**OFFICE OF THE PRINCIPAL, NORTH GAUHATI COLLEGE**
**P. O. College Nagar, Guwahati-781031**

অধ্যক্ষৰ কার্য্যালয়,
ডাক ঃ কলেজ নগৰ,

উত্তৰ গুৱাহাটী মহাবিদ্যালয়
গুৱাহাটী-৭৮১০৩১

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# PROGRAM OUTCOMES, PROGRAM-SPECIFIC OUTCOMES, AND COURSE OUTCOMES (CBCS)

## NORTH GAUHATI COLLEGE

Dr. Dilip Das
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Principal
North Gauhati College

# Program Outcome, Program - Specific Outcome and Course Outcome (CBCS)

**Programs offered:**

1. **Bachelor of Arts** (**B. A.)** : The college offers undergraduate degree courses in Arts in the subjects Anthropology, Assamese, Economics, Education, English, Geography, History and Political Science.

2. **Bachelor of Science (B. Sc.)** : Undergraduate degree courses in science offered by the college include the subjects Anthropology, Botany, Chemistry, Economics, Electronics, Geography, Mathematics, Physics and Zoology.

3. **Bachelor of Vocational Studies (B. Voc.)** : The college provides undergraduate vocational degree courses.

## B.A. and B.Sc. major program in Anthropology

**Program specific outcome:** Upon completion of the course, students will be able to demonstrate a broad and comparative understanding of humanity, the diversity of world cultures, and an understanding of core tenets of the four-field approach (sociocultural, archaeological, linguistics and biological) within anthropology as a discipline.

**Course outcome:**

Paper ANT-HC-1016: Introduction to Biological Anthropology

Students will learn about the genesis and development of biological anthropology, and the aspects from which evolution and variation is studied.

Paper ANT-HC-1026: Introduction to Socio-Cultural Anthropology

The basic theoretical knowledge about Social and Cultural Anthropology can be achieved. The knowledge of first-hand field data collection and analysis can be gained.

Paper ANT-HC-2016: Archaeological Anthropology

Student will be acquainted with archaeometrical background of prehistoric, protohistoric and historical evolution of human culture. Students will have practical understanding of prehistoric culture through tool technology and pottery technology.

Paper ANT-HC-2026: Fundamentals of Human Origin & Evolution

Students will learn about the stages of human evolutionary development. They will know about the fossil finds on the basis of which the evolutionary stages are identified.

Paper ANT-HC-3016: Tribes and Peasants in India

The anthropological knowledge and approach to study of tribes, villages and peasantry can be gained. The problems, prospects, development, and government policies for tribes, villages and peasants can be achieved.

Paper ANT-HC-3026: Human Ecology: Biological & Cultural dimensions

The knowledge on human adaptation in ecology will be gained. The knowledge on urbanization and industrialization in human societies will be achieved.

Paper ANT-HC-3036: Biological Diversity in Human Populations

The students will learn about markers for understanding biological diversity. Classical markers use for classifying races. Classification of Indian population.

Paper ANT-SE-3014: Tourism Anthropology

The students will learn about the socio-cultural background of developing tourism. The students will learn the basics of eco-tourism and heritage tourism in the current situation.

Paper ANT-SE-4014: Public Health and Epidemiology

The students will learn different aspects of health, diseases and principles of epidemiology.

Paper ANT-HC- 4016: Theories of Culture and Society

The knowledge of the basic theories of culture in Anthropology can be gained. The knowledge of the basic theories of society in Anthropology can be gained.

Paper ANT-HC-4026: Human Growth and Development

Students will learn about concepts related with growth and stages of growth. Students will learn biocultural factors that influence growth and development. Students will learn human body composition.

Paper ANT-HC-4036: Research Methods

The knowledge on formulation of research design, application of methods and techniques in data collection will be obtained. The ethics of research will be understood for an effective research study.

Paper ANT-HC-5016: Human Population Genetics

Students will learn about mechanisms which create variation in gene frequencies. Students will learn the method of assessing gene frequency variation. Students will learn how ecological factors which help maintain gene frequencies.

Paper ANT-HC-5026: Anthropology in Practice

Student will gain knowledge of Applied Anthropology, Action Anthropology and Role of Anthropology in Development. Student will gain knowledge of recent trend of Anthropology.

Paper ANT-HE-5016: Indian Archaeology

The students will be familiar with the rich prehistoric past of the country. The students will understand the prehistoric foundation on which the later course of history in the country developed.

Paper ANT-HE-5026: Anthropology of Religion, Politics and Economy

The knowledge on the anthropological theories of religion, economies and political institutions will be gained. The knowledge on the interrelationship between religion, economies and political institutions will be achieved.

Paper ANT-HE-5036: Paleoanthropology

Student will be acquainted with archaeological and paleontological background of prehistoric period. Students will have understanding of evolutionary biology and culture through fossilized evidences and bio-archeological approach.

Paper ANT-HC-6016: Forensic Anthropology

Students will learn about distinguishing human from non-human skeletal remains. Students will learn about the techniques of making personal identification.

Paper ANT-HC-6026: Anthropology of India

The students will learn about racial linguistic and ethnic dimension of Indian society. The students will be familiar with the anthropological situation of the country.

Paper ANT-HE-6016: Dissertation

The knowledge of conducting fieldwork by applying anthropological methods will be gained. The knowledge of data analysis and writing based on the collected data will be learned.

Paper ANT-HE-6026: Human Genetics

The students will learn about the structure and function human genome. The students will learn how genomic variation is studied. The students will learn about the genomic diversity and human evolution.

Paper ANT-HE-6036: Demographic Anthropology

Students will learn about the basics of demography and demographic theories. Students will learn about the tools used for population change.

## B.A. major program in Assamese

**Program specific outcome:** On completion of this course, students will attain knowledge on the Assamese language, culture and tradition. This course aims to develop skills in creative writing of Assamese prose and poetry. Competence in the language and grammar will enable students to improve communicative skills. The course also aims to provide a historical insight into the development of the Assamese language and literature.

**Course outcome:**

Paper ASM-HC-1016: Asomiya Sahityar Buranji (Charyapadar - Sankari Yug)

History of Assamese Literature enhance to understand the Trend & Heritage of Assamese Literature and Era Division, Basic characteristics, creations of significant writers, vastness of Assamese literature from one thousand years back to medieval period.

Paper ASM-HC-1026: Asomiya Sahityar Buranji (Uttar Sankari Yug - Arunodoi Yug)

From Medieval periods its Imparts knowledge of the trends and transition of Post-Sankardeva periods Assamese literature to Modern Assamese literature or Arunodoi (1846) Period.

Paper ASM-HC-2016: Bhasa-Bigyan Porichay

Introduction of Linguistics Paper Enhance to understand the Evolution of Assamese Language, basic concept of modern linguistics. Besides its enable the students to understand the stages of language and its structures.

Paper ASM-HC-2026: Sahitya Somalosona

Literary Criticism enable the students to know about Assamese Criticism, its styles and trends. Besides its imparts knowledge about the tradition, definition as well as aspect of criticism from the western to Eastern context.

Paper ASM-HC-3016: Asomiya Sahitya Prabesh

In this paper students will learn about Assamese literature through study of creative and critical writings.

Paper ASM-HC-3026: Asomiya Kabitar Saneki

In this paper students will get acquainted with Assamese poetry from different ages.

Paper ASM-HC-3036: Asomor Sanskriti

In this paper students will learn about the cultural and religious traditions, festivals, different arts alongwith the process of formation of the Assamese nationality.

Paper ASM-SE-3014: Byabaharik Asomiya

practical use of Assamese language.

Paper ASM-HC-4016: Tulonamulok Bharatiya Sahitya

In this paper students will learn about comparative analysis of modern Indian literature.

Paper ASM-HC-4026: Asomiya Bhasar Samaharan: Arya-Bhasa aru Arya Vinna Bhasa

In this paper students will learn the effect of different Aryan and non Aryan languages in developing the modern Assamese language.

Paper ASM-HC-4036: Asomiya Gadya Sahitya

In this paper students will learn about Assamese prose through dramas composed by Sankardeva and historical prose.

Paper ASM-SE-4014: Srijanimulak Sahitya

In this paper students will be taught practical aspects of prose and poetry writing.

Paper ASM- HC-5016: Asomiya Natok aru Poribesan Soili

In this history of Assamese drama and representative drama.

Paper ASM-HC-5026: Asomiya Byakaran

In this paper students will learn grammatical analysis of Assamese language.

Paper ASM-HE-5016: Asomiya Lok Sahitya Adhyayan

In this paper students will learn about the nature of Assamese folk literature.

Paper ASM-HE-5026: Asomiya Ramanyasabadi Kabita

In this paper students will learn about romanticism in Assamese poetry that developed in the nineteenth century.

Paper ASM-HE-5036: Sankardev

In this paper students will learn different literary compositions of Sankardeva.

Paper ASM-HE-5046: Asomiya Kalpabigyan Sahitya

In this paper students will learn about fictional Assamese literature.

Paper ASM-HC-6016: Asomiya Sutigalpa aru Upanyas

In this paper students will learn about Assamese short stories and novels.

Paper ASM-HC-6026: Asomiya Lipir Itihas

In this paper students will learn about the history of the Assamese written language.

Paper ASM-HE-6016: Lakshminath Bezbaruah

In this paper students will learn about the creative and thoughtful writings of Lakshminath Bezbaruah.

Paper ASM-HE-6026: Banikanta Kakati

In this paper students will learn about the critical and thoughtful articles of Banikanta Kakati.

Paper ASM-HE-6036: Asomiya Sishu aru Kishor Sahitya

In this paper students will learn about the Assamese child or teen literatures.

## B.Sc. major program in Botany

**Program specific outcome:** On completion of this course, students will acquire knowledge on the classification of plant kingdom including microbial diversity. They will be able to identify plants based on different characters. They will acquire knowledge on plant physiology, biochemistry, pathology and genetics. Students will also be able to learn about modern tools and techniques including bioinformatics.

**Course outcome:**

Paper BOT-HC-1016: Phycology and Microbiology

In this paper students will learn about different aspects of the kingdom Algae and the microbial world.

Paper BOT-HC-1026: Biomolecules and Cell Biology

In this paper students will learn the different types of biomolecules and their functions, alongwith the structure and function of the plant cell.

Paper BOT-HC-2016: Mycology and Phytopathology

In this paper students will learn classification and other aspects of the fungi. Alongwith this students will also learn about various types of plant diseases and their causal organisms.

Paper BOT-HC-2026: Archegoniate

In this paper students will learn about the Bryophytes, Pteridophytes and Gymnosperms.

Paper BOT-HC-3016: Morphology and Anatomy of Angiosperms

In this paper students will learn about the morphological and anatomical characteristics of different groups of the Angiosperms, as well as variations and adaptations involving these characters.

Paper BOT-HC-3026: Economic Botany

In this paper students will learn about economically and medicinally important plant species and the ways they are utilized by man.

Paper BOT-HC-3036: Genetics

In this paper students will learn the different laws that govern the hereditary control of traits of organisms as well the means by which variations take place.

Paper BOT-HC-4016: Molecular Biology

In this paper students will learn in molecular details different aspects of functioning of the cell as well as regulation of its processes.

Paper BOT-HC-4026: Plant Ecology and Phytogeography

In this paper students will learn about different ecosystems and the ways in which they function and maintain their integrity. They will also learn different aspects of the geographical variations in vegetation.

Paper BOT-HC-4036: Plant Systematics

In this paper students will learn the different types of classification of Angiosperms, their nomenclature, and phylogenetic relationships.

Paper BOT-HC-5016: Reproductive Biology of Angiosperms

In this paper students will learn different types of embryonic development, modes of fertilization, and variations in the reproductive processes of Angiosperms.

Paper BOT-HC-5026: Plant Physiology

In this paper students will learn the various physiological processes that control the plants' metabolism.

Paper BOT-HE-5016: Natural Resource Management

In this paper students will learn about sustainable management and contemporary practices in management of natural resources.

Paper BOT-HE-5026: Horticultural Practices and Post-Harvest Technology

In this paper students will learn about different types of horticultural plants and techniques used in their cultivation. They will also learn about the different techniques in disease management and conservation of crop harvests.

Paper BOT-HC-6016: Plant Metabolism

In this paper students will learn the metabolisms of different essential biomolecules and signaling pathways of plants.

Paper BOT-HC-6026: Plant Biotechnology

In this paper students will learn the different technological interventions that enable to develop plant attributes and its biological and commercial values.

Paper BOT-HE-6016: Industrial and Environmental Microbiology

In this paper students will learn the various microbial activities that are of commercial significance in different industries. They will also learn about microbial processes that maintain the homeostasis in nature, and help in preserving the environment.

Paper BOT-HE-6026: Analytical Techniques in Plant Sciences

In this paper students will learn about techniques such as imaging, cell fractionation, spectrophotometry, chromatography, etc. and tools of statistics used in biological data analyses.

Paper BOT-HE-6036: Project Work/Dissertation

In this paper students will learn to complete small research projects as a means to develop scientific thinking.

## B.Sc. major program in Chemistry

**Program specific outcome:** On completion of this course, students will acquire knowledge on the different branches of chemistry as physical chemistry, inorganic chemistry, organic chemistry and the quantum facets of chemistry. They will learn about the varieties of chemical reactions, properties of molecules, compounds and solutions, synthesis and analysis of organic samples, reaction dynamics, molecular rearrangements, tools such as spectroscopy, and medicinal chemistry. Moreover students will be enabled to learn various skills that require the application of chemistry in industries.

**Course outcome:**

Paper CHE-HC-1014: INORGANIC CHEMISTRY-I

Students would have clear understanding of the concepts related to atomic and molecular structure, chemical bonding, periodic properties and redox behaviour of chemical species.

Paper CHE-HC-1024: PHYSICAL CHEMISTRY I

In gaseous state unit students will learn the kinetic theory of gases, ideal gas and real gases. In liquid state unit, the students are expected to learn the qualitative treatment of the structure of liquid along with the physical properties of liquid, viz, vapour pressure, surface tension and viscosity. In the molecular and crystal symmetry unit they will be introduced to the elementary idea of symmetry which will be useful to understand solid state chemistry and group theory in some higher courses. In solid state unit the students will learn the basic solid state chemistry application of x-ray crystallography for the determination of some very simple crystal structures. The students will also learn another important topic “ionic equilibria” in this course.

Paper CHE-HC-2014: ORGANIC CHEMISTRY I

Students will be able to identify different classes of organic compounds, describe their reactivity and explain/analyze their chemical and stereo chemical aspects.

Paper CHE-HC-2024: PHYSICAL CHEMISTRY II

In this course the students are expected to learn laws of thermodynamics, thermochemistry, thermodynamic functions, relations between thermodynamic properties, Gibbs Helmholtz equation, Maxwell relations etc. Moreover the students are expected to learn partial molar quantities, chemical equilibrium, solutions and colligative properties. After completion of this course, the students will be able to understand the chemical systems from thermodynamic point of view.

Paper CHE-HC-3014: INORGANIC CHEMISTRY-II

On successful completion of this course students would be able to apply theoretical principles of redox chemistry in the understanding of metallurgical processes. Students will be able to identify the variety of s and p block compounds and comprehend their preparation, structure, bonding, properties and uses. Experiments in this course will boost their quantitative estimation skills and introduce the students to preparative methods in inorganic chemistry.

Paper CHE-HC-3024: ORGANIC CHEMISTRY-II

Students will be able to describe and classify organic compounds in terms of their functional groups and reactivity.

Paper CHE-HC-3034: PHYSICAL CHEMISTRY-III

The students are expected to learn phase rule and its application in some specific systems. They will also learn rate laws of chemical transformation, experimental methods of rate law determination, steady state approximation etc. in chemical kinetics unit. After attending this course the students will be able to understand different types of surface adsorption processes and basics of catalysis including enzyme catalysis, acid base catalysis and particle size effect on catalysis.

Paper CHE-SE-3024: IT SKILLS FOR CHEMISTS

Course learning outcomes focus on skill development related to basic computer operations and information technology. After completing the course the incumbent is able to use the computer for basic purposes of preparing his personnel/business letters, viewing information on Internet (the web), sending mails, using internet banking services etc. After opting this course the students are expected to accumulate the skills in writing activities and Handling numeric data.

Paper CHE-SE-3034: BASIC ANALYTICAL CHEMISTRY

Upon completion of this course, students shall be able to explain the basic principles of chemical analysis, design/implement microscale and semimicro experiments, record, interpret and analyze data following scientific methodology.

Paper CHE-SE-3044: CHEMICAL TECHNOLOGY & SOCIETY

Students shall be familiarized with processes and terminologies in chemical industry, like mass balance, energy balance etc… Learners will be able to use chemical and scientific literacy as a means to better understand the topics related to the society.

Paper CHE-SE-3054: CHEMOINFORMATICS

On the successful completion of the course, the students should be able to explain, interpret and critically examine the utility of computers and software tools to solving chemistry related problems. Recognize, apply, compare and predict chemical structures, properties, and reactivity and; solve chemistry related problems.

Paper CHE-SE-3064: BUSINESS SKILLS FOR CHEMISTS

Students shall be able to explain and/or analyze the important steps of business operations, finance and intellectual property as applied to chemical industry.

CHE-SE-3074: INTELLECTUAL PROPERTY RIGHTS (IPR)

After completing this course, students will have in-depth understanding about the importance and types of IPR. This course will also provide the clarity on the legal and economic aspects of the IP system.

Paper CHE-HC-4014: INORGANIC CHEMISTRY-III

On successful completion, students will be able name coordination compounds according to IUPAC, explain bonding in this class of compounds, understand their various properties in terms of CFSE and predict reactivity. Students will be able to appreciate the general trends in the properties of transition elements in the periodic table and identify differences among the rows.

Through the experiments students not only will be able to prepare, estimate or separate metal complexes/compounds but also will be able to design experiments independently which they should be able to apply if and when required.

Paper CHE-HC-4024: ORGANIC CHEMISTRY-III

Students shall demonstrate the ability to identify and classify different types of N-based derivatives, alkaloids and hetrocyclic compounds/explain their structure mechanism and reactivity/critically examine their synthesis and reactions mechanism.

Paper CHE-HC-4034: PHYSICAL CHEMISTRY-IV

In this course the students will learn theories of conductance and electrochemistry. Students will also understand some very important topics such as solubility and solubility products, ionic products of water, conductometric titrations etc. The students are also expected to understand the various parts of electrochemical cells along with Faraday's Laws of electrolysis. The students will also gain basic theoretical idea of electrical & magnetic properties of atoms and molecules.

Paper CHE-SE-4014: ANALYTICAL CLINICAL BIOCHEMISTRY

Students will be able to identify various molecules relevant to a particular pathological condition and their estimation protocols.

Paper CHE-SE-4024: GREEN METHODS IN CHEMISTRY

Students shall be able to describe and evaluate chemical products and processes from environmental perspective, define and propose sustainable solutions and critically assess the methods for waste reduction and recycling.

Paper CHE-SE-4034: PHARMACEUTICAL CHEMISTRY

Students will be able to appreciate the drug development process, identify various small molecules used for treatments different ailments and other physiological processes.

Paper CHE-SE-4044: CHEMISTRY OF COSMETICS & PERFUMES

Students will learn about the preparation and chemistry involved with the production different cosmetic. This may encourage students to take up entry level jobs at cosmetics industry or venture into commercial production of cosmetics as an entrepreneur.

Paper CHE-SE-4054: PESTICIDE CHEMISTRY

Students will be able to explain or describe and critically examine different types of pesticides, their activity/toxicity and their applications and the need for the search of an alternative based on natural products.

Paper CHE-SE-4064: FUEL CHEMISTRY

At the end of this course students will learn about the classes of renewable and non-renewable energy sources. Students will learn about the composition of coal and crude petroleum, their classification, isolation of coal and petroleum products and their usage in various industries. They will also learn to determine industrially significant physical parameters for fuels and lubricants.

Paper CHE-HC-5014: ORGANIC CHEMISTRY-IV

Students will be able to explain/describe the important features of nucleic acids, amino acids and enzymes and develop their ability to examine their properties and applications.

Paper CHE-HC-5024: PHYSICAL CHEMISTRY V

After completion of this course the students are expected to understand the application of quantum mechanics in some simple chemical systems such as hydrogen atom or hydrogen like ions. The students will also learn chemical bonding in some simple molecular systems. They will able to understand the basics of various kinds of spectroscopic techniques and photochemistry.

Paper CHE-HE-5014: APPLICATIONS OF COMPUTERS IN CHEMISTRY

After the completion of this course it will help the student to interpret laboratory data, curve fitting of experimental work, also perform quantum mechanical calculations for various molecular models.

Paper CHE-HE-5024: ANALYTICAL METHODS IN CHEMISTRY

On successful completion students will be have theoretical understanding about choice of various analytical techniques used for qualitative and quantitative characterization of samples. At the same time through the experiments students will gain hands on experience of the discussed techniques. This will enable students to take judicious decisions while analyzing different samples.

Paper CHE-HE-5034: MOLECULAR MODELLING & DRUG DESIGN

Students will be able to identify basic components of computer and programming as applied to computer assisted design and modelling of molecules.

Paper CHE-HE-5044: NOVEL INORGANIC SOLIDS

After the completion of this course it will also be possible for the students to opt for studying an interdisciplinary master's programme with an emphasis on the synthesis and applications of various materials or take up a job in the materials production and/or processing industry.

Paper CHE-HE-5054: POLYMER CHEMISTRY

After completion of this course the students will learn the definition and classifications of polymers, kinetics of polymerization, molecular weight of polymers, glass transition

temperature, and polymer solutions etc. They also learn the brief introduction of preparation, structure and properties of some industrially important and technologically promising polymers.

Paper CHE-HC-6014: INORGANIC CHEMISTRY-IV

By studying this course the students will be expected to learn about how ligand substitution and redox reactions take place in coordination complexes. Students will also learn about organometallic compounds, comprehend their bonding, stability, reactivity and uses. They will be familiar with the variety of catalysts based on transition metals and their application in industry. On successful completion, students in general will be able to appreciate the use of concepts like solubility product, common ion effect, pH etc. in analysis of ions and how a clever design of reactions, it is possible to identify the components in a mixture. With the experiments related to coordination compound synthesis, calculation of 10Dq, controlling factors etc. will make the students appreciate the concepts of theory in experiments.

Paper CHE-HC-6024: ORGANIC CHEMISTRY-V

Students will be able to explain/describe basic principles of different spectroscopic techniques and their importance in chemical/organic analysis. Students shall be able to classify/identify/critically examine carbohydrates, polymers and dye materials.

Paper CHE-HE-6046: RESEARCH METHODOLOGY FOR CHEMISTRY

After completing this course, students should be able to construct a rational research proposal to generate fruitful output in terms of publications and patents in the field of chemical sciences.

Paper CHE-HE-6014: GREEN CHEMISTRY

Apart from introducing learners to the principles of green chemistry, this course will make them conversant with applications of green chemistry to organic synthesis. Students will be prepared for taking up entry level jobs in the chemical industry. They also will have the option of studying further in the area.

Paper CHE-HE-6024: INDUSTRIAL CHEMICALS AND ENVIRONMENT

After successful completion of the course, students would have learnt about the manufacture, applications and safe ways of storage and handling gaseous and inorganic industrial chemicals. Students will get to know about industrial metallurgy and the energy generation industry. Students will also learn about environmental pollution by various gaseous, liquid wastes and nuclear wastes and their effects on living beings. Finally, the students will learn about industrial waste management, their safe disposal and the importance of environment friendly “green chemistry” in chemical industry.

Paper CHE-HE-6034: INORGANIC MATERIALS OF INDUSTRIAL IMPORTANCE

This course will establish the basic foundation of industrial inorganic chemistry among the students. This will be helpful for pursuing further studies of industrial chemistry in future. Experiments will help the Students to gather the experience of qualitative and quantitative chemical analysis. Students will be capable of doing analysis of the inorganic materials which are used in our daily life. They will have insight of the industrial processes.

CHE-HE-5064: INSTRUMENTAL METHODS OF CHEMICAL ANALYSIS

Students shall be able to explain the theoretical basis of different analytical techniques, identify the experimental requirements and compare/analyze the data/results thereof.

## B.A. and B.Sc. major program in Economics

**Program specific outcome:** On completion of this course, students will acquire knowledge on the branches of economics, tools used in economic analyses, the role of government in formulating and implementing economic policies, international economics, the role of economic policies in sustainable development, history of economic thoughts, and national and regional economic policies.

**Course outcome:**

Paper ECO-HC-1016: INTRODUCTORY MICROECONOMICS

This course will expose the students to the basic principles of microeconomic theory. The emphasis will be on thinking like an economist and the course will illustrate how microeconomic concepts can be applied to analyze real-life situations.

Paper ECO-HC-1026: MATHEMATICAL METHODS IN ECONOMICS–I

This paper will transmit the body of basic mathematics that enables the study of economic theory at the undergraduate level, specifically the courses on microeconomic theory, macroeconomic theory, statistics and econometrics set out in this syllabus. In this course, particular economic models are not the ends, but the means for illustrating the method of applying mathematical techniques to economic theory in general.

Paper ECO-HC-2016: INTRODUCTORY MACROECONOMICS

This course will introduce the students to the basic concepts of Macroeconomics. Macroeconomics deals with the aggregate economy. This course discusses the preliminary concepts associated with the determination and measurement of aggregate macroeconomic variable like savings, investment, GDP, money, inflation, and the balance of payments.

Paper ECO-HC-2026: MATHEMATICAL METHODS IN ECONOMICS – II

This course will transmit the body of basic mathematics that enables the study of economic theory at the undergraduate level, specifically the courses on microeconomic theory, macroeconomic theory, statistics and econometrics set out in this Syllabus. In this course, particular economic models are not the ends, but the means for illustrating the method of applying mathematical techniques to economic theory in general.

Paper ECO-HC-3016: INTERMEDIATE MICROECONOMICS – I

The course will provide a sound training in microeconomic theory to formally analyze the behaviour of individual agents. Since students are already familiar with the quantitative techniques in the previous semesters, mathematical tools are used to facilitate understanding of the basic concepts.

Paper ECO-HC-3026: INTERMEDIATE MACROECONOMICS – I

This course introduces the students to formal modeling of a macro-economy in terms of analytical tools. It discusses various alternative theories of output and employment determination in a closed economy in the short run as well as medium run, and the role of policy in this context. It also introduces the students to various theoretical issues related to an open economy.

Paper ECO-HC-3036: STATISTICAL METHODS FOR ECONOMICS

This course will impart learning on statistical methods for economics. It begins with some basic concepts and terminology that are fundamental to statistical analysis and inference. It then develops the notion of probability, followed by probability distributions of discrete and continuous random variables and of joint distributions. This is followed by a discussion on sampling techniques used to collect survey data. The course introduces the notion of sampling distributions that act as a bridge between probability theory and statistical inference. The semester concludes with some topics in statistical inference that include point and interval estimation.

Paper ECO-HC-4016: INTERMEDIATE MICROECONOMICS – II

Completion of this course will provide conceptual clarity to the student coupled with the use of mathematical tools and reasoning. It covers general equilibrium and welfare, imperfect markets and topics under information economics.

Paper ECO-HC-4026: INTERMEDIATE MACROECONOMICS – II

In this course, the students are introduced to the long run dynamic issues like growth and technical progress. It also provides the micro-foundations to the various aggregative concepts used in the previous course.

Paper ECO-HC-4036: INTRODUCTORY ECONOMETRICS

This course provides a comprehensive introduction to basic econometric concepts and techniques. It covers statistical concepts of hypothesis testing, estimation and diagnostic testing of simple and multiple regression models. The course also covers the consequences of and tests for misspecification of regression models.

Paper ECO-HC-5016: INDIAN ECONOMY-I

This course will introduce students to major trends in economic indicators and policy debates in India in the post-Independence period, with particular emphasis on paradigm shifts and turning points. Given the rapid changes taking place in India, the reading list will have to be updated annually.

Paper ECO-HC-5026: DEVELOPMENT ECONOMICS-I

The course will provide students with the knowledge of alternative conceptions of development and their justification. It then proceeds to aggregate models of growth and cross-national comparisons of the growth experience that can help evaluate these models. The axiomatic basis for inequality measurement is used to develop measures of inequality and connections between growth and inequality are explored. The course ends by linking political institutions to growth and inequality by discussing the role of the state in economic development and the informational and incentive problems that affect state governance.

Paper ECO-HC-6016: INDIAN ECONOMY-II

This course will impart knowledge of sector-specific polices and their impact in shaping trends in key economic indicators in India. It highlights major policy debates and evaluates the Indian empirical evidence.

Paper ECO-HC-6026: DEVELOPMENT ECONOMICS-II

It will familiarize the students with basic demographic concepts and their evolution during the process of development. The structure of markets and contracts is linked to the particular problems of enforcement experienced in poor countries. The governance of communities and organizations is studied and this is then linked to questions of sustainable growth. The course will also provide reflections on the role of globalization and increased international dependence on the process of development.

Paper ECO-HE-5016: ECONOMICS OF HEALTH AND EDUCATION

This course provides a microeconomic framework to analyze, among other things, individual choice in the demand for health and education, government intervention and aspects of inequity and discrimination in both sectors. It also gives an overview of health and education in India.

Paper ECO-HE-5026: MONEY AND FINANCIAL MARKETS

This course exposes students to the theory and functioning of the monetary and financial sectors of the economy. It highlights the organization, structure and role of financial markets and institutions. It also discusses interest rates, monetary management and instruments of monetary control. Financial and banking sector reforms and monetary policy with special reference to India are also covered.

Paper ECO-HE-5036: PUBLIC FINANCE

This course provides students with a non-technical overview of government finances with special reference to India. The course does not require any prior knowledge of economics. It will look into the efficiency and equity aspects of taxation of the centre, states and the local governments and the issues of fiscal federalism and decentralisation in India. The course will be useful for students aiming towards careers in the government sector, policy analysis, business and journalism.

Paper ECO-HE-6016: ENVIRONMENTAL ECONOMICS

This course provides insight on economic causes of environmental problems. In particular, economic principles are applied to environmental questions and their management through various economic institutions, economic incentives and other instruments and policies. Economic implications of environmental policy are also addressed as well as valuation of environmental quality, quantification of environmental damages, tools for evaluation of environmental projects such as cost-benefit analysis and environmental impact assessments.

Paper ECO-HE-6026: INTERNATIONAL ECONOMICS

This course develops a systematic exposition of models that try to explain the composition, direction and consequences of international trade, and the determinants and effects of trade policy. It then builds on the models of open economy macroeconomics developed in courses 08 and 12, focusing on national policies as well as international monetary systems. It concludes with

an analytical account of the causes and consequences of the rapid expansion of international financial flows in recent years. Although the course is based on abstract theoretical models, students will also be exposed to real-world examples and case studies.

Paper ECO-HE-6036: THE ECONOMY OF ASSAM

This course will provide students an idea of evolution of the Assam Economy from the colonial period to the contemporary time. The course is expected to help students to better appreciate the challenges and opportunities of the economy of Assam in the present context.

## B.A. major program in Education

**Program specific outcome:** On completion of this course, students will acquire knowledge on the different theories of education, the social, psychological, environmental aspects of education, the technological advances in education, and the implementation of scientific methods in conducting research in the field of education.

**Course outcome:**

Paper EDU-HC-1026: PSYCHOLOGICAL FOUNDATIONS OF EDUCATION

This course will make the students understand the relationship between education and psychology. Explain the need of educational psychology in teaching learning process. Describe the nature and theories of learning and role of motivation in learning. Understand the concept of memory, forgetting, attention and interest. Understand intelligence, its theories and measurement. Acquaint with different types of personality and the adjustment mechanism.

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Paper EDU-HC-2016: PHILOSOPHICAL AND SOCIOLOGICAL FOUNDATION OF EDUCATION

This course will enable the students to learn the concept of philosophy and its relationship with education. Understand the educational implications of different Indian schools of philosophy. Understand the educational implications of different Western schools of philosophy. Know the concept of sociology and its relationship with education. Develop understanding about the concept of educational sociology, social groups and socialization.

Paper EDU-HC-2026: DEVELOPMENT OF EDUCATION IN INDIA-I

This course will enable the students to recount the concept of Ancient Indian education system. Describe the education system in Ancient India, particularly Vedic Education. Examine the education system in Medieval India. Analyse the education system during British Period.

Paper EDU-HC-3016: DEVELOPMENT OF EDUCATION IN INDIA-II

This course will enable the students to understand the Educational situation during the time of Independence. Explain the recommendations and educational importance of different Education Commission and Committees in post Independent India. Analyse the National Policy on Education in different tomes. Accustom with the recent Educational Development in India.

Paper EDU-HC-3026: EDUCATIONAL TECHNOLOGY AND TEACHING METHODS

This course will make the students understand the objective of educational technology in teaching learning process. Acquaint the students with innovations in the field of education through technology. Make the students understand about various methods and devices of teaching. Acquaint students with levels, effectives of teaching and classroom management. Make the students understand the strategies of effective teaching as a profession.

Paper EDU-HC-3036: VALUE AND PEACE EDUCATION

This course will make the students understand the concept and meaning of value. Become aware about the role of educational institutions in building a value based society. Understand the meaning and concept of peace and its importance in human life. Understand the meaning and importance of peace education and its relevance at national and international level. Identify the different issues/ challenges in imparting peace education. Identify the strategies and skills in promoting peace education at institutional level.

Paper EDU-SEC- 3014: PUBLIC SPEAKING SKILL

After completing this course, students will be able to acquire the capacities of public speaking skill.

Paper EDU-HC-4016: GREAT EDUCATIONAL THINKERS

This course will enable the students to learn the Philosophy of life of different Educational Thinkers and their works. Enable the students to learn about the views of thinkers in educational context. Enable the students to learn about relevance of some of their thoughts at present day context.

Paper EDU-HC-4026: EDUCATIONAL STATISTICS AND PRACTICAL

This course will enable the students to develop the basic concept of Statistics, be acquainted with different statistical procedures used in Education. Develop the ability to represent educational data through graphs. Familiarize the students about the Normal Probability Curve and its applications in Education.

Paper EDU-HC-4036: EMERGING ISSUES IN EDUCATION

This course will make the students acquaint with major emerging issues national, state, and local. Acquaint the students with the various issues in education that are emerging in the recent years in the higher education system. Address the various problems and challenges of education in India at all levels.

Paper EDU-SE-4014: WRITING BIODATA AND FACING AN INTERVIEW

After completing this course, students will be able to write a bio-data scientifically and will develop confidence to face different types of interview.

Paper EDU-HC-5016: MEASUREMENT AND EVALUATION IN EDUCATION & PRACTICAL

This course will enable the students to understand the concept of measurement and evaluation in education. Acquaint the students with the general procedure of test construction and characteristics of a good test. Develop an understanding of different types of educational tests and their uses. Acquaint the students about personality test, and aptitude tests.

Paper EDU-HC-5026: GUIDANCE AND COUNSELLING

This course will help the students to understand the concept, need and importance of Guidance and Counselling. Enable the students to know the different types and approaches to Guidance and Counselling. Acquaint the students with the organization of guidance service and school guidance clinic. Enable the learners to understand the challenges faced by the teacher as guidance worker.

Paper EDU-DSE-5016: CONTINUING EDUCATION

This course will help the students to understand the concept, objectives, scope and significance of continuing education in the context of present scenario. Understand about different aspects and agencies of continuing education. Realize different methods and techniques as well as issues of continuing education. Know the meaning of open education and realize the importance of open school and open universities in continuing education. Understand the development of adult education in India, kinds of adult education and different problems of adult education.

Paper EDU-DSE-5026: DEVELOPMENTAL PSYCHOLOGY

This course will enable the students to understand the basic concepts relating to development. Acquaint the students about heredity and environmental factors affecting pre-natal development. Enable the students to understand the development aspects during infancy and childhood. Enable the students to understand the development aspects of adolescence, importance of adolescence period and problems associated with this stage.

Paper EDU-DSE-5036: HUMAN RIGHTS EDUCATION

After completion of this course the learner will be able to explain the basic concept, nature and scope of human rights. Describe the meaning, nature, principles, curriculum and teaching methods of human rights education at different levels of Education. Know the role of United Nations on human rights. Understand enforcement mechanism in India. Know the role of advocacy groups

Paper EDU-DSE-5046: TEACHER EDUCATION IN INDIA

This course will enable the students to learn the Concept, Scope, Aims & Objectives and Significance of teacher education. Acquaint with the development of Teacher Education in India. Acquaint with the different organising bodies of teacher education in India and their functions in preparation of teachers for different levels of education. Acquaint with the innovative trends and recent issues in teacher education, and be able to critically analyse the status of teacher education

in India. Understand and conceive the qualities, responsibilities and professional ethics of teachers.

Paper EDU-HC-6016: EDUCATION AND DEVELOPMENT

After completion of this course the learner will be able to identify relation between education and development. Educational development in the post globalization era. Role of education in community development. Education for human resource development. Economic and political awareness through education.

Paper EDU-HC-6026: PROJECT

After completion of this course the learner will be able to explain the process of conducting a Project. Prepare a Project Report.

Paper EDU-DSC-6016: MENTAL HEALTH AND HYGIENE

This course will enable the student to acquaint with the fundamentals and development of mental health and the characteristics of a mentally healthy person. Understand the concept and importance of mental hygiene and its relationship with mental health. Acquire knowledge about the principles, factors promoting mental health and the role of home, school, and society in maintaining proper mental health. Learn the meaning and problem of adjustment and also the different adjustment mechanisms. Familiarize with the concept and issues of positive psychology, mental health of women, role of WHO and stress management.

Paper EDU-DSC-6026: SPECIAL EDUCATION

This course will enable the student to understand the meaning ad importance of special education. Acquaint with the different policies and legislations of special education. Familiarise the students with the different types of special children with their characteristics. Enable the students to know about different issues, educational provisions and support services of special education.

Paper EDU-DSC-6036: EDUCATIONAL MANAGEMENT

This course will enable the student to develop an understanding of the basic concept of educational management. Enable the students to know about the various resources in education. Enable the students to understand the concept and importance of educational planning. Enable the students to know about the financial resources and financial management in education.

Paper EDU-DSC-6046: WOMEN AND SOCIETY

This course will enable the student to understand the changing role of women in. Understand gender discrimination in Indian. Make the students understand the constitutional provisions for women and their rights. Make the students understand women empowerment. Develop an awareness and sensitivity towards women.

## B.A. major program in English

**Program specific outcome:** Students will get a comprehensive idea of English Literature as a whole. They will also be able to judge literary quality of any literary text and to find connections and continuities of the past and present as well as identify disjuncture in these traditions.

**Course outcome:**

Paper 1: ENG-HC-1016 Indian Classical Literature

This paper introduces students to a selection of literatures of India in English translation. Given that Indian Classical Literature offers a rich and diverse canvas that spans across genres like drama, poetry, the epic narrative as well as short fictional fables, to name a few, it is essential that students studying English literature are familiar with at least a few of these. This paper encourages students to think laterally about literatures of the world, and the possibility of cultural exchange.

Paper 2: ENG-HC-1026 European Classical Literature

Classical writing in Europe saw the emergence of traditions that cut across many genres, which included poetry, theatre, and general discourses. While the Aristotelian focus on the examination of the essentials of poetry extended to incorporate discussions on epic and drama, subsequent writers such as Horace drew attention to the purposefulness of the creative exercise. In the theatre the widely divergent compositions by Sophocles and Plautus respectively show the consolidation of a rich cultural discourse. It is this enriching literary tradition that this paper seeks to familiarize with through the study of representative texts belonging to the Classical Period.

Paper 3: ENG-HC-2016 Indian Writing in English

This paper on Indian Writing in English introduces students to the historical development of this body of writing- the challenges faced by early writers, the growing sense of accomplishment in the writing of different forms and the interpretation of individual and collective experience in colonial and postcolonial India.

Paper 4: ENG-HC-2026 British Poetry and Drama: 14th to 17th Centuries

This paper acquaints students with the two major forms in British literature from the 14th to the 17th centuries – poetry and drama, apart from acquainting them with the contexts that generated such literatures. The larger contexts of the Renaissance, the nature of the Elizabethan Age and its predilections for certain kinds of literary activities, and the implications of the emergence of new trends will be focused in this paper. It will also highlight the seminal issues and preoccupations of the writers and their ages as reflected in these texts.

Paper 5: ENG-HC-3016 History of English Literature and Forms

This paper will introduce students to the History of English Literature and the major literary forms. It adopts a chronological approach to the study of poetry, drama, fiction and non-fictional prose, showing the development of each form as it moves through the various periods of English literature and its expansion into global English writing.

Paper 6: ENG-HC-3026 American Literature

This paper will acquaint the students with the main currents of American literature in its social and cultural contexts. The texts incorporated in the paper are a historical reflection of the growth of American society and of the way the literary imagination has grappled with such growth and change. A study of the paper, hence, should lead to an acquaintance with the American society in its evolutionary stages from the beginnings of modernism to the present as well as with exciting generic innovations and developments that have tried to keep pace with social changes.

Paper 7: ENG-HC-3036 British Poetry and Drama: 17th and 18th Centuries

This paper will familiarize the students with British literature in the 17th and 18th centuries, a time-period which sees the emergence and establishment of greatly diverse kinds of writings. The selected texts may encourage the students to look at the economic, political and social changes in (primarily) Britain during this period, such as the shifts from the Puritan Age to the Restoration and Neoclassical periods. The paper also seeks to familiarize the students with the larger contexts that generated such literatures as well as the possible impacts of the literature on society.

Paper 8: ENG-HC-4016 British Literature: The 18th Century

This paper will familiarize the students with British literature in the 18th century. A very interesting age in which reason and rationality dominated, this age saw the publication of some of the best novels and works of non-fictional prose and poetry in the English language. Though it was not predominantly an age of drama yet one cannot but pay attention to the few plays of the century.

Paper 9: ENG-HC-4026 British Romantic Literature

This paper will familiarize students with selections from works of major Romantic poets which address these issues, enabling students to appreciate the essence of the Romantic vision. In addition they will read that remarkable oddity, Frankenstein, a novel that also illuminates Romanticism from another angle.

Paper 10: ENG-HC-4036 British Literature: The 19th Century

This paper will expose the students to the ground-breaking efforts of the poets as well to the works of fiction writers who manage to consolidate and refine upon the achievements of the novelists of the previous era. Austen to Rossetti represents a remarkable literary development and range of works, addressing a very diverse array of social preoccupations.

Paper 11: ENG-HC-5016 British Literature: The 20th Century

This paper will introduce students to the spirit of modernism, with its urgent desire to break with the codes and conventions of the past, experiment with new forms and idioms, and its cosmopolitan willingness to open itself up to influences coming from other shores. The paper goes beyond the High Modern period of the early century and the students will also get acquainted with the ethos of postmodernism through a reading of recent poetic and fictional works.

Paper 12: ENG-HC-5026 Women's Writing

This paper will direct the students' attention to nineteenth and twentieth century writings by women living in different geographical and socio cultural settings. Students will get acquainted with the situationally distinct experiences of women articulated in a variety of genres-poetry, novels, short stories, and autobiography, while the selections from Mary Wollstonecraft-the only 18th century text prescribed, will acquaint students with the ideas contained in one of the earliest feminist treatises of the western world.

Paper ENG-HE-5016 Popular Literature

This paper will highlight the nature of 'popular' literature as a genre and the critical ideas underpinning the theorization of popular literature.

Paper ENG-HE-5026 Modern Indian Writing in English Translation

This paper will give students an introductory glimpse into this richness and diversity of Indian literature written in the regional languages.

Paper ENG-HE-5036 Literature of the Indian Diaspora

This paper will look at the diasporic experience with particular reference to Indian diasporic writers.

Paper ENG-HE-5046 Nineteenth Century European Realism

This paper will provide an interesting sampling of the traditions that contributed to the growth and consolidation of European Realism in the nineteenth century. Study of these texts will also facilitate the understanding of the gradual movement towards modernism in the twentieth century which was, in many ways, both a response and a reaction to the major tendencies of European Realism.

Paper ENG-HE-5056 Literary Criticism and Literary Theory

This paper will familiarize students with some important texts on literary criticism and literary theory. Beginning from William Wordsworth's Preface to the Lyrical Ballads the purpose will be to inform the students on the shifts in literary interpretations and critical approaches so as to equip them while reading texts across genres.

Paper ENG-HE-5066 Science Fiction and Detective Literature

This paper will introduce students to Science Fiction and Detective Literature that have a fairly venerable ancestry, going back at least two centuries. Some fine literary minds have engaged with these genres, and their creations can be fruitfully studied to explore ways in which new narrative possibilities have emerged due to the human fascination for crime, mystery and improbable occurrences.

Paper 13: ENG-HC-6016 Modern European Drama

The paper will introduce the students to the innovative dramatic works of playwrights from different locations in Europe, which taken together represents the wide range of modern drama and its fortunes on the written page and the stage. The selected plays would allow an understanding of the emergence of avant garde movements and trends and dramatic devices and techniques during the period of modernism which eventually influenced theatrical practices in other nations of the world.

Paper 14: ENG-HC-6026 Postcolonial Literatures

This paper gives the students an opportunity to acquaint themselves with some of the novels, short stories and poems from postcolonial literatures across the world, with the texts showcasing the many regional, cultural differences and peculiarities, as well as common and shared experiences of the postcolonial condition.

Paper ENG-HE-6016 Literature and Cinema

This paper gives the students an opportunity to acquaint themselves with Literature and Cinema.

Paper ENG-HE-6026 World Literatures

This paper gives the students an opportunity to acquaint themselves with World Literatures.

Paper ENG-HE-6036 Partition Literature

This paper gives the students an opportunity to acquaint themselves with Partition Literature.

Paper ENG-HE-6046 Travel Writing

This paper gives the students an opportunity to acquaint themselves with Travellers' Writing.

Paper ENG-HE-6056 Life Writing

This paper gives the students an opportunity to acquaint themselves with Life Writing.

Paper ENG-HE-6066 Writings from North East India

This paper gives the students an opportunity to acquaint themselves with Writings from North East India.

## B.A. and B.Sc. major program in Geography

**Program specific outcome:** This course enables students to understand the formation and interpretation of various landforms across the earth, the science of climatic phenomenon and oceanography, soil and biogeography. They get acquainted with the regional geographies of different regions of the world, as well as the social, political and economic aspects of world geography. The students also learn the role of geography in human settlements and population distribution alongwith the relation of man with his environment. The students completing this course also get armed with the knowledge of cartography and use of tools such as GIS, GPS and remote sensing with the help of satellites.

**Course outcome:**

Paper: GGY - HC – 1016: Geomorphology

The students will learn that the earth is unstable and it is undergoing constant changes due to dynamic earth's processes. The students will come to know about the meaning and scope of geomorphology as a major branch of Physical Geography. After gaining knowledge based on the contents embodied in this paper, the students will be able to realize the importance of

geomorphological knowledge as applied in various developmental activities executed in different areas.

Paper: GGY-HC-1026: Cartographic Techniques

The students will understand the importance of various cartographic techniques in geographica study. General understanding of map type, map scale and mapcontent. An acquaintance of different cartographic techniques for representation of various facets of physical and human geographic data of any area.

Paper: GGY-HC–2016: Human Geography

The paper will be useful for students in developing ideas on human-environment issues that geographers usually address in the anthropocene. The paper will be useful for students preparing for UGC NET/SLET exams and other competitive exams including the civil services.

Paper: GGY-HC-2026: Climatology and Biogeography

The paper will be useful for students in developing ideas on climate related aspects of geographical analyses. The paper will help provide theoretical insights and perspectives to students if they wish to pursue a research programme in future.

Paper: GGY-HC-3016: Economic Geography

The paper will be useful for students in developing ideas on how geographical aspects organise economic space and will offer perspectives to students if they wish to pursue a research programme.

Paper: GGY-HC-3026: Geography of India with Special Reference to N.E. India

The paper will be useful for students in developing understanding on Indian geography and its various dimensions.

Paper: GGY-HC-3036: Quantitative Methods in Geography

Thorough understanding of the statistical methods and techniques used in geographical studies; understanding of tabulation, analysis and interpretation of geographical data.

Paper: GGY–SE-3044: River Basin Studies

At the end of the course, the students will be able to learn use of a few instruments like rotameter, planimeter, Dumpy Level, etc. To learn the basics of morphometric analysis techniques. To acquaint with the field methods of river studies in across-section.

Paper: GGY–SE-3054: Thematic Cartography

Understanding the importance of various techniques of preparation of maps in geographical study. General understanding of preparation of different types of plan and maps. An acquaintance of different cartographic techniques for representation of various facets of earth’s surface.

Paper: GGY-HC-4016: Environmental Geography and Disaster Management

This paper will be useful for students in developing ideas on environmental issues including disasters that geographers usually address. This paper will be useful for students preparing for different competitive exams including the civil services.

Paper: GGY-HC-4026: Population and Settlement Geography

The paper will be useful for students in developing ideas about spatio-temporal changes in the characteristics of population and settlement and the factors associated with them.

Paper: GGY-HC-4036: Remote Sensing, GIS and GPS

The paper remains useful for students in developing skills in spatial data analysis if they wish to pursue a research programme.

Paper: GGY-SE-4044: Advanced Statistical Techniques for Spatial Analysis

It provides general understanding of geographical data and application of various statistical measures for their meaningful analysis. Acquiring basic knowledge about probability and normal distributions and their applications for sample data collection and analysis. Understanding the patterns and processes associated with various geographical phenomena through application of different statistical techniques.

Paper: GGY-SE-4054: Surveying Techniques

It provides general understanding of the importance of various surveying techniques in geographical study. General understanding of preparation procedures of different types of plan and map. An acquaintance of different surveying techniques for representation of various spatial objects/ Phenomena.

Paper: GGY-HC-5016: Social and Political Geography

This course will help equip the students to comprehend various social and political aspects of phenomena and their interface within the realm of geography.

Paper: GGY-HC-5026: Field Techniques in Geography

This course will help students to proceed with a research problem and the steps she/he should adopt and the tools and craft to be employed for doing quality research. Students perceive fieldwork to be beneficial to their learning, because through it they experience ‘geographical reality’, and have deeper understanding of the subject. The students will have a chance to interact with respondents and collect data through questionnaire directly from the field. This course will develop understanding about designing and writing a field report.

Paper: GGY-HE-5036: Geography of Transportation

The students will be able to understand and analyse the principal issues confronting the transportation systems from geographical perspectives. The students will get an insight into various transportation systemsfrom global and India perspectives.

Paper: GGY-HE–5046: Regional Development and Planning

The paper will be useful for students in developing ideas on disparities within and between countries and their fallout. The paper will help provide theoretical insights and perspectives to students, if they wish to pursue a higher studies or research in future.

Paper: GGY-HE-5056: Urban Geography

The paper will be useful for students in developing ideas on how geographical factors organize urban spaces and how geographers seek to address various urban problems and issues. It will help build skills among students seeking advanced studies on urban development and planning.

Paper: GGY-HE-5066: Agricultural Geography

This paper will be useful for students in developing ideas about agricultural practices

and their distribution and characteristics. This paper will also be useful tothe students in understanding the world agricultural systems.

Paper: GGY-HC-6016: Geographical Thought

This course develops a comprehensive understanding of the discipline; this course helps the students to apply the historic and contemporary perspective to explain and approach the real world geographic problems.

Paper: GGY-HC-6026: Research Methods in Geography and Project Work

This course will help the students to proceed with a research problem and the steps she/he should adopt and the tools and craft to be employed while doing quality research.

Paper: GGY-HE–6036: Geography of Health

This course will help the students in understanding of the concept of human health and healthcare from the perspective of geography. Acquiring knowledge about factors influencing human health and occurrence of diseases in varying ecological settings. Providing useful information about the impact of global climate change on human health and occurrence of various diseases in different ecological settings in India.

Paper: GGY-HE-6046: Hydrology

After completion of this course the students will be able to speak on the basic concepts of hydrology and its application in river basin studies. Students will also have a practical orientation of the concepts both in laboratory and in the field.

Paper: GGY–HE-6056: Geography of Tourism

The paper will be useful for students in developing ideas on how geographical factors tangent on tourism activities and how geographers seek to address issues of development and carrying capacities of varied environments. It will also build skills for students seeking to enroll in a research programme and/or provide openings for them to work with tourism/eco-tourism planning agencies.

Paper: GGY-HE-6066: Geography of Resources and Development

This paper will be useful to students in developing ideas on different aspects of resources, and the linkages with development issues that geographers usually address.

## B.A. major program in History

**Program specific outcome:** This course enables students to learn the ancient, medieval and modern history of India and Assam. The political history of India under different regimes has been discussed elaborately. The students also learn the history of different ancient civilizations of the world. The students also get to learn the elaborate history of Europe and developed countries of Asia such as China and Japan. Students also learn the different stages of development of science and technology in India.

**Course outcome:**

Paper: HIS-HC-1016: HISTORY OF INDIA- I

After the completion of this paper, the students will be able to explore and effectively use historical tools in reconstructing the remote past of ancient Indian pre and proto history. The course will also train the students to analyse the various stages of evolution of human cultures and the belief systems in the proto- history period.

Paper HIS-HC-1026: SOCIAL FORMATIONS AND CULTURAL PATTERNS OF THE ANCIENT WORLD

After the completion of this paper, the students will be able to explain the processes and stages of the evolution of the variety of cultural pattern throughout antiquarian periods in History. They will be able to relate the connections between the various Bronze Age civilizations in the ancient world as well as development of slave and polis societies in ancient Greece.

Paper HIS-HC-2016: HISTORY OF INDIA- II

On successful completion of this course the students will be able to explain the economic and socio-cultural connections, transitions and stratifications during the ruling houses, empires and the politico-administrative nuances of early Indian History from 300 BCE to 300 CE.

Paper HIS-HC-2026: SOCIAL FORMATIONS AND CULTURAL PATTERNS OF THE MEDIEVAL WORLD

After the completion of this course, the students will be able to analyse and explain the historical socio-political, administrative and economic patterns of the medieval world. They will be able to describe the emergence, growth and decline of various politico-administrative and economic patterns and the resultant changes therein.

Paper HIS-HC-3016: HISTORY OF INDIA III (c. 750 -1206)

The completion of this paper will enable the students to relate and explain the developments in India in its political and economic fields and its relation to the social and cultural patterns therein in the historical time period between c.700 to 1206. They will also be able to analyse India's interaction with another wave of foreign influence and the changes brought in its wake in the period.

Paper HIS-HC-3026: RISE OF THE MODERN WEST – I

On completion of this course, the students will be able to explain the major trends and developments in the Western world between the 14th to the 16th century CE. They will be able

to explore and analyse the significant historical shifts and events and the resultant effects on the civilizations of Europe in the period.

Paper HIS-HC-3036: HISTORY OF INDIA IV (c.1206 - 1550)

After completion of this course students will be able to explain the political and administrative history of medieval period of India from 1206 to 1550 AD. They will also be able to analyse the sources of history, regional variations, social, cultural and economic set up of the period.

Paper HIS-HC-4016 : RISE OF THE MODERN WEST – II

After the completion of this course, the student will be able to explain the political and intellectual currents in Europe in the Modern Age. They will also be able to relate the circumstances and causal factors of the intellectual.

Paper HIS-HC-4026 : HISTORY OF INDIA V (c. 1550 - 1605)

At the completion of this course, the students will be able to analyse the circumstances and historical shifts and foundations of a variety of administrative and political setup in India between c.1550-1605. They will also be able to describe the inter relationships between the economy, culture and religious practices of the period.

Paper HIS-HC-4036 : HISTORY OF INDIA VI (c. 1605 - 1750)

After the completion of this course, the students will be able to explain and reconstruct the linkages of the history of India under the Mughal Rule. As a whole, this course will nable them to relate to the socio-economic and religious orientation of the people of Medieval period in India.

Paper HIS-HC-5016: History of Modern Europe- I (c. 1780-1939)

After the completion of this course the students will be able to evaluate the historical evolution and political developments that occurred in Europe in the period between 1780 to 1939. They will also be also to critically analyse the evolution of social classes, nation states, evolution of capitalism and nationalist sentiment in Europe. They will also be able to relate to the variety of causes that dragged the world into devastating wars in the intervening period.

Paper HIS-HC-5026 : HISTORY OF INDIA VII (c. 1780 - 1857)

After the completion of this course, the students will be able to relate the circumstances leading to the consolidation of colonial rule over India and their consequences. They will also be able to explain the orientation of the indigenous population and the masses towards resistance to the colonial exploitation. The course will also enable the students to analyse popular uprisings among the tribal, peasant and common people against the British policies.

Paper HIS –HE-5016: HISTORY OF ASSAM (UPTO c. 1228)

This paper will give a general outline of the history of Assam from the earliest times to the advent of the Ahoms in the 13th century. Upon completion, students will be acquainted with major stages of developments in the political, social and cultural history of Assam during the early times.

Paper HIS –HE-5026 : HISTORY OF ASSAM (c. 1228 –1826)

On completion of this paper, students will be able to identify major stages of developments in the political, social and cultural history of Assam during the medieval times. This paper will enable the student to explain the history of Assam from the 13th century to the occupation of Assam by the English East India Company in the first quarter of the 19th century.

Paper HIS-HC-6016 : HISTORY OF INDIA VIII (c. 1857 - 1950)

At the completion of this course, the learners will be able to analyse the course of British colonial exploitation, the social mobilizations during the period between c.1857 to 1950 and also the techniques of Indian resistance to British policies. It will also enable the students to explain the circumstances leading to de-colonization and also the initial period of nation building in India.

Paper HIS-HC-6026: HISTORY OF MODERN EUROPE II (c. 1780 -1939)

After the completion of this course, the students will be able to analyse the historical developments in Europe between c.1780 to 1939. As the course structure of this paper focuses on the democratic and socialist foundations modern Europe, the students will be able to situate the historical development of working class movements, socialist upsurge and the economic forces of the two wars and the other ideological shifts of Europe in the period.

Paper HIS –HE-6016 : HISTORY OF ASSAM (c. 1826 – 1947)

Upon completion of this course, students will be able to describe the period of British rule in Assam after its annexation by the imperialist forces. They will also be able to situate the development of nationalism in Assam and its role in India's freedom struggle. The course would enable the students to analyse the main currents of the political and socio-economic developments in Assam during the colonial period.

Paper HIS –HE-6026 : ASSAM SINCE INDEPENDENCE

Students will be able to assess the aftermath of Partition and other socioeconomic developments in post-independence Assam upon completion of this course. They will also be able to identify the main currents of political and socio-economic development in Assam after India's independence and the causes and impact of various struggles and movements in contemporary Assam.

## B.Sc. major program in Mathematics

**Program specific outcome:** The learning outcomes of this course are aimed at facilitating the learners to acquire the attributes of knowledge, understanding, skills, attitudes, values and academic achievements sought, keeping in view of their preferences and aspirations for knowledge of mathematics. Mathematics is the study of quantity, structure, space and change. It has a very broad scope in science, engineering and social sciences. The key areas of study in mathematics are Calculus, Algebra, Geometry, Analysis, Differential Equations and Mechanics. Programme Specific Outcome of B.Sc. (Hons) Mathematics.

**Course outcome:**

Paper MAT-HC-1016: Calculus (including practical)

This course will enable the students to:

i) Learn first and second derivative tests for relative extremum and apply the knowledge in problems in business, economics and life sciences.
ii) Sketch curves in a plane using its mathematical properties in different coordinate systems.
iii) Compute area of surfaces of revolution and the volume of solids by integrating over cross-sectional areas.
iv) Understand the calculus of vector functions and its use to develop the basic principles of planetary motion.

Paper MAT-HC-1026:Algebra

This course will enable the students to:

i) Employ De Moivre's theorem in a number of applications to solve numerical problems.
ii) Learn about equivalent classes and cardinality of a set.
iii) Use modular arithmetic and basic properties of congruences.
iv) Recognize consistent and inconsistent systems of linear equations by the row echelon form of the augmented matrix.
v) Learn about the solution sets of linear systems using matrix method and Cramer's rule

Paper MAT-HC-2016: Real Analysis

This course will enable the students to:

i) Understand many properties of the real line R, including completeness and Archimedean properties.
ii) Learn to define sequences in terms of functions from N to a subset of R.
iii) Recognize bounded, convergent, divergent, Cauchy and monotonic sequences and to calculate their limit superior, limit inferior, and the limit of a bounded sequence.
iv) Apply the ratio, root, alternating series and limit comparison tests for convergence and absolute convergence of an infinite series of real numbers.

Paper MAT-HC-2026: Differential Equations(including practical)

The course will enable the students to:

i) Learn basics of differential equations and mathematical modeling.
ii) Formulate differential equations for various mathematical models.
iii) Solve first order non-linear differential equations and linear differential equations of higher order using various techniques.
iv) Apply these techniques to solve and analyze various mathematical models.

Paper MAT-HC-3016: Theory of Real Functions

This course will enable the students to:

i) Have a rigorous understanding of the concept of limit of a function.
ii) Learn about continuity and uniform continuity of functions defined on intervals.
iii) Understand geometrical properties of continuous functions on closed and bounded intervals.

iv) Learn extensively about the concept of differentiability using limits, leading to a better understanding for applications.
v) Know about applications of mean value theorems and Taylor's theorem

Paper MAT-HC-3026: Group Theory – I

The course will enable the students to:

i) Recognize the mathematical objects that are groups, and classify them as abelian, cyclic and permutation groups, etc.
ii) Link the fundamental concepts of groups and symmetrical figures.
iii) Analyze the subgroups of cyclic groups and classify subgroups of cyclic groups.
iv) Explain the significance of the notion of cosets, normal subgroups and factor groups.
v) Learn about Lagrange's theorem and Fermat's Little theorem.
vi) Know about group homomorphisms and group isomorphisms.

Paper MAT-HC-3036: Analytical Geometry

This course will enable the students to:

i) Learn conic sections and transform co-ordinate systems
ii) Learn polar equation of a conic, tangent, normal and properties
iii) Have a rigorous understanding of the concept of three dimensional coordinates systems

Paper MAT-SE-3014: Computer Algebra Systems and Related Software

This course will enable the students to:

i) Use of softwares; Mathematica/MATLAB/Maxima/Maple etc. as a calculator, for plotting functions and animations
ii) Use of CAS for various applications of matrices such as solving system of equations and finding eigenvalues and eigenvectors.
iii) Understand the use of the statistical software R as calculator and learn to read and get data into R.
iv) Learn the use of R in summary calculation, pictorial representation of data and exploring relationship between data.
v) Analyze, test, and interpret technical arguments on the basis of geometry.

Paper MAT-SE-3024: Combinatorics and Graph Theory

This course will enable the students to:

i) Learn about the counting principles, permutations and combinations, Pigeonhole principle
ii) Understand the basics of graph theory and learn about social networks, Eulerian and Hamiltonian graphs, diagram tracing puzzles and Knight's tour problem.

Paper MAT-HC-4016: Multivariate Calculus

This course will enable the students to:

i) Learn the conceptual variations when advancing in calculus from one variable to multivariable discussion.
ii) Understand the maximization and minimization of multivariable functions subject to the given constraints

iii) Learn about inter-relationship amongst the line integral, double and triple integral formulations.
iv) Familiarize with Green's, Stokes' and Gauss divergence theorems.

Paper MAT-HC-4026: Numerical Methods (including practical)

The course will enable the students to:

i) Learn some numerical methods to find the zeroes of nonlinear functions of a single variable and solution of a system of linear equations, up to a certain given level of precision.
ii) Know about methods to solve system of linear equations, such as False position method, Fixed point iteration method, Newton's method, Secant method and LU decomposition.
iii) Interpolation techniques to compute the values for a tabulated function at points not in the table.
iv) Applications of numerical differentiation and integration to convert differential equations into difference equations for numerical solutions.

Paper MAT-HC-4036: Ring Theory

On completion of this course, the student will be able to:

i) Appreciate the significance of unique factorization in rings and integral domains.
ii) Learn about the fundamental concept of rings, integral domains and fields.
iii) Know about ring homomorphism and isomorphism theorems of rings.
iv) Learn about the polynomial rings over commutative rings, integral domains, Euclidean domains, and UFD

Paper MAT-SE-4014: R Programming

This course will enable the students to:

i) Become familiar with R syntax and to use R as a calculator.
ii) Understand the concepts of objects, vectors and data types.
iii) Know about summary commands and summary table in R.
iv) Visualize distribution of data in R and learn about normality test.
v) Plot various graphs and charts using R.

Paper MAT-SE-4024: LaTeX and HTML (practical)

After studying this course the student will be able to:

i) Create and typeset a LaTeX document.
ii) Typeset a mathematical document using LaTex.
iii) Learn about pictures and graphics in LaTex.
iv) Create beamer presentations.
v) Create web page using HTML.

Paper MAT-HC-5016: Riemann Integration and Metric spaces

The course will enable the students to:

i) Learn about some of the classes and properties of Riemann integrable functions, and the applications of the Fundamental theorems of integration.
ii) Know about improper integrals including, beta and gamma functions.

iii) Learn various natural and abstract formulations of distance on the sets of usual or unusual entities. Become aware one such formulations leading to metric spaces.
iv) Analyse how a theory advances from a particular frame to a general frame.
v) Appreciate the mathematical understanding of various geometrical concepts, viz. Balls or connected sets etc. in an abstract setting.
vi) Know about Banach fixed point theorem, whose far-reaching consequences have resulted into an independent branch of study in analysis, known as fixed point theory.
vii) Learn about the two important topological properties, namely connectedness and compactness of metric spaces.

Paper MAT-HC-5026: Linear Algebra

The course will enable the students to:

i) Learn about the concept of linear independence of vectors over a field, and the dimension of a vector space.
ii) Basic concepts of linear transformations, dimension theorem, matrix representation of a linear transformation, and the change of coordinate matrix.
iii) Compute the characteristic polynomial, eigenvalues, eigenvectors, and eigenspaces, as well as the geometric and the algebraic multiplicities of an eigenvalue and apply the basic diagonalization result.
iv) Compute inner products and determine orthogonality on vector spaces, including Gram−Schmidt orthogonalization to obtain orthonormal basis.
v) Find the adjoint, normal, unitary and orthogonal operators.

Paper MAT-HE-5016: Number Theory

This course will enable the students to:

i) Learn about some fascinating discoveries related to the properties of prime numbers, and some of the open problems in number theory, viz., Goldbach conjecture etc.
ii) Know about number theoretic functions and modular arithmetic.
iii) Solve linear, quadratic and system of linear congruence equations.

Paper MAT-HE-5026: Mechanics

The course will enable the students to:

i) Know about the concepts in statics such as moments, couples, equilibrium in both two and three dimensions.
ii) Understand the theory behind friction and center of gravity.
iii) Know about conservation of mechanical energy and work-energy equations.
iv) Learn about translational and rotational motion of rigid bodies.

Paper MAT-HE-5036: Probability and Statistics

This course will enable the students to:

i) Learn about probability density and moment generating functions.
ii) Know about various univariate distributions such as Bernoulli, Binomial, Poisson, gamma and exponential distributions.
iii) Learn about distributions to study the joint behavior of two random variables.

iv) Measure the scale of association between two variables, and to establish a formulation helping to predict one variable in terms of the other, i.e., correlation and linear regression.
v) Understand central limit theorem, which helps to understand the remarkable fact that: the empirical frequencies of so many natural populations, exhibit a bell-shaped curve, i.e., a normal distribution

Paper MAT-HE-5046: Linear Programming

This course will enable the students to:

i) Learn about the graphical solution of linear programming problem with two variables.
ii) Learn about the relation between basic feasible solutions and extreme points.
iii) Understand the theory of the simplex method used to solve linear programming problems.
iv) Learn about two-phase and big-M methods to deal with problems involving artificial variables.
v) Learn about the relationships between the primal and dual problems.
vi) Solve transportation and assignment problems.
vii) Apply linear programming method to solve two-person zero-sum game problems.

Paper MAT-HE-5056: Spherical Trigonometry and Astronomy

This course will enable the students to:

i) Learn about the properties of spherical and polar triangles
ii) know about fundamental formulae of spherical triangles
iii) learn about the celestial sphere, circumpolar star, rate of change of zenith distance and azimuth
iv) learn about Keplar's law of planetary motion, Cassini's hypothesis, differential equation for fraction

Paper MAT-HE-5066: Programming in C (including practical)

After completion of this paper, student will be able to:

i) Understand and apply the programming concepts of C which is important to mathematical investigation and problem solving.
ii) Learn about structured data-types in C and learn about applications in factorization of an integer and understanding Cartesian geometry and Pythagorean triples.
iii) Use of containers and templates in various applications in algebra.
iv) Use mathematical libraries for computational objectives.
v) Represent the outputs of programs visually in terms of well formatted text and plots.

Paper MAT-HC-6016: Complex Analysis (including practical)

Completion of the course will enable the students to:

i) Learn the significance of differentiability of complex functions leading to the understanding of Cauchy−Riemann equations.
ii) Learn some elementary functions and can evaluate the contour integrals.
iii) Understand the role of Cauchy−Goursat theorem and the Cauchy integral formula.
iv) Expand some simple functions as their Taylor and Laurent series, classify the nature of singularities, find residues and apply Cauchy Residue theorem to evaluate integrals.

Paper MAT-HC-6026: Partial Differential Equations (including practical)

The course will enable the students to:

i) Formulate, classify and transform first order PDEs into canonical form.
ii) Learn about method of characteristics and separation of variables to solve first order PDE's.
iii) Classify and solve second order linear PDEs.
iv) Learn about Cauchy problem for second order PDE and homogeneous as well as nonhomogeneous wave equations.
v) Apply the method of separation of variables for solving second order PDEs.

Paper MAT-HE-6016: Boolean Algebra and Automata Theory

The course will enable the students to:

i) Learn about the order isomorphism, Hasse diagrams, building new ordered set.
ii) Learn about the algebraic structure lattices, properties of modular and distributive lattices.
iii) Get ideas about the Boolean algebra, Switching circuits and applications of switching circuits.
iv) Appreciate the theory of automata and its applications

Paper MAT-HE-6026: Bio-Mathematics

Apropos conclusion of the course will empower the student to:

i) Learn the development, analysis and interpretation of bio mathematical models such as population growth, cell division, and predator-prey models.
ii) Learn about the mathematics behind heartbeat model and nerve impulse transmission model.
iii) Appreciate the theory of bifurcation and chaos.
iv) Learn to apply the basic concepts of probability to molecular evolution and genetics.

Paper MAT-HE-6036: Mathematical Modelling (including practical)

The course will enable the students to:

i) Know about power series solution of a differential equation and learn about Legendre's and Bessel's equations.
ii) Use of Laplace transform and inverse transform for solving initial value problems.
iii) Learn about various models such as Monte Carlo simulation models, queuing models, and linear programming models.

Paper MAT-HE-6046: Hydromechanics

The course will enable the students to:

i) Know about Pressure equation, rotating fluids.
ii) Learn about Fluid pressure on plane surfaces, resultant pressure on curved surfaces, Gas law, mixture of gases
iii) Learn about the Eulerian and Lagrangian method.
iv) Learn about equation of continuity, examples, acceleration of a fluid at a point

Paper MAT-HE-6056: Rigid Dynamics

The course will enable the students to:

i) Know how to find the moments and products of inertia.
ii) Learn about the motion of the centre of inertia
iii) Learn about the D'Alembert's principle and Lagrange's equations
iv) Learn about motion of a body in two dimension

Paper MAT-HE-6066: Group Theory II

The course shall enable students to:

i) Learn about automorphisms for constructing new groups from the given group.
ii) Learn about the fact that external direct product applies to data security and electric circuits.
iii) Understand fundamental theorem of finite abelian groups.
iv) Be familiar with group actions and conjugacy in Sn.
v) Understand Sylow theorems and their applications in checking non-simplicity.

Paper MAT-HE-6076: Mathematical Finance

On completion of this course, the student will be able to:

i) Know the basics of financial markets and derivatives including options and futures.
ii) Learn about pricing and hedging of options, as well as interest rate swaps.
iii) Learn about no-arbitrage pricing concept and types of options.
iv) Learn stochastic analysis (Ito formula, Ito integration) and the Black−Scholes model.
v) Understand the concepts of trading strategies and valuation of currency swaps.

## B.Sc. major program in Physics

**Program specific outcome:** The learning outcomes of this course are aimed at facilitating the learners to acquire the knowledge of mechanics, electrostatics, thermodynamics, wave optics, relativity, atomic physics, quantum mechanics, astrophysics, electronics, electromagnetism, and problem solving of physical sciences using mathematics and computer programming.

**Course outcome:**

Paper PHY-HC-1016: Mathematical Physics I

Successful students should be able to understand vector and its applications in various fields, differential equations and its applications, different coordinate systems, concept of probability and error.

Paper PHY-HC-1026: Mechanics

On successful completion of the course students should be able understand Inertial and non inertial reference frames, Newtonian motion, Galilean transformations, projectile motion, work and energy, Elastic and inelastic collisions, motion under central force, simple harmonic oscillations, special theory of relativity.

Paper PHY-HC-2016: Electricity & Magnetism

After successful completion of this course, students will be able to Understand electric and magnetic fields in matter, Dielectric properties of matter magnetic properties of matter, electromagnetic induction, applications of Kirchhofff's law in different circuits, applications of network theorem in circuits.

Paper PHY-HC-2026: Waves & Optics

After successful completion of this course, students will be able to Understand superposition of harmonic oscillations, different types of wave motions, superposition of harmonic waves, interference and interferometer, diffraction, holography.

Paper PHY-HC-3016: Mathematical Physics II

After successful completion of the course, students will be able to solve differential equation using power series solution method, solve differential equation using separation of variables method, special integrals, different properties of matrix, Fourier series.

Paper PHY-HC-3026: Thermal Physics

Upon successful completion, students will have the knowledge and skills to identify and describe the statistical nature of concepts and laws in thermodynamics, in particular: entropy, temperature, Thermodynamics potentials, Free energies, Maxwell's relations in thermodynamics, behaviour of real gases.

Paper PHY-HC-3036: Digital Systems & Applications

After successful completion of the course student will be able to understand the working principle of CRO, develop a digital logic and apply it to solve real life problems, Analyze, design and implement combinational logic circuits, Classify different semiconductor memories, Analyze, design and implement sequential logic circuits, Analyze digital system design using PLD, Simulate and implement combinational and sequential circuits.

Paper PHY-SE-3014: Physics Workshop Skills

After successful completion of the course student will be familiarized and experienced with various mechanical and electrical tools through hands-on mode

Paper PHY-SE-3024: Computational Physics Skills

The aim of this course is not just to teach computer programming and numerical analysis but to emphasize its role in solving problems in Physics.

Paper PHY-SE-3034: Computer Assembling and Networking

After successfully completing the course students will be able to Identify Computer Hardware Components, Network Components and Peripherals, assemble and dissemble a computer, Identify the different types of network topologies and protocols. Enumerate the layers of the OSI model and TCP/IP. Explain the function(s) of each layer, Identify the different types of network devices and their functions within a network, Understand and building the skills of subnetting and routing mechanisms., Familiarity with the basic protocols of computer networks, and how they can be used to assist in network design and implementation.

Paper PHY-SE-3044: Digital Photography & Editing

On successful completion of the course students will be able to indentify cameras according to formats and view finder systems, identify types of lenses and state what type of lenses to be used for different purposes, apply settings of shutter speed, control depth of field via aperture settings, apply suitable focal length, Use the light metering mechanism of the camera to take photographs.

Paper PHY-SE-3054: Video Editing For Social Media

On successful completion of the course students will be able to learn to Edit impactful video content which appeals to target audience, Add or Edit Music, Soundtrack or Audio to your videos, Learn to customize your videos by using Text (fonts), Learn to use transitions and effects to create impactful videos.

Paper PHY-SE-3064: WEATHER FORECASTING

The aim of this course is not just to impart theoretical knowledge to the students but to enable them to develop an awareness and understanding regarding the causes and effects of different weather phenomenon and basic forecasting techniques.

Paper PHY-SE-3074: APPLIED OPTICS

Theory includes only qualitative explanation. Minimum five experiments should be performed covering minimum three sections.

Paper PHY-SE-3084: TECHNICAL DRAWING

After successfully completing the course students will be able to draw free hand sketches of various kinds of objects, apply different dimensioning methods on drawing of objects, different types of scales and their utilization in reading and reproducing drawings of objects and maps, Draw 2 - dimensional view of different objects viewed from different angles, Generate isometric (3D) drawing from different 2D (orthographic) views/sketches, use basic commands of Auto CAD.

Paper PHY-SE-3094: PAGEMAKER

On successful completion of the course students will be able to Create Documents and Templates, add text into documents using various methods, and apply different formatting styles to characters and paragraphs, Import graphics, create objects using various tools, add effects to objects, Create a book and export it into PDF, Multipage Layout Design.

Paper PHY-HC-4016: Mathematical Physics III

On successful completion of the course students will able to solve complex integrals using residue theorem, apply Fourier and Laplace transforms in solving differential equations, understand properties of Tensor like Transformation of coordinates, contravariant and co-variant tensors, indices rules for combining tensors.

Paper PHY-HC-4026: Elements of Modern Physics

On completion of the course students will be able to understand modern development in Physics, Starting from Planck’s law, it development of the idea of probability interpretation and the formulation of Schrodinger equation. Students will also get preliminary idea of structure of nucleus, radioactivity Fission and Fusion and Laser.

Paper PHY-HC-4036: Analog Systems & Applications

On successful completion of the course students will be able to understand about the physics of semiconductor p-n junction and devices such as rectifier diodes, zener diode, photodiode etc. and bipolar junction transistors, transistor biasing and stabilization circuits, the concept of feedback in amplifiers and the oscillator circuits, students will also have an understanding of operational amplifiers and their applications.

Paper PHY-SE-4014: BASIC INSTRUMENTATION SKILLS

This course is to get exposure with various aspects of instruments and their usage through hands-on mode. Experiments listed below are to be done in continuation of the topics.

Paper PHY-SE-4024: Research & Technical Writing

On successful completion of the course students will be able to identify and write different parts of technical reports, write article, thesis, and presentation in latex, create chart in Microsoft excel, use different format of chart based on need, plot data from different sources using Origin plot.

Paper PHY-SE-4034: Domestic and Industrial Electrical Wiring

After successfully completion of the course students will be able to recognize various electrical devices and their symbols, Recognize various electrical devices placed on the panels/distribution boards and to design the panels, Read schematic and wiring diagrams of electrical devices, Read and interpret electrical installation plan, Practice and execute any type of wiring , Estimate and determine the cost of wiring installation.

Paper PHY-SE-4044: Photoshop

On successful completion of the course students will be able to work with the tools in Adobe Photoshop CC, crop image in Adobe Photoshop CC, to resize an image for print and digital media in Adobe Photoshop CC, apply Photoshop filters in print and digital media, apply filters to sharpen the images, different types of brushes used for digital painting.

Paper PHY-SE-4054: MOTION GRAPHICS FOR ADVERTISING & FILMS

On successful completion of the course students will be able to create Motion Graphic Design for Ads, Commercials, Promos & Film / Show Titles, use After Effects templates to create your own customized 2D or 3D Motion Graphics, Understand Working with Layers, create Shape morphing animation and build transitions, utilize After Effects' Motion Graphics Techniques.

Paper PHY-SE-4064: Radiation Safety

The students will acquire a basic knowledge of types and sources of radiations, interactions of radiations with matter, risks involved and safety measures to be taken.

Paper PHY-SE-4074: RENEWABLE ENERGY AND ENERGY HARVESTING

The aim of this course is not just to impart theoretical knowledge to the students but to provide them with exposure and hands-on learning wherever possible.

Paper PHY-SE-4084: Introduction to CorelDraw

On successful completion of the course students will be able to work with layers and symbols in CorelDRAW, Apply fills and outlines to illustrations in CorelDRAW, Use, edit, and create artistic and paragraph text in CorelDRAW, Create boundaries to objects and copy and clone the effect of one object to another in CorelDRAW, Import and export projects, Print objects/documents created on CorelDRAW.

Paper PHY-SE-4094: GRAPHIC DESIGN FOR DIGITAL ADVERTISING

On successful completion of the course students will be able to Understand aesthetics & visual appeal in design, Using impactful visual content which appeals to target audience, Conceptualize, Visualize and Create Graphic Designs for:Digital Ads, Posters, Banners and Flyers, Social Media Ads & Banners, Websites and Blogs.

Paper PHY-HC-5016: Quantum Mechanics & Applications

On successful completion of the course students will be able to understand the principles in quantum mechanics, such as the Schrödinger equation, the wave function, the uncertainty principle, stationary and non-stationary states, time evolution of solutions, as well as the relation between quantum mechanics and linear algebra. Students will be able to solve the Schrödinger equation for hydrogen atom. Students will have the concepts of angular momentum and spin, as well as the rules for quantization and addition of these, spin-orbit coupling and Zeeman Effect.

Paper PHY-HC-5026: Solid State Physics

On successful completion of the course students should be able to explain the main features of crystal lattices and phonons, understand the elementary lattice dynamics and its influence on the properties of materials, describe the main features of the physics of electrons in solids; explain the dielectric ferroelectric and magnetic properties of solids and understand the basic concept in superconductivity.

Paper PHY-HE-5016: Experimental Techniques

Upon completion of this course, students will be able to describe the errors in measurement and statistical analysis of data required while performing an experiment. Also, students will learn the working principle, efficiency and applications of transducers & industrial instruments like digital multimeter, RTD, Thermistor, Thermocouples and Semiconductor type temperature sensors.

Paper PHY-HE-5026: Embedded System: Introduction to microcontroller

Upon completion of this course, students will be able to understand microprocessor and microcontroller 8051. Students will also learn about the 8051 I/O port programming, various addressing modes, Timer and counter programming, Serial port programming with and without interrupt and interfacing 8051 microcontroller to peripherals.

Paper PHY-HE-5036: Advanced Mathematical Physics I

Upon completion of this course, students will be able to solve problems in Physics related to Linear Vector space, Matrix algebra, Tensor.

Paper PHY-HE-5046: Physics of Devices and Instruments

Upon completion of this course, students will be able to gain knowledge on advanced electronics devices such as UJT, JFET, MOSFET, CMOS etc., detailed process of IC fabrication, Digital

Data serial and parallel Communication Standards along with the understanding of communication systems.

Paper PHY-HE-5056: Nuclear and Particle Physics

Upon completion of this course, students will have the understanding of the sub atomic particles and their properties. They will gain knowledge about the different nuclear techniques and their applications in different branches of Physics and societal application. The course will develop problem based skills and the acquire knowledge can be applied in the areas of nuclear, medical, archeology, geology and other interdisciplinary fields of Physics and Chemistry.

Paper PHY-HC-6016: Electromagnetic Theory

On successful completion of the course students will acquire the concepts of Maxwell's equations, propagation of electromagnetic (EM) waves in different homogeneous-isotropic as well as anisotropic unbounded and bounded media, production and detection of different types of polarized EM waves, general information as waveguides and fibre optics.

Paper PHY-HC-6026: Statistical Mechanics

On successful completion of the course students will be learn the techniques of Statistical Mechanics to apply in various fields including Astrophysics, Semiconductors, Plasma Physics, Bio-Physics, Chemistry and in many other directions.

Paper PHY-HE-6016: Communication Electronics

Upon completion of this course, students will have the concepts of electronics in communication, details of communication techniques based on Analog Modulation, Analog and digital Pulse Modulation including PAM, PWM, PPM, ASK, PSK, FSK, overview of communication and Navigation systems such as GPS and mobile telephony system.

Paper PHY-HE-6026: Digital Signal Processing

Upon completion of this course, students will be able This paper describes the discrete-time signals and systems, Fourier Transform Representation of Aperiodic Discrete-Time Signals. This paper also highlights the concept of filters and realization of Digital Filters. At the end of the syllabus, students will develop the understanding of Discrete and fast Fourier Transform.

Paper PHY-HE-6036: Advanced Mathematical Physics II

Upon completion of this course, students will be able to apply the concepts of Calculus of Variations, Group Theory and Probability Theory to solve numerical problems in Physics.

Paper PHY-HE-6046: Astronomy and Astrophysics

Upon completion of this course, students will be able to understanding the origin and evolution of the Universe. The course will give a comprehensive introduction on the measurement of basic astronomical parameters such as astronomical scales, luminosity and astronomical quantities. It will give an overview on key developments in observational astrophysics. Students will have the idea of the instruments implemented for astronomical observation, the formation of planetary system and its evolution with time, the physical properties of Sun and the components of the solar system; and stellar and interstellar components of our Milky Way galaxy. Students will

have the understanding of the origin and evolution of galaxies, presence of dark matter and large scale structures of the Universe.

Paper PHY-HE-6056: PHYSICS-DSE: CLASSICAL DYNAMICS

Upon completion of this course, students will have the overview of Newton's Laws of Motion, Special Theory of Relativity by 4-vectoer approach and fluids. Students will also have the understanding of the Lagrangian and Hamiltonian of a system.. By the end of this course, students will be able to solve the seen or unseen problems/numericals in classical mechanics.

## B.A. major program in Political Science

**Program specific outcome:** On completion of this course, students will acquire knowledge on the various types of political systems in different countries around the world, and the functioning of the democratic system of government in India. Students will be enabled to learn the provisions in the constitutions of different nations, as well as the aspects of International relations. Students will also learn different aspects of issues such as human rights, and also the views of political thinkers around the globe.

**Course outcome:**

Paper POL HC 1016: Understanding Political Theory

On completion of this course, students will be enabled

• To introduce the idea of political theory and various approaches
• To enable the students to assess the contemporary trends of political theory
• To reconcile theory and practice in relation to democracy

Paper POL HC 1026 Constitutional Government and Democracy in India

On completion of this course, students will be enabled

• To acquaint students with constitutional design of state structures and institutions
• To understand the conflicts in constitutional provisions
• To make them comprehend the state institutions in relation to extra constitutional environment.

Paper POL HC 2016 Political Theory-Concepts and Debates

On completion of this course, students will be enabled

• Understand the various concepts in political theory and appreciate how they can be helpful to analyse crucial political issues
• Understand the significance of debates in political theory in exploring multiple perspectives to concepts, ideas and issues.
• Appreciate how these concepts and debates enrich political life and issues surrounding it.

Paper POL HC 2026 Political Process in India

On completion of this course, students will be enabled

• Understand the working of major political institutions in India.

• Understand the major debates in Indian politics along the axes of caste, gender, region and religion.
• Understand the changing nature of the Indian state and the contradictory dynamics of modern state power.

Paper POL HC 3016 Introduction to Comparative Government and Politics

• To make students understand the basic concepts in comparative politics,
• To make students classify the different political systems and historical context of modern governments,
• To enable students to have a comparative analysis of countries related to their political institutions and behaviour.

Paper POL HC 3026 Perspectives on Public Administration

On completion of this course, students will be enabled

• To enable students to learn the basic concepts related to public administration and its importance,
• To make students learn the major theories of public administration,
• To enable students to have an understanding of public policy and its formulation,
• To familiarize students with the major approaches and recent debates related to field of public administration.

Paper POL HC 3036 Perspectives on International Relations and World History

On completion of this course, students will be enabled

• To make students understand the key theoretical approaches in International relations,
• To familiarize students with the evolution of International state systems and its importance.
• To make students aware of the key theoretical debates in International relations
• To enable students to have an overall understanding of International relations in relation to twentieth century IR history.

Paper POL SE 3014 Parliamentary Procedures and Practices

On completion of this course, students will be enabled

• To help students in understanding the practical approaches to legislatives practices and procedures,
• To make students understand the procedures and processes related to drafting a Bill and the passage of the Bill,
• To enable students to have an understanding of the importance

Paper POL SE 3024 Youth and Nation-Building

On completion of this course, students will be enabled

• To enable students to learn the importance of youth in NSS and NCC,
• To make students understand the activities related to NSS and NCC and its importance,
• To make students learn the basics of National Disaster Management and its importance.

Paper POL HC 4016 Political Processes and Institutions in Comparative Perspective

On completion of this course, students will be enabled

• To understand, comprehend and analyse the complex nature and functioning of the political systems, political institutions and corresponding issues to these both in a country specific case of India and cross-country perspectives.
• To demonstrate critical thinking about key issues of political system of different forms, political process and public policy.
• To use the contents and sub-units of the course as yardsticks for comparing these political systems and processes.

Paper POL HC 4026 Public Policy and Administration in India

On completion of this course, students will

• Be familiarised with and gain knowledge about the processes of public policy making in India and their significance in administering the state.
• Develop the ability to assess the functioning of the government and the administration in ensuring a citizen centric welfare administration in India.

Paper POL HC 4036 Global Politics

On completion of this course, students will be enabled

• To enable students to understand how to approach a wide range of important global political and economic policy problems and participate in public policy debates on the crucial issues facing the world today.
• To have knowledge of the essential theoretical assumptions underlying globalisation's conceptual frameworks and their relationships to policy interventions.
• To demonstrate elementary knowledge of major issues and subject-matters surrounding globalisation that decides the international relations- political, economic and security relations- among the nations.

Paper POL SE 4014: Panchayati Raj in Practice

• This paper will help students understand the importance of grassroot political institutions in empowering people.
• This paper will highlight the complex challenges faced by PRIs in India and mechanisms involved to make it more participatory and inclusive in nature.

Paper POL SE 4024 Citizens and Rights

On completion of this course, students will be enabled

• To analyse the linkages between citizenship, law, rights and equality
• To understand the measures of discrimination, justice and empowerment and the ways to protect the same.
• To evaluate the idea of justice and assess its relevance in context of contemporary India.

Paper POL HC 5016 Classical Political Philosophy

On completion of this course, students will be enabled

• To interpret ideas underlying traditions in classical political philosophy

• To analyze the debates and arguments of leading political philosophers belonging to different traditions of the period
• To appraise the relevance of classical political philosophy in understanding contemporary politics.

Paper POL HC 5026 Indian Political Thought-I

On completion of this course, students will be enabled

• To underline themes and issues in political traditions of pre-colonial India.
• To compare and contrast positions of different political traditions those were present in pre-colonial India.
• To evaluate the relevance of political thought of pre-colonial India for contemporary politics.

Paper POL HE 5016 Human Rights

On completion of this course, students will be enabled

• To describe the basic concepts of human rights
• To comprehend different approaches regarding human rights
• To familiarise the role of UNO in the growth and development of human rights
• To describe different measures taken for the protection of human rights

Paper POL HE 5026 Public Policy in India

On completion of this course, students will be enabled

• To be familiarised with and gain knowledge about the processes of public policy making in India
• To assess the functioning of the government and the administration in ensuring a citizen centric welfare administration in India.

Paper POL HE 5036 Understanding Global Politics

On completion of this course, students will be enabled

• To describe the key concepts underlying the idea of world order and their historical evolution.
• To comprehend diverse approaches to understand global political and economic problems.
• To demonstrate relevance of international actors in understanding world politics.

Paper POL HE 5046 Select Constitutions – I

• Students will be able to understand the importance of constitutions
• This paper is an integral part of public services examinations
• Students will be introduced to the various types of constitutions and the forms of governments from different parts of the world.

Paper POL HC 6016 Modern Political Philosophy

On completion of this course, students will be enabled

• To interpret ideas underlying traditions in modern political philosophy
• To analyze the debates and arguments of leading political philosophers of different philosophical traditions

• To appraise the relevance of modern political philosophy in understanding contemporary politics

Paper POL HC 6026 Indian Political Thought-II

On completion of this course, students will be enabled

• To underline themes and issues in political thought of modern India.
• To compare and contrast positions of leading political thinkers in India on issues those are constitutive of modern India.
• To assess the relevance of political thought of modern India in understanding contemporary politics.

Paper POL HE 6016 Human Rights in India

On completion of this course, students will be enabled

• To describe origin and development of human rights in India
• To comprehend different measures adopted by India for the protection and development of human rights
• To familiarise the emerging issues related to human rights

Paper POL HE 6026 Understanding South Asia

On completion of this course, students will be enabled

• To identify geo-political and historical construction of South Asia as a region.
• To analyse the politics and socio-economic issues of the South Asian Region.
• To assess the relevance of regionalism in South Asia and India's position in the region.

Paper POL HE 6036 Women, Power and Politics

On completion of this course, students will be enabled

• To explain key concepts that offers an understanding of gender inequality.
• To appraise the historical evolution of the Women's movement in India and issues addressed by it.
• To underline the contemporary issues that affect women's participation in politics

Paper POL HE 6046 Select Constitutions – II

• Students will be able to understand the importance of constitutions;
• This paper is an integral part of public services examinations.
• Students will be introduced to the various types of constitutions and the forms of governments from different parts of the world.

## B.Sc. major program in Zoology

**Program specific outcome:** On completion of this course, students will acquire knowledge on the classification of animal kingdom including microbial diversity. They will be able to identify and classify animals based on their attributes. They will acquire knowledge on animal

physiology, biochemistry, pathology, developmental biology and genetics. Students will also be able to learn about modern tools and techniques including bioinformatics and biostatistics.

**Course outcome:**

Paper: ZOO-HC-1016: NON-CHORDATES I: PROTISTS TO PSEUDOCOELOMATES

On completion of this course, students will be enabled to identify lower non chordates, their charateristics, classification and important members including practical demonstrations.

Paper: ZOO-HC-1026: PRINCIPLES OF ECOLOGY

On completion of this course, students will be enabled to understand the basic concepts of our environment and importance of different aspects of ecological study to for conservation and sustainable development.

Paper: ZOO-HC-2016: NON-CHORDATES II: COELOMATES

On completion of this course, students will be enabled to identify higher non-Chordates and including practicals to study live and preserved specimens.

Paper: ZOO-HC-2026: CELL BIOLOGY

On completion of this course, students will be enabled in understanding the various structures present in a living cell and their functions.

Paper: ZOO-HC-3016: DIVERSITY OF CHORDATA

On completion of this course, students will be empowered with basic and fundamental knowledge of chordate animals of the living world and include Practicals to study live and museum specimens.

Paper: ZOO-HC-3026: ANIMAL PHYSIOLOGY: CONTROLLING AND COORDINATING SYSTEMS

On completion of this course, students will be enabled to understand the underlying mechanism of functioning of different organ system of animals.

Paper: ZOO-HC-3036: FUNDAMENTALS OF BIOCHEMISTRY

On completion of this course, students will be enabled to understand the biochemistry of living cells and its different constituents.

Paper: ZOO-HC-4016: ANATOMY OF VERTEBRATES

On completion of this course, students will be enabled to understand of the structure and organisation of the body of vertebrate animals including man.

Paper: ZOO-HC-4026: ANIMAL PHYSIOLOGY: LIFE SUSTAINING SYSTEMS

On completion of this course, students will be enabled to understand the underlying mechanism of functioning of life sustaining systems of animals.

Paper: ZOO-HC-4036: METABOLIC PROCESSES

On completion of this course, students will be enabled to understand the various metabolic activities taking place in the animal cells.

Paper: ZOO-HC-5016: MOLECULAR BIOLOGY

On completion of this course, students will be enabled to understand the molecular details of the cellular activities and their regulation.

Paper: ZOO-HC-5026: PRINCIPLES OF GENETICS

On completion of this course, students will be enabled to understand the laws governing the nature of heredity and regulation of variation at cellular and sub-cellular level.

Paper: ZOO-HE-5016: COMPUTATIONAL BIOLOGY and BIOSTATICS

On completion of this course, students will be enabled to utilize computer programs in maintaining and accessing biological databases, modeling, and use of statistical tools to analyse biological data.

Paper: ZOO-HE-5026: ANIMAL BIOTECHNOLOGY

On completion of this course, students will be enabled to understand the use of biotechnology in improving animal traits and their products.

Paper: ZOO-HE-5036: ENDOCRINOLOGY

On completion of this course, students will be enabled to understand roles of different hormones in the animal body.

Paper: ZOO-HE-5046: PARASITOLOGY

On completion of this course, students will be enabled to understand the role of parasites in disease causing in animals.

Paper: ZOO-HC-6016: DEVELOPMENTAL BIOLOGY

On completion of this course, students will be enabled to understand the processes involved in growth, development and differentiation of animals.

Paper: ZOO-HC-6026: EVOLUTIONARY BIOLOGY

On completion of this course, students will be enabled to learn the process of evolutionary changes in animals and the mechanisms involved therein.

Paper: ZOO-HE-6016: BIOLOGY OF INSECTA

On completion of this course, students will be enabled to learn the biology of insects.

Paper: ZOO-HE-6026: FISH AND FISHERIES

On completion of this course, students will be enabled the biology of fishes.

Paper: ZOO-HE-6036: REPRODUCTIVE BIOLOGY

On completion of this course, students will be enabled to understand the development of reproductive structures, and the different steps involved in animal reproduction.

Paper: ZOO-HE-6046: WILD LIFE CONSERVATION AND MANAGEMENT

On completion of this course, students will be enabled learn about measures for sustainable development and conservation of ecosystems in which the animals thrive.

Paper: ZOO-HE-6056: DISSERTATION

On completion of this course, students will be enabled to undertake small research projects, and develop scientific method.

## B. Voc. program in: (i) Tourism and Hospitality Management
## (ii) Beauty Therapy and Aesthetics

**Program specific outcome:** The B.Voc Degree is recognised by UGC and is affiliated to Gauhati University. A special feature of the course is that there are multiple exit points, which facilitates a student to leave the course at the end of the first year with a Diploma. Similarly, if someone leaves after two years s/he will get an Advance Diploma and those who complete three years will get the B.Voc Degree.