

Bachelor of Science (B.Sc.)

Physics

Programme Outcomes (POs)

At the completion of programme, student will attain the ability to:

- PO-1:** Acquire a systematic and coherent understanding of the diversified academic fields of Physics through good understanding on various components of Physical Science.
- PO-2:** Solve & understand major concept in all disciplines of Physics.
- PO-3:** Apply his/her comprehensive Laboratory training in their Professional life.
- PO-4:** Employ scientific knowledge and Critical thinking in their daily life
- PO-5:** Employ their Scientific Temperament in the field of research and higher studies.
- PO-6:** Employ their knowledge in the studies of upcoming advance merging technology.
- PO-7:** Demonstrate relevant generic skills for global competencies like investigative skills related to various issue and problems, analytical skills with ability to construct logical arguments, ICT skills.
- PO-8:** Demonstrate professional behaviour & help to become-objective unbiased & truthful individual, potentially ethical in work-related situation.

Specific Programme Outcomes (POs)

At the completion of the program, students will attain the ability to:

- PSO1:** Develop strong competencies in Physics and its applications in a technology-rich, interactive environment.
- PSO2:** Link not only to the research in the area of theoretical but also to the area of experimental physics.
- PSO3:** Acquire skills in the numerical technique for modeling physical system & for analysis & interpretation of complex system.
- PSO4:** Develop & understanding on the impact of Physics & Science on Society.
- PSO5:** Evolve as better human resource with a solid foundation in theoretical and experimental aspects in respective specializations as a preparation for career in academia and industry.
- PSO6:** Apply knowledge gained from this programme for employment in several sectors including Electronics, Manufacturing and Teaching Sector.
- PSO7:** Conceptual understanding of Physics to general real-world situation.

SEMESTER – 1

MJC-1: Introduction to Mathematical Physics & Classical Mechanics

Course Outcome (COs)

After completion of the course, the student will be able to:

CO1: Understand various mathematical techniques used in Physical Problems. Know the difference between Newtonian Mechanics and Analytic Mechanics.

CO2: Understand utility of scalars and vectors and their operations-algebraic and D-operator.

CO3: Understand the concept of Pseudo force and its importance with application in real life situations.

CO4: Realize the idea of Centre of Mass and Laboratory frame.

CO5: Understand the orbit of communication and Remote sensing satellite.

Multidisciplinary Course

Course Title: Physics around Us

Course Outcomes (COs)

After completion of the course, the student will be able to:

CO1: Understand the physical laws governing climate and atmosphere.

CO2: Explore the use of Physics in agriculture and its product Preservation.

CO3: Importance of Renewable energy and Physics behind its various harvested types.

Skill Development Course

Course Title: Physics Workshop Skill

Course Outcomes (COs)

After completion of the course, the student will be able to:

CO1: Apply basic tools in Day-to-day application.

CO2: Use acquired skills for detecting and correcting House hold electrical circuit and appliance.

CO3: Utilize acquired skills in market, as per the interest.

Value Added Course

Course Title: Great Indian Scientists

Course Outcomes (COs)

After completion of the course, the student will be able to:

CO1: Understand the importance of scientific thinking and benefits of Consistent exploration.

CO2: Recognize the benefits of consistent small efforts over cozy technological use.

CO3: Learn about contribution of Indian Scientist for national development and about Indian knowledge system.

CO4: Realize the lead role of Indian Women in area of Science and Technology.

SEMESTER – 2

MJC-2: Oscillations and Waves

Course Outcome (COs)

After completion of the course, the student will be able to:

CO1: Understand the concept of Periodic and Oscillatory motion with application of free, Damped and Forced Oscillation in Physical Situation.

CO2: Learn application of Lissajou Figure in different Physical Problems.

CO3: Explore the working of various Musical Instrument.

CO4: Understand the Physics behind Acoustic of Building.

CO5: Know the technique of sound Recording and Reproduction.

MIC-2: Oscillations and Waves

Course Outcome (COs)

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CO4: Understand the Physics behind Acoustics of Building.

CO5: Know the technique of sound Recording and Reproduction.

Multidisciplinary Course

Course Title: Crystallography

Course Outcome (COs)

After completion of the course, the student will be able to:

CO1: Understand the structure of various crystal.

CO2: Know the theoretical framework like symmetry and space groups.

CO3: Know characterization of crystal using diffraction technique.

CO4: Know the analysis of collected diffraction data.

Skill Development Course

Course Title: Web Development

Course Outcome (COs)

After completion of the course, the student will be able to:

CO1: Simple and impressive design techniques, from basics till advanced to focus on goal oriented and user centric designs.

CO2: How to and where to start research, planning for website & actually build excellent web sites.

CO3: To create web elements like buttons, text boxes and various UI designs.

CO4: Forms and validations for website. Setting up page layout, color schemes etc. in the designs.

Value Added Course

Course Title: History of Science

Course Outcome (COs)

After completion of the course, the student will be able to:

CO1: Understand the origin of science and the correlation between "Cause" & "Effect".

CO2: Understand the contribution of Indian Scientists in area of Atomic Energy, Dairy Technology and Agriculture etc.

CO3: Understand the legacy of ancient Indian Science.

CO4: Understand the Indian calendar system and Vedic mathematical calculations.

Skill Enhancement Course (SEC)

Course Title – Advance Spreadsheet Tools

Learning Objectives

The Learning Objectives of this course are as follows:

- To enable the students to use Excel for advanced data analysis
- To equip the students to with automation skills on excel
- To enable the students to use excel for informed decision making.

Course Outcomes (COs)

The Course Outcomes of this course are as follows:

CO1: By studying this course, students will be able to make meaningful representations of data in the form of charts and pivot tables.

CO2: By studying this course, students will be able to draw analysis on data using spreadsheets and use interpretation to make decisions.

CO3: By studying this course, students will be able to generate word documents with appropriate formatting, layout, proofing.

CO4: By studying this course, students will be able to manage data for generating queries, forms and reports in a database.

Course Title – Basic IT Tools

Learning Objectives

The Learning Objectives of this course are as follows:

- To enable students develop IT skills that are a pre-requisite in today's work environment.
- To equip them with basic computing skills that will enhance their employability in general.
- To enable the students to analyse and present information in a meaningful manner.

Course Outcomes (COs)

The Course Outcomes of this course are as follows:

CO1: By studying this course, students will be able to use word-processor to generate documents with appropriate formatting, layout, review and referencing.

CO2: By studying this course, students will be able to manage data in worksheets and workbooks and analyze it using spreadsheet functions and inbuilt formulas.

CO3: By studying this course, students will be able to analysis on data using spreadsheets to make decisions.

CO4: By studying this course, students will be able to make meaningful representations of data in the form of charts and pivot tables.

CO5: By studying this course, students will be able to manage data in database tables and use the same for generating queries, forms and reports.

Course Title – Beginners Course to Calligraphy

Learning Objectives

The Learning Objectives of this course are as follows:

- To teach students the art of Calligraphy.
- To make students better at handwriting and embellish the scripts.
- To help the students communicate with creativity.

Course Outcomes (COs)

The Course Outcomes of this course are as follows:

CO1: Students will be skilled in calligraphy scripts.

CO2: Learning flourishing will help to develop good writing.

CO3: Practice sessions will further a project at the end of semester.

CO4: Will induce skills to set up a business, too.

Course Title – Big Data Analytics

Learning Objectives

The Learning Objectives of this course are as follows:

- To Understand the Big Data Platform and its Uses
- Provide an overview of Apache Hadoop
- Provide HDFS Concepts and Interfacing with HDFS.
- Provide hands on Hadoop Eco System
- To understand spark framework

Course Outcomes (COs)

The Course Outcomes of this course are as follows:

CO1: After studying this course, students will be able to identify Big Data and its Business Implications.

CO2: After studying this course, students will be able to list the components of Hadoop and Hadoop Eco-System.

CO3: After studying this course, students will be able to access and process data on distributed file system.

CO4: After studying this course, students will be able to manage job execution in Hadoop environment.

CO5: After studying this course, students will be able to develop Big Data Solutions using Hadoop Eco System.

Course Title – Business Communication

Learning Objectives

The Learning Objectives of this course are as follows:

- To train students to enhance written as well as oral communication in the corporate world.
- To help students in understanding the principles and techniques of business communication.
- To understand the use of electronic media for communication.

Course Outcomes (COs)

The Course Outcomes of this course are as follows:

CO1: After studying this course, students will be able to explain the need for communication in management.

CO2: After studying this course, students will be able to appreciate the need of effective writing for communication.

CO3: After studying this course, students will be able to demonstrate the skill of effective report writing and summarizing annual reports.

CO4: After studying this course, students will be able to analyze business correspondence and e-correspondence.

CO5: After studying this course, students will be able to appreciate oral presentations.

Course Title – Communication in Everyday Life

Learning Objectives

The Learning Objectives of this course are as follows:

- To lay down a basic foundation for basic communication that is a part of a student's everyday life.
- To inculcate the fundamentals of communication with the aim to enhance listening, speaking and writing skills.
- To hone practical skills that can be used in day-to-day affairs.

Course Outcomes (COs)

The Course Outcomes of this course are as follows:

CO1: After studying this course, students will be able to improve mediation skills.

CO2: After studying this course, students will be able to building human relationships.

CO3: After studying this course, students will be able to foster societal understanding & develop an independent perspective.

CO4: After studying this course, students will be able to enhance social Communication skills of students.

Course Title – Communication in professional Life

Learning Objectives

The Learning Objectives of this course are as follows:

- To prepare the students for their upcoming professional fields.
- To inculcate the fundamentals of professional and business communication.
- To learn aspects of global communication.
- To enhance employability skills of the learners by enabling them to write effective resumes and face interviews with confidence.

Course Outcomes (COs)

The Course Outcomes of this course are as follows:

CO1: After studying this course, students will be able to improve presentation skills to be learnt by effective use of verbal and non-verbal communication for the professional field.

CO2: After studying this course, students will be able to acquire practical employability skills to be disseminated through focused sessions on practical employable knowledge.

CO3: After studying this course, students will be able to enhance professional communication.

CO4: After studying this course, students will be able to improve persuasion and negotiation skills which will be useful for the professional field.

Course Title – Communication in Professional Life

Learning Objectives

The Learning Objectives of this course are as follows:

- To build creative writing skills of students in the main in odes of creative writing viz poetry, fiction (novel, short stories), non-fiction (life narratives, autobiographies and biographies) and drama.
- To inculcate practical skill in students by mapping their creative talent which be beneficial for employability too.
- To perform hands-on-activities to students to develop their creative skills through practical sessions.

Course Outcomes (COs)

The Course Outcomes of this course are as follows:

CO1: After studying this course, students will be able to sensitive to the texture of literary language.

CO2: After studying this course, students will be able to develop craft in creative writing.

CO3: After studying this course, students will be able to develop sense of expressing themselves through poetry/short biography.

CO4: After studying this course, students will be able to induce an understanding of their lationship between an individual and society.

CO5: After studying this course, students will be able to get into different fields and pursue versatile career opportunities.

CO6: After studying this course, students will be able to develop an understanding of theatre and performance through drama will also help them to develop observatory and behavioral skills.

CO7: After studying this course, students will be able to develop a critical thought process and a knack in putting it in words. Students may also utilize the learnings of proofreading and editing for their academic and professional growth.

CO8: After studying this course, students will be able to go for publishing their own work.

CO9: After studying this course, students will be able to write a book and submit.

Course Title – Digital Marketing

Learning Objectives

The Learning Objectives of this course are as follows:

- To acquaint the students with the knowledge of growing integration between the traditional and digital marketing concepts and practices in the digital era.
- To familiarize the students with the tools and techniques used by the digital marketers for driving the marketing decisions to attain marketing objectives.

Course Outcomes (COs)

The Course Outcomes of this course are as follows:

CO1: After studying this course, students will be able to understand the concept of digital marketing and its integration with traditional marketing.

CO2: After studying this course, students will be able to understand customer value journey in digital context and behaviour of online consumers.

CO3: After studying this course, students will be able to understand email, content and social media marketing and apply the learnings to create digital media campaigns.

CO4: After studying this course, students will be able to examine various tactics for enhancing a website's position and ranking with search engines.

CO5: After studying this course, students will be able to leverage the digital strategies to gain competitive advantage for business and career.

Course Title – Graphic Design and Animation

Learning Objectives

The Learning Objectives of this course are as follows:

- To introduce the students to the skill of animation.
- To learn about the application of 2D and 3D animation.

Course Outcomes (COs)

The Course Outcomes of this course are as follows:

CO1: After studying this course, students will be able to understand the importance of animation and graphics design.

CO2: After studying this course, students will be able to learn graphics design in 2D and 3D animation.

CO3: After studying this course, students will be able to learn the application of graphics design in 2D and 3D animation in advertising and other areas.

Course Title – Introduction to Cloud Computing (AWS)

Learning Objectives

The Learning Objectives of this course are as follows:

- To learn about cloud computing through Amazon Web Services (AWS) platform.
- To learn about AWS cloud concepts, services, security and architecture to build an application.

Course Outcomes (COs)

The Course Outcomes of this course are as follows:

CO1: After studying this course, students will be able to Understanding cloud computing platform.

CO2: After studying this course, students will be able to differentiate between on-premises, hybrid-cloud, and all-in cloud

CO3: After studying this course, students will be able to describe the basic global infrastructure of the AWS Cloud

CO4: After studying this course, students will be able to understanding the core AWS services, including compute, network databases and storage.

Course Title – Personal Financial Planning

Learning Objectives

The Learning Objectives of this course are as follows:

- To familiarize students with different aspects of personal financial planning like savings, investment, taxation, insurance and retirement planning.
- To develop the necessary knowledge and skills for effective financial planning.

Course Outcomes (COs)

The Course Outcomes of this course are as follows:

CO1: After studying this course, students will be able to understand the meaning and appreciate the relevance of financial planning.

CO2: After studying this course, students will be able to understand the concept of investment planning and its methods.

CO3: After studying this course, students will be able to examine the scope and ways of personal tax planning.

CO4: After studying this course, students will be able to analyze insurance planning and its relevance.

CO5: After studying this course, students will be able to develop insight into retirement planning and its relevance.

Course Title – Personality Development and Communication

Learning Objectives

The Learning Objectives of this course are as follows:

- To develop inter personal and effective communication skills.
- To develop problem solving skills and understand its influence on behaviour and attitudes of individuals.

Course Outcomes (COs)

The Course Outcomes of this course are as follows:

CO1: After studying this course, students will be able to understand the importance of oral and written communication in day-to-day working of the organization.

CO2: After studying this course, students will be able to develop inter personal skills and problem-solving skills.

CO3: After studying this course, students will be able to understand the rule of body language in effective communication.

Course Title – Prospecting E-waste for Sustainability

Learning Objectives

The Learning Objectives of this course are as follows:

- To provide in-depth knowledge on the effective mechanisms to regulate the generation, collection and storage of e-waste
- To gain insights into the internationally/nationally acceptable methods of transport, import and export of e-waste within and between countries
- To develop a holistic view on recycling, treatment and disposal of e-waste and related legislative rules.

Course Outcomes (COs)

The Course Outcomes of this course are as follows:

CO1: After studying this course, students will be able to holistically analyze the environmental impacts of e-waste.

CO2: After studying this course, students will be able to apply the skills and various concepts for sustainable management of e-waste.

CO3: After studying this course, students will be able to decipher the role of various national and international regulations for e-waste management.

CO4: After studying this course, students will be able to provide specific recommendations for improved methods for handling e-waste at different stages such as generation, collection, storage, transport and recycling.

Course Title – Public Speaking in English Language and Leadership

Learning Objectives

The Learning Objectives of this course are as follows:

- To impart leadership skills to students along with adequate communication skills to curate strong leaders in the emerging social, political and corporate world.
- To create leaders with ethics and resilience in industry-based fields as well as social fields.
- To allow students to realize their leadership skills and curate them through a hand-on practical approach which will be helpful in generating employable skills for them.

Course Outcomes (COs)

The Course Outcomes of this course are as follows:

CO1: After studying this course, students will be able to learn effective communication through Public Speaking will instill leadership development among students.

CO2: After studying this course, students will be able to lead in different fields at the undergraduate level, be responsible citizens and employ leadership skills in their future endeavors too.

CO3: After studying this course, students will be able to strengthen their critical mindset, help them being assertive and put forward constructive viewpoints employing the skills learnt in the practice sessions.

Course Title – Statistical Software Package

Learning Objectives

The Learning Objectives of this course are as follows:

- To familiarize students with data analysis using a statistical software package like SPSS or any equivalent.
- To provide skills for research analysis and increase employability.
- To lay a foundation for advance data analysis work and higher education.

Course Outcomes (COs)

The Course Outcomes of this course are as follows:

CO1: After studying this course, students will be able to understand basic functions of statistical software package for managing variables and generate descriptive statistics to describe the data and analyze data through graphs and charts.

CO2: After studying this course, students will be able to test differences in sample means.

CO3: After studying this course, students will be able to identify relationships between variables and develop models for predicting dependent variables on the basis of independent variables.

CO4: After studying this course, students will be able to understand data structures and identify clusters in data.

CO5: After studying this course, students will be able to identify principal components that are relevant from a host of variables.

Course Title – Sustainable Ecotourism and Entrepreneurship

Learning Objectives

The Learning Objectives of this course are as follows:

- To train students in concepts and principles of sustainable ecotourism leading to a new generation of entrepreneurs
- To inculcate field-based practical skills in translating ecological systems into wealth generation while conserving natural resources
- To transform local biological wealth into a hub of global attraction and generate a scientific basis of Indian traditional knowledge

Course Outcomes (COs)

The Course Outcomes of this course are as follows:

- CO1:** After studying this course, students will be able to develop next-generation ecological entrepreneurs.
- CO2:** After studying this course, students will be able to evolve eco-literate society by integrating market-based instruments with eco-cultural knowledge of traditional societies.
- CO3:** After studying this course, students will be able to practice ecological knowledge for wealth generation, environmental conservation and popularization of Indian traditional knowledge.

Course Title – Visual Communication and Photography

Learning Objectives

The Learning Objectives of this course are as follows:

- To synthesize a comprehensive view of principles involved in Visual Communication.
- To appreciate and express the cultural significance of photography art and understand its evolution and purposes.
- To develop an awareness of compositional and organizational strategies for the effective deployment of formal elements of visual art.
- To read visual texts with a deep knowledge of visual history and theory.
- To create an ability of situating the content and form of the visual representation of thematic context.

Course Outcomes (COs)

The Course Outcomes of this course are as follows:

- CO1:** After studying this course, students will be able to acquire knowledge of the cultural and historical importance of the visual medium.
- CO2:** After studying this course, students will be able to explore the fundamentals and underlying theories of Visual Communication.
- CO3:** After studying this course, students will be able to develop a thorough knowledge of concepts and skills in creating photographs.
- CO4:** After studying this course, students will be able to learn to identify and analyze semiotics in photographs.
- CO5:** After studying this course, students will be able to develop a craftsmanship in creating aesthetically pleasing photographs.

Course Title – पटकथा लेखन

Learning Objectives

The Learning Objectives of this course are as follows:

- पटकथा लेखन का परिचय कराना।
- विद्यार्थी की लेखन-क्षमता और भाषा-कौशल को बढ़ावा देना।
- विद्यार्थी की लेखन में रोजगार सम्बन्धी क्षेत्रों के लिए तैयार करना।

Course Outcomes (COs)

The Course Outcomes of this course are as follows:

- CO1:** पटकथा लेखन तथा उसके तकनीकी शब्दों से विद्यार्थी अवगत हो सकेगा।
- CO2:** पटकथा लेखन की जानकारी मिलने के उपरान्त विद्यार्थी के लिए रोजगार की संभावनाएँ बनेंगी।
- CO3:** विद्यार्थी भाषायी सम्प्रेषण को समझते हुए लेखन से सम्बन्धित विभिन्न पक्षों से अवगत हो सकेगा।
- CO4:** विद्यार्थी में अभिव्यक्ति कौशल का विकास हो सकेगा।

Course Title – रंगमंच

Learning Objectives

The Learning Objectives of this course are as follows:

- हिन्दी रंगमंच का परिचय कराना।
- नाट्य-प्रस्तुति की प्रक्रिया की जानकारी देना।
- अभिनय के विभिन्न पक्षों से अवगत करना।
- रंगमंच के खेलों और गतिविधियों से अवगत कराना।

Course Outcomes (COs)

The Course Outcomes of this course are as follows:

- CO1:** नाट्य-प्रस्तुति की प्रक्रिया से विद्यार्थी अवगत हो सकेगा।
- CO2:** रंगमंच की जानकारी मिलने के उपरान्त इस क्षेत्र में विद्यार्थी के लिए रोजगार की संभावनाएँ बनेंगी।
- CO3:** रंगमंचीय गतिविधियों से विद्यार्थी के व्यक्तित्व का विकास हो सकेगा।
- CO4:** विद्यार्थी में अभिव्यक्ति कौशल का विकास हो सकेगा।

Course Title – रचनात्मक लेखन

Learning Objectives

The Learning Objectives of this course are as follows:

- विद्यार्थियों के मौखिक और लिखित अभिव्यक्ति कौशल को विकसित करना।
- उनमें कल्पनाशीलता और रचनात्मकता का विकास करना।
- साहित्य की विविध विधाओं और उनकी रचनात्मक शैली का परिचय कराते हुए लेखन की ओर प्रेरित करना।
- प्रिंट एवं इलेक्ट्रानिक माध्यमों के लिए लेखन प्रवृत्ति को विकसित करना।

Course Outcomes (COs)

The Course Outcomes of this course are as follows:

CO1: मौखिक और लिखित अभिव्यक्ति कौशल को विकसित होने में मदद मिलेगी।

CO2: उसमें कल्पनाशीलता और रचनात्मकता का विकास हो सकेगा।

CO3: साहित्य की विधि विधाओं और उनकी रचनात्मकता शैली का परिचय होगा जिससे वे स्वयं भी विधाओं में लेखन की अग्रसर हो सकेंगे।

CO4: प्रिंट एवं इलेक्ट्रानिक माध्यमों के लिए लेखन की ओर भी अग्रसर होंगे।

Value Added Courses (VAC)

Course Title – Arts of Beign Happy

Learning Objectives

The Learning Objectives of this course are as follows:

- To synthesize the insights developed by Human Development experts, Psychologists, Anthropologists on one hand, and the intellectual traditions of Vedantic Philosophy and Indology on the other towards the experience of happiness.
- To illustrate various factors the determine the subjective experience of happiness in a cross cultural context.

Course Outcomes (COs)

The Course Outcomes of this course are as follows:

CO1: The students shall be able to evaluate the factors contributing to the phenomenon of happiness in the personal, familial and community life of an individual in different cultures in the Indian context.

CO2: They will be able to develop healthy interpersonal relationships and wellbeing, cherishing the values of Indian culture and philosophy.

CO3: They will be able to relate to the global phenomenon of sustainable development and become sensitive to the needs of the planet.

CO4: They will be able to apply the experience of Aananda at a personal level.

Course Title – Ayurveda and Nutrition

Learning Objectives

The Learning Objectives of this course are as follows:

- To introduce the basic principles of nutrition in Ayurveda.
- To link the Ayurvedic nutrition with modern dietary practices for health.
- To analyze basic tenets of traditional diets and health recipes.
- To understand the contemporary food habits in everyday life.

Course Outcomes (COs)

The Course Outcomes of this course are as follows:

CO1: Awareness of traditional food cultures of India.

CO2: Evaluate changing food patterns and lifestyle over the years.

CO3: Understand Indian Knowledge Systems (IKS) and key Vedic principles with respect to Food and Nutrition.

CO4: Apply basic tenets of traditional diets for health and disease.

CO5: Prepare selected healthy recipes based on Ayurvedic principles.

Course Title – Constitutional Values And Fundamental Duties

Learning Objectives

The Learning Objectives of this course are as follows:

- Enrich students with knowledge and relevance of the Constitution.
- Develop awareness about Duties and Values.
- Inculcate a sense of Constitutionalism in thought and action.

Course Outcomes (COs)

The Course Outcomes of this course are as follows:

CO1: Understand the Constitution and its relevance.

CO2: Appreciate the values and goals embedded in the Constitution.

CO3: Recognize the importance of Fundamental Duties enshrined in the Constitution.

CO4: Apply the spirit of fundamental values and duties in everyday national life.

Course Title – CULTURE AND COMMUNICATION

Learning Objectives

The Learning Objectives of this course are as follows:

- To focus on traditional values disseminated from Indian cultural heritage.
- To understand the interconnections between the legacy of our past and needs of our contemporary society.
- To learn to adapt interact and celebrate our diversity and pluralistic culture.
- To develop communication skills in speaking listening reading and writing and apply them in our quotidian life as young citizens of contemporary India.
- To integrate ethical values and life skills.

Course Outcomes (COs)

The Course Outcomes of this course are as follows:

- CO1:** Students will be able to appreciate the relevance of ancient Indian wisdom and core ethical values in our contemporary life.
- CO2:** Students will be able to engage in a dialogue between the past and the present and inculcate the best principles towards a meaningful life.
- CO3:** Students will be encouraged to involve themselves in team work and group activities to address challenges faced in metropolitan cities.
- CO4:** Students will be able to develop communication skills, that is, analytical reading, empathetic listening, considerate speaking as well as informed writing.
- CO5:** Extension activities will equip the students, drawn from diverse backgrounds, with life skills and confidence to integrate with a multicultural environment and work towards an inclusive community.
- CO6:** Students will be encouraged to envisage and work towards an ethically robust society and there by strengthen the nation.

Course Title – Digital Empowerment

Learning Objectives

The Learning Objectives of this course are as follows:

- Understand the digital world and need for digital empowerment
- Create awareness about Digital India.
- Explore, communicate and collaborate in cyberspace.
- Building awareness on cyber safety and security.

Course Outcomes (COs)

The Course Outcomes of this course are as follows:

CO1: Use ICT and digital services in daily life.

CO2: Develop skills to communicate and collaborate in cyber space using social platforms, teaching/learning tools.

CO3: Understand the significance of security and privacy in the digital world.

CO4: Evaluate ethical issues in the cyber world.

Course Title – Emotional Intelligence

Learning Objectives

The Learning Objectives of this course are as follows:

- Introduce the concept of emotional intelligence, its models and components.
- Understand the significance of emotional intelligence in self-growth and building effective relationships.
- Identify the measures of emotional intelligence.

Course Outcomes (COs)

The Course Outcomes of this course are as follows:

CO1: Self-Awareness, Self-Management, Social Awareness & Relationship Management.

CO2: Discover personal competence and techniques of building emotional intelligence.

CO3: Gain insights into establishing positive relationships.

Course Title – Ecology and Literature

Learning Objectives

The Learning Objectives of this course are as follows:

- To raise awareness among students towards the urgent predicament of Environmental and Ecological crisis and the need for reducing our carbon footprint upon fast depleting ravaged ecological reserves.
- To develop a heightened ecological consciousness among students, leading to more responsible ecological behavior.
- To view environmental concerns as raised through plays stories and poems.

Course Outcomes (COs)

The Course Outcomes of this course are as follows:

CO1: The course will highlight the urgency of environmental crisis making students conscious and aware of the role each one of us plays into environmental sensitivity and responsible ecological behavior.

CO2: Students will be encouraged to respond to incidents of habitat destruction deforestation etc. and realize the need for our urgent intervention.

Course Title – Ethics and Culture

Learning Objectives

The Learning Objectives of this course are as follows:

- The course aims to help students explore ethical and cultural dimensions of their lives.
- The course provides a forum for students to pause, revisit their assumptions and beliefs and becomes mindful of their thoughts, emotions and actions.
- It gives the students an opportunity to express themselves and inquire into their decision making processes. This will enable them to cultivate ethical values and participate in the creation of a society based on acceptance, compassion and justice.

Course Outcomes (COs)

The Course Outcomes of this course are as follows:

CO1: Explore perspectives on ethics in thoughts, words and actions

CO2: Evolve ethics decision making practices

CO3: Understand the need for an ethical society and culture

CO4: Introspect, become conscious of and assess one's stance in life

CO5: Cultivate empathy, tolerance and compassion

CO6: Apply the values learnt in the course to everyday life.

Course Title – Ethics and Values in Ancient Indian Traditions

Learning Objectives

The Learning Objectives of this course are as follows:

- To understand the rich cultural traditions relating to discourses on life and its purpose, instilling of values relating to ethical and moral propriety.
- To make students more engaged with the past traditions of the country.
- To introduce students to early epics: Puranic, Buddhist and other traditions.

Course Outcomes (COs)

The Course Outcomes of this course are as follows:

CO1: Students will develop an overview of indigenous philosophies.

CO2: Understanding the richness of Indian heritage leading to greater sensitivity.

CO3: Inspiration from history to deal with contemporary issues.

CO4: Appreciate the traditions of diversity, discussions, debates and knowledge transmission.

Course Title – Financial Literacy

Learning Objectives

The Learning Objectives of this course are as follows:

- Familiarity with different aspects of financial literacy such as savings, investment, taxation and insurance.
- Understand the relevance and process of financial planning
- Promote financial well-being

Course Outcomes (COs)

CO1: Develop proficiency for personal and family financial planning

CO2: Apply the concept of investment planning

CO3: Ability to analyze banking and insurance products

CO4: Personal tax planning

Course Title – Fit India

Learning Objectives

The Learning Objectives of this course are as follows:

- Encourage physical activity through engaging the students in sports and yoga.
- Understand the importance of a balanced diet.
- Build skills for self-discipline, self-confidence, cooperation and teamwork.
- Promote fitness as a joyful activity.

Course Outcomes (COs)

The Course Outcomes of this course are as follows:

CO1: Adopting a healthy lifestyle.

CO2: Knowledge of nutrition, diet and psycho-physiological aspects of fitness.

CO3: Develop self-esteem, Self-confidence, Self-discipline and team spirit as indicators of fitness.

Course Title – Gandhi and Education

Learning Objectives

The Learning Objectives of this course are as follows:

- Seek inspiration from Gandhi's thoughts on education.
- Analyse Gandhian education philosophy for moral and character development.
- Understand Gandhi's Idea on Self-reliant education (Swavalambi Shiksha).
- Relate Gandhi's educational thoughts to NEP 2020

Course Outcomes (COs)

The Course Outcomes of this course are as follows:

CO1: Value Gandhian perspective on education.

CO2: Appreciate the significance of education in Indian languages

CO3: Evaluate the application of Gandhian thoughts in NEP 2020

CO4: Realise the principles of NEP 2020 in vocational and skill oriented education.

Course Title – Panchakosha: Holistic Development of Personality

Learning Objectives

The Learning Objectives of this course are as follows:

- To introduce Five Koshas – five levels of mind-body complex – Annamaya, Pranayama, Manomaya, Vigyanamaya and Anandamaya Kosha; for a holistic development of personality.
- To generate awareness about physical and mental wellbeing through the Indian concept of Panchkosha.
- To develop a positive attitude towards self, family and society amongst students.
- To guide students build personalities based on the understanding of Panchkosha.

Course Outcomes (COs)

The Course Outcomes of this course are as follows:

CO1: Enhanced physical and mental health.

CO2: Coping with peer pressures and stress.

CO3: Improved concentration leading to better overall performance.

CO4: Manage life situations through a balanced and mature approach.

Course Title – Social and Emotional Learning

Learning Objectives

The Learning Objectives of this course are as follows:

- This course aims to develop social and emotional awareness in students and initiate them towards better personal and social well-being.
- To create an awareness towards self, others, the environment and their harmonious coexistence.

Course Outcomes (COs)

The Course Outcomes of this course are as follows:

CO1: Students will be able to become aware of oneself and the society.

CO2: Make informed lifestyle choices and extend the self in the joy of giving.

CO3: Develop empathy, compassion, connect with nature and evolve emotionally to create a more harmonious society.

CO4: Cultivate sensitivity towards discriminatory practices and explore possible solutions.

Course Title – Sports for Life

Learning Objectives

The Learning Objectives of this course are as follows:

- To imbibe the significance of sports to promote health, fitness and wellness in life.
- To understand the values of teamwork, tolerance, goal-setting and decision making.
- To learn the strategies and tactical moves while playing a sport.
- To understand the importance of physical activity in reference to 3S: strength, speed and suppleness.

Course Outcomes (COs)

The Course Outcomes of this course are as follows:

CO1: Acquire values of cooperation, team spirit, determination, and endurance.

CO2: Acquire good health and psychological well-being through sports participation.

CO3: Apply the decision making-ability and goal-setting skills acquired through sports participation in everyday life.

CO4: Acquire skills for engaging in moderate or vigorous physical activity and sports participation.

CO5: Reduce exposure to screen time on electronic gadgets and channelizing energy through sports participation.

Course Title – Swachh Bharat

Learning Objectives

The Learning Objectives of this course are as follows:

- To understand the developmental challenges with reference to sanitation infrastructure and practices.
- To build values of cleanliness, hygiene and waste management in diverse socio-economic contexts.
- To understand planning of social policy and programmes.
- To use waste management techniques at community level.
- To instill a sense of service towards society and the Nation.

Course Outcomes (COs)

The Course Outcomes of this course are as follows:

CO1: Understanding the significance of the Swachh Bharat Abhiyan.

CO2: Ability to analyse and predict the sanitation challenges of India.

CO3: Determine the link between sanitation and development.

CO4: Contribute to the Swachh Bharat Abhiyan through real time projects/fieldwork.

Course Title – Vedic Mathematics

Learning Objectives

The Learning Objectives of this course are as follows:

- Foster love for math's and remove its fear through Vedic Mathematics
- Enhance computation skills in students through Vedic Mathematics
- Develop logical and analytical thinking
- Promote joyful learning of Mathematics
- Discuss the rich heritage of mathematical temper of Ancient India.

Course Outcomes (COs)

The Course Outcomes of this course are as follows:

CO1: Overcome the fear of Math's.

CO2: Improved critical thinking

CO3: Familiarity with the mathematical underpinnings and techniques

CO4: Ability to do basic Math's faster and with ease.

CO5: Appreciate the Mathematical advancements of Ancient India.

Course Title – भारतीय भक्ति परंपरा और मानव मूल्य

Learning Objectives

The Learning Objectives of this course are as follows:

- भारतीय भक्ति की महान परंपरा, प्राचीनता और इसके अखिल भारतीय स्वरूप से छात्रों का परिचय कराना
- भारतीय भक्ति परंपरा के माध्यम से छात्रों में मानव मूल्यों और गुणों को जगाकर उनका चारित्रिक विकास करना और एक अच्छे मनुष्य का निर्माण करना।
- छात्रों को भारतीय नैतिक, सांस्कृतिक और समाजिक मूल्यों के प्रति जागरूक करना।
- भारतीय भक्ति परंपरा के माध्यम से राष्ट्रीयता और अखिल भारतीयता की भावना जागृत करना।

Course Outcomes (COs)

The Course Outcomes of this course are as follows:

CO1: भारतीय भक्ति परंपरा के माध्यम से छात्रों में मानव मूल्यों और गुणों का विकास होगा और वे एक अच्छे और चरित्रवान मनुष्य बन सकेंगे।

CO2: भारतीय भक्ति परंपरा के सांस्कृतिक और सामाजिक पक्षों की जानकारी हो सकेगी।

CO3: भक्ति की प्राचीनता और अखिल भारतीय स्वरूप की जानकारी से राष्ट्रीयता और अखिल भारतीयता की भावना जागृत और मजबूत होगी।

CO4: प्रमुख भक्त कवियों का परिचय और उनके विचारों की जानकारी हो सकेगी।

Course Title – सृजनात्मक लेखन के आयाम

Learning Objectives

The Learning Objectives of this course are as follows:

- सृजनात्मक और भाषायी कौशल का संक्षिप्त परिचय कराना
- विचारों का प्रभावी प्रस्तुति करण करना
- सृजनात्मक चिंतन और लेखन क्षमता को विकसित करना
- मीडिया लेखन की समझ विकसित करना पाठ्यक्रम अध्ययन के परिणाम

Course Outcomes (COs)

The Course Outcomes of this course are as follows:

CO1: सृजनात्मक चिंतन और लेखन क्षमता का विकास हो सकेगा

CO2: लेखन और मौखिक अभिव्यक्ति की प्रभावी क्षमता विकसित हो सकेगी

CO3: मीडिया लेखन की समझ विकसित होगी

CO4: विद्यार्थी में अपने परिवेश, समाज तथा राष्ट्र के प्रति संवेदनशीलता का विकास होगा

SEMESTER- III

MJC-03: Thermal Physics & Thermodynamics

Course Outcomes (COs)

After the completion of the course, the student will be able to:

CO1: Comprehended the basic concepts of thermodynamics, the first and the second law of thermodynamics.

CO2: Understand the concept of entropy and the associated theorems, the thermodynamic potentials and their physical interpretations.

CO3: Learn about Maxwell's relations and use them for solving many problems in Thermodynamics.

CO4: Learn the basic aspects of kinetic theory of gases, Maxwell-Boltzmann distribution law, equipartition of energy, mean free path of molecular collisions transport phenomenon like: viscosity, thermal conductivity, diffusion and Brownian motion.

CO5: Get background for further studies and research in different subject areas namely condensed matter physics, chemistry, material science and life sciences.

SEMESTER- III

MJC-04: Electricity & Magnetism

Course Outcomes (COs)

After the completion of the course, the student will be able to:

CO1: Understand the basic concepts of electrostatics.

CO2: Understand the dielectric and magnetic properties of matter.

CO3: Understand the electromagnetic induction and electric circuits.

CO4: Provides background for further studies and research in different subject areas.

SEMESTER – IV (AEC-4)

Course on NCC

Learning Objectives

The Learning Objectives of this course are as follows:

- Provide knowledge about the history of NCC, its organization, and incentives of NCC for their career prospects.
- Inculcate spirit of duty and conduct in NCC cadets.
- Provide understanding about different NCC camps and their conducts.
- Provide understanding about the concept of national integration and its importance.
- Provide understanding about the concept of self-awareness and emotional intelligence
- Provide understanding about the concept of critical & creative thinking.
- Provide understanding about the concept of decision making & problem solving.
- Provide understanding about the concept of team and its functioning.
- Provide understanding about the concept and importance of Social service.

Course Outcomes (COs)

The Course Outcomes of this course are as follows:

CO1: Understand the basic concept of NCC.

CO2: Respect the diversity of different Indian culture.

CO3: Practice togetherness, team work and empathy in all walks of their life.

CO4: Do their own self-analysis and will work out to overcome their weakness for better performance in all aspects of life.

CO5: Critically think and analyse.

SEMESTER – IV

MJC-05: Mathematical Physics-II and Introduction to Computational Methods

Course Outcomes (COs)

After the completion of the course, the student will be able to:

CO1: Master the basic elements of complex mathematical analysis.

CO2: Solve differential equations that are common in physical sciences.

CO3: Apply group theory and integral transforms to solve mathematical problems of interest in Physics.

CO4: Understanding how to use special functions in various physics problems.

CO5: Provides background for further studies and research in different subject areas.

SEMESTER – IV

MJC-06: Electrodynamics and Electromagnetism

Course Outcomes (COs)

After the completion of the course, the student will be able to:

CO1: Establish and analyze four Maxwell's equations of electromagnetism.

CO2: Understand the propagation of electromagnetic waves in vacuum, dielectrics and conductors also in guided media and the phenomenon of reflection and refraction of plane waves at different boundaries.

CO3: Understand the importance of energy flow (Pointing Theorem) and its usefulness.

CO4: Get background for further studies and research in different subject areas.

SEMESTER – IV

MJC-07: Optics

Course Outcomes (COs)

After the completion of the course, the student will be able to:

CO1: Understand Interference as superposition of waves from coherent sources derived from same parent source.

CO2: Demonstrate basic concepts of Diffraction: Superposition of wavelets diffracted from aperture.

CO3: Understand Fraunhofer and Fresnel Diffraction.

CO4: Gain experience of using various optical instruments and making finer measurements of wavelength of light using Newton's Rings experiment, Fresnel Biprism, etc.

CO5: Get background for further studies and research in different subject areas.

SEMESTER – V

MJC-08: Elements of Modern Physics

Course Outcomes (COs)

After the completion of the course, the student will be able to:

CO1: To understand the inadequacy of classical Mechanics.

CO2: To understand the historical development of Quantum Concepts.

CO3: To understand the behaviour of Mother Nature at microscopic level.

CO4: To prepare background for interdisciplinary research in condensed matter/ Material Science/atomic Physics/Life Science etc.

CO5: To enhance employability skills as scientific officers at different research orientated centres.

CO6: To promote application of nuclear energy in various areas.

CO7: To Get background for further studies and research in different subject areas.

SEMESTER – V

MJC-09: Basic Electronics

Course Outcomes (COs)

After the completion of the course, the student will be able to:

CO1: Understand fundamental designing concepts of different types of Logic Gates, Minimization techniques etc.

CO2: Design of different types of the Digital circuits, and to give the computational details for Digital Circuits.

CO3: Draw characteristics of devices like PNP and NPN junction diode and truth tables of different logic gates.

CO4: Understand basic elements and measurement of their values with multimeter and their characteristic study.

CO5: Get background for further studies and research in different subject areas.

SEMESTER – VI

MJC-10: Analytical Mechanics & Special Theory of Relativity

Course Outcomes (COs)

After completion of the course, the student will be able to:

CO1: Understand Physical Principle behind derivation of Lagrange and Hamilton ion Equation.

CO2: Understand Canonical Transformation.

CO3: Analysis the Centre of mass and Laboratory frames of reference and their use in explaining elastic inelastic collisions.

CO4: Understand the Planetary motions and motions of satellites using the principles of gravitation and Kepler's laws. Getting an idea of postulates of special theory of relativity and their implications.

CO5: Get background for further studies and research in different subject areas.

SEMESTER – VI

MJC-11: Statistical Mechanics

Course Outcomes (COs)

After the completion of the course, the student will be able to:

CO1: Basic knowledge of thermodynamic systems.

CO2: Understand the basic idea about statistical distributions.

CO3: Impart the knowledge about the phase transitions and potentials.

CO4: Understand the application of statistical laws.

CO5: Get background for further studies and research in different subject.

SEMESTER – VI

MJC-12: Quantum & its Application

Course Outcomes (COs)

After the completion of the course, the student will be able to:

CO1: Learn to represent quantum states by ket vectors, physical observables as operators and their time evolution.

CO2: Understand commutator brackets between observables and their properties.

CO3: Learn concept of system of identical non- interacting particles: dynamics of two level systems, cubits.

CO4: Get background for further studies and research in different subject.

SEMESTER – VII

MJC-13: Physics of Atoms and Nuclei

Course Outcomes (COs)

After the completion of the course, the student will be able to understand:

CO1: To understand the idea of spectra of one and two valence electron atoms.

CO2: To understand the effect of external fields on spectral lines.

CO3: To understand the concept of vector atom model.

CO4: To understand the structure of nucleus.

CO5: To promote interdisciplinary research in spectroscopy and element analysis.

CO6: Get background for further studies and research in different subject.

SEMESTER – VIII

MJC-14: Research Methodology

SEMESTER – VII

MJC-15: Solid State Physics

Course Outcomes (COs)

After the completion of the course, the student will be able to:

CO1: Elucidate the concept of lattice, crystals and symmetry operations.

CO2: Understand the elementary lattice dynamics and its influence on the properties of materials.

CO3: Describe the main features of the physics of electrons in solids: origin of energy bands and their influence electronic behavior.

CO4: Explain the origin of the dielectric properties exhibited by solids and the concept of polarizability.

CO5: Get background for further studies and research in different subject.

SEMESTER – VIII

MJC-16: Physics of Laser and Molecules

Course Outcomes (COs)

After the completion of the course, the student will be able to:

- CO1:** To understand the working of LASER- Sources.
- CO2:** To understand the application of different types of LASER in day to day life.
- CO3:** To understand the concept of formation of Molecule.
- CO4:** To understand the mechanism of spin Resonance Spectroscopy.
- CO5:** To learn the working of Opto-electronic and Photonic devices.
- CO6:** To enhance the employability in the field of optics.
- CO7:** To explore research in the area of photonics.
- CO8:** Get background for further studies and research in different subject.

SEMESTER – III

MIC-03: Thermal Physics & Thermodynamics

Course Outcomes (COs)

After the completion of the course, the student will be able to:

- CO1:** Comprehended the basic concepts of thermodynamics, the first and the second law of thermodynamics.
- CO2:** Understand the concept of entropy and the associated theorems, the thermodynamic potentials and their physical interpretations.
- CO3:** Learn about Maxwell's relations and use them for solving many problems in Thermodynamics.
- CO4:** Learn the basic aspects of kinetic theory of gases, Maxwell-Boltzmann distribution law, equitation of energies, mean free path of molecular collisions, viscosity, thermal conductivity, diffusion and Brownian motion.

SEMESTER – IV

MIC-04: Electricity & Magnetism

Course Outcomes (COs)

After the completion of the course, the student will be able to:

CO1: Understand the basic concepts of electrostatics.

CO2: Understand the dielectric properties of matter.

CO3: Understand the electromagnetic induction and electrical circuits.

SEMESTER – V

MIC-05: Mathematical Physics-II and Introduction to Computational Methods

Course Outcomes (COs)

After the completion of the course, the student will be able to:

CO1: Master the basic elements of complex mathematical analysis.

CO2: Solve differential equations that are common in physical sciences.

CO3: Apply group theory and integral transforms to solve mathematical problems of interest in Physics.

CO4: Understanding how to use special functions in various physics problems.

CO5: Provides background for further studies and research in different subject areas.

SEMESTER – V

MIC-06: Electrodynamics and Electromagnetism

Course Outcomes (COs)

After the completion of the course, the student will be able to:

CO1: Establish and analyze four Maxwell's equations of electromagnetism.

CO2: Understand the propagation of electromagnetic waves in vacuum, dielectrics, and conductors also in guided media and the phenomenon of reflection and refraction of plane waves at different boundaries.

CO3: Understand the importance of energy flow (Poynting Theorem) and its usefulness.

SEMESTER – VII

MIC-07: Optics

Course Outcomes (COs)

After the completion of the course, the student will be able to:

- CO1:** Understand Interference as superposition of waves from coherent sources derived from same parent source.
- CO2:** Demonstrate basic concepts of Diffraction: Superposition of wavelets diffracted from aperture.
- CO3:** Understand Fraunhofer and Fresnel Diffraction.
- CO4:** Gain experience of using various optical instruments and making finer measurements of wavelength of light using Newton's Rings experiment, Fresnel Biprism, etc.

SEMESTER – VI

MIC-08: Elements of Modern Physics

Course Outcomes (COs)

After the completion of the course, the student will be able to:

- CO1:** Main aspects of the inadequacies of classical mechanics as well as understanding of the historical development of quantum mechanics.
- CO2:** Formulation of Schrodinger equation and the idea of probability interpretation associated with wave-functions.
- CO3:** The spontaneous and stimulated emission of radiation, optical pumping and population inversion. Three level and four level lasers. Ruby laser and He-Ne laser in details. Basic lasing.
- CO4:** The properties of nuclei like density, size, binding energy, nuclear forces and structure of atomic nucleus, liquid drop model and nuclear shell model and mass formula.

SEMESTER – VII

MIC-09: Basic Electronics

Course Outcomes (COs)

After the completion of the course, the student will be able to:

- CO1:** Understand fundamental designing concepts of different types of Logic Gates, Minimization techniques etc.

CO2: Design of different types of the Digital circuits and to give the computational details for Digital Circuits.

CO3: Draw characteristics of devices like PNP and NPN junction diode and truth tables of different logic gates.

CO4: Understand basic elements and measurement of their values with multimeter and their characteristic study.

SEMESTER – VIII

MIC-10: Analytical Mechanics & Special Theory of Relativity

Course Outcomes (COs)

After the completion of the course, the students will be able to:

CO1: Understand Physical Principle behind derivation of Lagrange's and Hamilton ion Equation.

CO2: Understand problems in space science theoretical research.

CO3: Analysis the Centre of mass and Laboratory frames of reference and their use in explaining elastic and inelastic collisions.

CO4: Understand the Planetary motions and motions of satellites and Space science. Getting an idea of postulates of special theory of relativity and their implications.

Course Title: - History and Philosophy of Science

Course objective:

- To introduce some fundamental issues in the history and philosophy of science.
- To provide some understanding of the general principles of scientific thinking and methodology.
- To aim at understanding and debating what is meant by scientific enterprise.
- To explore the connection between history, science and philosophy.

Course Outcomes (COs)

The Student will be able to learn

CO1: Scientific method, reasoning, truth and evidence.

CO2: The contrast between empirical facts and philosophical facts.

CO3: The change from Aristotelian worldview to the Newtonian worldview.

CO4: The recent developments in science especially relativity theory and evolutionary theory.

MDC-03: Physics of Communication Technology

SEMESTER – III

MDC-03: SPORTS SCIENCE

SEMESTER – III

Atmospheric & SPACE SCIENCE

Course Objective

To understand the basics of atmospheric and space science dealing with the structure of atmosphere, and stellar objects.

Course Outcomes (COs)

After this course, the student will be able to:

CO1: Understand the structure of atmosphere.

CO2: Deal with tools and techniques used for space observation.

CO3: Familiarize with our solar system.

CO4: Realize the idea of the formation, evolution and classification of star sand.

CO5: Develop an idea of nucleo-synthesis and formation of heavy nuclei and theories of the Universe.

CO6: Connect the multi-disciplinary nature of development in science and technology to enhance the capability of space observation.