process of drug discovery and development, various regulatory Authorities and agencies governing the manufacture and sale of pharmaceuticals, regulatory approval process and their registration in Indian and international markets.

Pharmacy Practice:

CO1: To know various drug distribution methods in a hospital, pharmacy stores management and inventory control.

CO2: To monitor drug therapy of patient through medication chart review and clinical review, obtain medication history interview and counsel the patients, identifying drug related problems, detection and assessment of adverse drug reactions.

Computer Applications in Pharmacy:

CO1: To understand the Database Management system, computer applications in clinical studies.

Communicative Skills in Pharmacy:

CO1: To understand the behavioral needs for a Pharmacist to function effectively in different profiles of pharmacy profession.

CO2: To learn and practice verbal and non-verbal communication along with managerial skills.

Course Outcomes (Cos):

D. Pharm:

Pharmaceutics:

CO1: To understand the basics of different dosage forms, handling of prescription and aseptic techniques.

Hospital and Clinical Pharmacy:

CO1: To know various drug distribution methods in a hospital and study of the pharmacy stores management and inventory control.

CO2: To do patient counseling in community pharmacy.

Pharmaceutical Chemistry:

CO1: To understand the classification and nomenclature of organic compounds, structural isomerism and important physico-chemical properties.

CO2: To know the sources of impurities and methods to determine the impurities in inorganic drugs and pharmaceuticals and understand the medicinal and pharmaceutical importance of inorganic compounds.

CO4: To understand the chemistry of drugs with respect to their pharmacological activity and synthesis of active pharmaceutical ingredients (APIs).

Pharmacology:

CO1: To understand the gross morphology, structure and functions of various organs of the human body.

CO3: To understand the pharmacological actions of different categories of drugs along with their mechanism of action, therapeutic/ prophylactic uses and adverse effects.

Pharmacognosy:

CO1: To study the morphology and microscopy of crude drugs.

CO3: To study of Herbal drugs and formulations.

Drug Store and Business Management:

CO1: To study the drug distribution, stock maintenance, pharmacy store management and inventory control in a hospital.

CO2: To study the prescription errors and understand the concept of rational drug therapy.

Communicative Skills in Pharmacy:

CO1: To understand the behavioral needs for a Pharmacist to function effectively in different profiles of pharmacy profession.

CO2: To learn and practice verbal and non-verbal communication along with managerial skills.