

Lumding College, Lumding

Programme Outcomes, Programme Specific Outcomes and Course Outcomes for all programmes

The College is permanently affiliated to Gauhati University and it follows the programme wise curriculum designed by the university. The programme outcomes, programme specific outcomes and course outcomes are mainly the subject of the affiliating university. The learning outcomes of the programmes and courses are stated clearly in the syllabus for Undergraduate programme of the university. The same is published in the official website of the university which can be downloaded by the affiliate colleges.

Lumding College, Lumding offers undergraduate courses in Science, Commerce and Arts stream, which requires three years of full time study consisting of six semesters. The College offers BA (Honors and Regular) in the subjects are Assamese, Education, Political Science, Economics, Bengali, English, Hindi, and History. It also offers BSc (Honors and Regular) in the subjects are Zoology, Mathematics, Physics, Botany, Geology and Chemistry. The College also offers BCom (Honors and Regular) programme. The College also offers Regular undergraduate programme with elective subject in Computer Science and Statistics.

The College has its own mechanism to communicate the learning outcomes of the curriculum to the teachers and the students. Hard copy and soft copies of syllabus and learning outcomes are available in all the departments for ready reference. A web link to the Gauhati University Curriculum and learning outcomes of UG programmes and Courses is also provided in the college website for reference. Department prepare teaching plan based on the syllabus and communicate with students to make the students aware of the curriculum and the learning outcomes. However, for communication with all the stakeholders these are important and uploaded in the college website.

1. Bachelor Programme in Commerce (Honours)	
Programme Outcome	1. Students are able to gain a basic knowledge in the fundamental of commerce, management, finance and accounting. 2. Curriculum offers a number of specializations and practical disclosures which would provide the student to face the contemporary challenges in the business activities. 3. Deep understanding of accounting and taxation Issues related to business. 4. Interpersonal and Communication Skills. 5. Understanding ethical and socially sustainable business issues. 6. By goodness of the preparation they can turn into a Manager, Accountant, Stock Agents etc. and will prove themselves in different professional exams like CA., CS, CMA, etc.
Programme Specific Outcome	1. Demonstrate effectively oral and written communication. 2. Demonstrate ability to understand compliance as per various company and tax related enactment. 3. Demonstrate understanding of sustainability related concerns in different areas of business. 4. The students will acquire the knowledge, skill in different areas of communication, decision making, innovations and problem solving in day to day business activities.

	5. Students will gain thorough systematic and subject skills within various disciplines of finance, auditing and taxation, accounting, management, communication, computer. 6. Students will be able to do their higher education and can make research in the field of accounting, management, finance and commerce.		
Course Outcome			
Semester I			
BCM-AE-1014	Ability-Enhancement Compulsory Course (AECC)-1	Business Communication (English/Hindi/MIL)	To acquire skills in reading, writing, comprehension and communication, as also to use electronic media for business communication.
COM-HC-1026	Core Course C-1	Financial Accounting	To help students to acquire conceptual knowledge of the Financial Accounting and to impart skills for recording various kinds of business transactions.
COM-HC-1036	Core Course C-2	Business Law	To impart basic knowledge of the important business legislation along with relevant case law.
COM-GE-1046(B)	Generic Elective (GE)-1	Investing in Stock Markets	To provide basic skills to operate in stock markets and the ways of investing in it. It will enable the student to take up investment in stock markets independently.
Semester II			
ENV-AE-2014	Ability-Enhancement Compulsory Course (AECC)-2	Environmental Studies	To acquire the conceptual knowledge of the environment and other issues relating to environment.
COM-HC-2026	Core Course C-3	Corporate Accounting	To acquire the conceptual knowledge of the corporate accounting and to learn the techniques of preparing the financial statements
COM-HC-2036	Core Course C-4	Corporate Laws	To impart basic knowledge of the provisions of the Companies Act 2013 and the Depositories Act, 1996
COM-GE-2046(B)	Generic Elective (GE)-2	Insurance & Risk Management	To develop on understanding among

			students about identifying analyzing and managing various types of risk. Besides, the students will be in a position to understand principles of insurance and its usefulness in business along with its regulatory framework.
Semester III			
COM-HC-3016	Core Course C-5	Computer Applications in Business	To provide computer skills and knowledge for commerce students and to enhance the student understands of usefulness of information technology tools for business operations
COM-HC-3026	Core Course C-6	Income-tax Law and Practice	To provide basic knowledge and equip students with application of principles and provisions of Income-tax Act, 1961 and the relevant Rules
COM-HC-3036	Core Course C-7	Management Principles and Applications	To provide the student with an understanding of basic management concepts, principles and practices
COM-GE-3046 (A)	Generic Elective (GE)-3	Business Statistics	To familiarise students with the basic statistical tools used for managerial decision-making.
COM-SEC-HC-3054 (A)	Skill-Enhancement Elective Course (SEC)-1	Entrepreneurship	To orient the learner toward entrepreneurship as a career option and creative thinking and behavior.
Semester IV			
COM-HC-4016	Core Course C-8	Cost Accounting	To acquaint the students with basic concepts used in cost accounting, various methods involved in cost ascertainment and cost accounting book keeping systems
COM-HC-4026	Core Course C-9	Business Mathematics	To familiarize the students with the basic Financial

			mathematics tools, with an emphasis on applications to business and economic situations
COM-HC-4036	Core Course C-10	Human Resource Management	To acquaint students with the techniques and principles to manage human resource of an organisation.
COM-GE-4046 (B)	Generic Elective (GE)-4	Micro Finance	To make the students understand the basic concepts of micro-finance and its importance, institution structure, management of micro-finance institutions and microfinance in Indian context.
COM-SEC-HC-4054 (B)	Skill-Enhancement Elective Course (SEC)-2	E-Filing of Returns	To provide the students the concepts and practical knowledge about electronic filling of IT returns.
Semester V			
COM-HC-5016	Core Course C-11	Principles of Marketing	To provide basic knowledge of concepts, principles, tools and techniques of marketing.
COM-HC-5026	Core Course C-12	Fundamentals of Financial Management	To familiarize the students with the principles and practices of financial management.
COM-DSE-HC-5036 (A)	Discipline Specific Elective (DSE)-1	Management Accounting	To impart the students, knowledge about the use of financial, cost and other data for the purpose of managerial planning, control and decision making.
COM-DSE- HC-5036 (F)	Discipline Specific Elective (DSE)-2	Indian Financial System	To provide students the basic knowledge of Indian Financial System and its components, institutions and their functions.
Semester VI			
COM-HC-6016	Core Course C-13	Auditing and Corporate Governance	To provide knowledge of auditing principles, procedures and techniques in accordance with current legal requirements and

			professional standards and to give an overview of the principles of Corporate Governance and Corporate Social Responsibility
COM-HC-6026	Core Course C-14	Indirect Tax Laws	To provide basic knowledge and equip students with application of principles and provisions of Service Tax, VAT, Central Excise, and Customs Laws
COM-DSE- HC-6036 (A)	Discipline Specific Elective (DSE)-3	Fundamentals of Investment	To familiarize the students with different investment alternatives, introduce them to the framework of their analysis and valuation and highlight the role of investor protection
COM-DSE- HC-6036 (F)	Discipline Specific Elective (DSE)-4	Business Research Methods and Project Work	To provide general understanding of business research and the methods of business research. The course will impart learning about how to collect, analyze, present and interpret data.

2. Bachelor Programme in Commerce (Regular)

Programme Outcome	1. This programme could provide well trained professionals to Industries, Banking Sectors, Insurance Companies, Financing companies, etc. to meet the requirements. 2. Students can get thorough knowledge of accounting, management, finance and commerce 3. Capability of the students to make decisions at personal & professional level will increase after completion of this course. 4. Students can independently start up their own Business. 5. Demonstrate the ability to create business plans.
Programme Specific Outcome	1. Demonstrate ability to interpret and analyze financial statements. 2. The students can get the knowledge, skills and attitudes during the end of the B.com degree course. 3. Developing Entrepreneurship Acumen 4. Students can also get the practical skills to work as accountant, audit assistant, tax consultant, as well as other financial supporting services. 5. Students will learn relevant accounting career skills, applying both quantitative and qualitative knowledge to their future careers in business.

Course Outcome			
Semester I			
BCM-AE-1014	Ability-Enhancement Compulsory Course (AECC)-1	Business Communication (English/Hindi/MIL)	To acquire skills in reading, writing, comprehension and communication, as also to use electronic media for business communication.
COM-RC-1026	Core Course C-1	Financial Accounting	To help students to acquire conceptual knowledge of the Financial Accounting and to impart skills for recording various kinds of business transactions.
COM-RC-1036	Core Course C-2	Business Organisation and Management	To provide basic knowledge to the students about the organisation and management of a business enterprise.
ENG-CC-1016	Language-1	English Language	To develop literary sensibilities and communicative abilities among students..
Semester II			
ENV-AE-2014	Ability-Enhancement Compulsory Course (AECC)-2	Environmental Studies	To acquire the conceptual knowledge of the environment and other issues relating to environment.
COM-RC-2026	Core Course C-3	Business Law	To impart basic knowledge of the important business legislation along with relevant case law.
COM-RC-2036	Core Course C-4	Business Mathematics and Statistics	To familiarize students with the applications of mathematics and statistical techniques in business decision-making.
ENG-CC-2016	Language-2	English-II	To develop oral and written communication skills of the students so that their employability enhances.
Semester III			
COM-RC-3016	Core Course C-5	Company Law	To impart basic knowledge of the provisions of the Companies Act 2013. Case studies involving issues in company law are required to be discussed.
COM-RC-3026	Core Course C-6	Income Tax Law and Practice	To provide basic knowledge and equip students with application of principles and provisions of

			Income-tax Act, 1961 and the relevant Rules.
COM-CC-3036	Language-3	Hindi/ Modern Indian Language	To enhance learners' confidence in using modern Indian language for academic, professional and social purposes.
COM-SEC-RC-3044 (A)	Skill-Enhancement Elective Course (SEC)-1	Computer Application in Business	To provide computer skills and knowledge for commerce students and to enhance the student understands of usefulness of information technology tools for business operations.
Semester IV			
COM-CC-4016	Language-4	Soft Skills for Business	To enhance learners' confidence in using English for academic, professional and social purposes and to enable the learners to write formal and business documents for commercial correspondence, such as reports, letters, memos etc.
COM-RC-4026	Core Course C-7	Corporate Accounting	To help the students to acquire the conceptual knowledge of the corporate accounting and to learn the techniques of preparing the financial statements.
COM-RC-4036	Core Course C-8	Cost Accounting	To acquaint the students with basic concepts used in cost accounting, various methods involved in cost ascertainment and cost accounting book keeping systems.
COM-SEC-RC-4044 (B)	Skill-Enhancement Elective Course (SEC)-2	E-Filing of Return	To provide the students the concepts and practical knowledge about electronic filling of returns.
Semester V			
COM-DSE-RC-5016 (C)	Discipline Specific Elective (DSE)-1	Auditing and Corporate Governance	To provide knowledge of auditing principles, procedures and techniques in accordance with current legal requirements and professional standards and to give an overview of the principles of Corporate Governance and Corporate Social Responsibility.
COM-DSE-RC-5026 (A)	Discipline-Specific Elective (DSE)-2	Fundamentals of Financial Management	To familiarise the students with the principles and practices of financial management.

COM-SEC-RC-5024 (A)	Skill-Enhancement Elective Course (SEC)-3	Entrepreneurship	The purpose of the paper is to orient the learner toward entrepreneurship as a career option and creative thinking and behaviour.
COM-GE-RC-5036 (B)	Generic Elective (GE)-1	Business Economics	To familiarise the students with the basic concept of Micro Economics and inculcate an analytical approach to the subject matter.
Semester VI			
COM- DSE-RC-6016 (C)	Discipline-Specific Elective (DSE)-3	Management Accounting	To impart the students, knowledge about the use of financial, cost and other data for the purpose of managerial planning, control and decision making
COM- DSE-RC-6026 (C)	Discipline-Specific Elective (DSE)-4	Fundamentals of Investment	To familiarise the students with different investment alternatives, introduce them to the framework of their analysis and valuation and highlight the role of investor protection
COM- SEC-RC-6034 (A)	Skill-Enhancement Elective Course (SEC)-4	Personal Selling and Salesmanship	To familiarise the students with the fundamentals of personal selling and the selling process. They will be able to understand selling as a career and what it takes to be a successful salesman.
COM- GE-RC-6046 (A)	Generic Elective (GE)-2	Indian Economy	To enable the student to grasp the major economic problems in India and their solution.

3. Bachelor Programme in Assamese (Honours)			
Programme Outcome		Students are able to gain the Knowledge of Assamese Language, Literature and Culture.	
Programme Specific Outcome		The students will acquire the knowledge of Assamese language, literature and culture. also to know the Assamese language as communicative language.	
Course Outcome			
Semester-I			
ASM-HC-1016	Core Course 1	History of Assamese Literature(Early period)	This course is designed to acquire the basic concept of early history of Assamese literature from Sarjyapad to Sankari era.

ASM-HC-1026	Core Course 2	History of Assamese Literature from post Sankari era to Aronodoi era	To gain the knowledge of medieval Assamese literature with special reference to post Sankardeva, Pre-Aronodoi, Aronodoi period literature.
ASM-HG-1016	Generic Elective (GE)	History of Assamese Language	To gain the knowledge of history of Assamese language and the nature of Assamese language of various period.
Semester-II			
ASM-HC-2016	Core Course 3	Introduction of Linguistics	To introduce the students to the basic concepts of linguistics, branches of linguistics, phonology, morphology, semantics and syntax.
ASM-HC-2026	Core Course 4	Literary Criticism	After completion of the course, a student will be able to define literature and various literary genres and to Estimate any given piece of literature using different judgmental tools.
ASM -HG-2016	Generic Elective (GE)	History of Assamese Literature (from the beginning to 19 th century)	Students will acquire the knowledge of Assamese Folk literature, Pre-Shankardeva, Shankardeva and Post-Shankardeva literature.
Semester-III			
ASM-HC-3016	Core Course 5	Introduction to Assamese Literature	Students will get a complete information regarding Assamese poem, short story, Essays, novel, biography, travelogue etc. for gathering knowledge.
ASM-HC-3026	Core Course 6	Study of Assamese poetry	After completion of the course, a student will be able to state history of Assamese poetry, analyze trend in Assamese poetry in a given period, illustrate any literary text in Assamese composed in poetic form.
ASM-HC-3036	Core Course 7	Study of Assamese Culture	After completion of the course, a student will be able to define culture, describe assimilation in Assamese culture, distinguish arts, beliefs, traits and trends in Assamese culture
ASM-SE-3014	Skill Enhancement Course (SEC)-I	Applied Assamese	It will enrich the knowledge in Filmmaking, advertising, translation, Book publication and other research purposes.
ASM-HG-3016	Generic Elective (GE)	Assamese Drama and Stage Performance	By the end of this programme, the students will gather knowledge about the sketches of Assamese drama and

			also gather knowledge regarding various modern drama performance.
Semester-IV			
ASM-HC-4016	Core Course 8	Comparative Indian Literature	After completion of the course, a student will be able to define comparative literature and origin and development of Indian comparative literature. Basic concept and differences between Indian and Assamese literature.
ASM-HC-4026	Core Course 9	Assimilation of Assamese Language: Aryan Language and Non-Aryan Language	By the end of this programme the students will get the knowledge of origin and development of Assamese Language. Students also gather the knowledge about Non-Aryan language and the differences between Aryan and Non-Aryan languages .
ASM-HC-4036	Core Course 10	Assamese prose Literature (from the beginning to 19 th Century)	From this programme, the students will gather knowledge about various stages Assamese prose from beginning to the 19 th Century perspectives.
ASM-SE-4014	Skill Enhancement Course (SEC)-II	Creative Literature	After completion of this programme, students will acquire the knowledge of writing of poem and prose.
ASM-HG-4016	Generic Elective (GE)	Study of Assamese modern songs and literature.	It will provide an adequate knowledge to the students regarding modern, patriotic Assamese songs of several period.
Semester-V			
ASM-HC-5016	Core Course 11	Assamese Drama and performance	After the completion of the programme the students will acquire knowledge about the history and development of Assamese drama.
ASM-HC-5026	Core Course 12	Assamese Grammar	To familiarize the students' regarding the History and different perspectives of Assamese grammar viz., Phonology, morphology and syntax.
ASM-HE-5016	Discipline Specific Elective (DSE) Courses-1	Study of Assamese Folk Literature	To provide the students' basic knowledge regarding Assamese folk literature.
ASM-HE-5026	Discipline Specific Elective (DSE)	Assamese romantic poem	This paper exposes students to different forms and history of Assamese Romantic poems.

	Courses-2		
ASM-HE-5036	Discipline Specific Elective (DSE) Courses-3	Shankardeva	After completion of this programme students will gather knowledge about the philosophy and various ideas put forwarded by Shankardeva.
Semester-VI			
ASM-HC-6016	Core Course 13	Assamese short story and Novel.	To enhance the students' knowledge regarding trends of Assamese short story and novels.
ASM-HC-6026	Core Course 14	History of Assamese script	After the completion of the programme the students will acquire knowledge about the history of Assamese scripts with reference to Shila Lipi, Tamrolipi etc.
ASM-HE-6036	Discipline Specific Elective (DSE) Courses-1	Assamese Children literature	It will provide an adequate knowledge about the moral value through the study of Assamese poem, prose, drama, Essay etc.
ASM-HE-6046	Discipline Specific Elective (DSE) Courses-2	Dialect of Assamese language	It helps the students' to develops the basic concept of dialect and the regional and social dialect of Assamese language.
ASM-HE-6056	Discipline Specific Elective (DSE) Courses-3	Dissertation	It will encourage the students to accomplish their area of interest in Assamese language, literature, culture etc.
4. Bachelor Programme in Assamese (Regular)			
Programme Outcome		Students are able to gain the Knowledge of Assamese Language, Literature and Culture.	
Programme Specific Outcome		The students will acquire the knowledge of Assamese language, literature and culture. Also to know the Assamese language as communicative language.	
Course Outcome			
Semester-I			
ASM-RC-1016	First Semester Core	History of Assamese Language	To introduce the students to the history of Assamese language
Semester-II			
ASM-RC-2016	Second Semester Core	History of Assamese Literature(From the beginning to 19 th century)	To introduce the students to the history of Assamese Literature from the beginning to 19 th century. Students also gain the knowledge about Folk literature, literature of Pre-Sankari,

			Shankari and Post-Sankari era literature.
Semester-III			
ASM-RC-3016	Third Semester Core	Assamese Drama and stage performance	To develop the knowledge of the students regarding traditional performing art, various kind of modern Assamese drama.
ASM-CC-3016	Third Semester Core	Ancient Assamese Literature	After the completion of the programme the students will acquire knowledge about ancient Assamese Literature like Geet-pod, Kabya, Kotha sahitya etc.
Semester-IV			
ASM-RC-4016	Fourth Semester Core	Study of Modern Assamese song	It introduces the students to concept of origin and development of modern Assamese songs ,like patriotic song, romantic song etc.
ASM-CC-4016	Fourth semester Core	Modern Assamese Literature	After the completion of the programme the students will acquire the knowledge about modern Assamese literature, like modern Assamese poem, prose ,drama etc.
Semester-V			
ASM-SE-5014	Fifth Semester DSE-1	Recital art	After the completion of the programme the students will acquire the knowledge about history and trends of recital and recital art. students will also gain the knowledge about pace, memorization, modulation etc.
ASM-RE-5016	Fifth semester DSE-2	Shankardeva	It introduces the students of the Shankardeva and his literature ,Philosophy etc.
ASM-RE-5026	Fifth semester DSE-3	Study of Assamese Folk literature	After the completion of the programme the students will acquire the knowledge about the nature of Assamese folk literature, ballad, tribe song etc.
ASM-RG-5016	Fifth Semester GE	Shankardeva	It introduces the students of the Shankardeva and his literature ,Philosophy etc.
Semester-VI			
ASM-SE-6014	Six semester	Assamese letter formation	After the completion of the programme the students will acquire the knowledge about Assamese vowel, consonant, Assamese word Formation etc.
ASM-RE-6016	Sixth Semester DSE-1	Sondo and Olonkar	After the completion of the programme the students will acquire the knowledge about the Assamese sondo and olonkar, like sobdalonkar, arthalonkar etc.
ASM-RG-6016	Sixth Semester	Sondo and olonkar	After the completion of the programme the students will acquire the knowledge

	DSE-2		about the Assamese sondo and olonkar, like sobdalonkar, arthalonkar etc.
5. Bachelor Programme in Bengali (Honours/Regular)			
Objectives:	1. Educate students in both the artistry and utility of the Bengali language through the study of literature. 2. Provide students with the critical faculties necessary in an academic environment, on the job, and in an interdependent world. 3. Graduate students, who are capable of performing research, analysis and criticism of literary texts from different historical periods and genres. 4. Assist students in the development of intellectual flexibility, creativity and cultural literacy, so that they may engage in life-long.		
Learning Outcomes:	1. Students should be familiar with representative literary and cultural texts within a significant number of historical, political, geographical and cultural contexts. 2. Students should be able to apply critical and theoretical approaches to the reading and analysis of literary and cultural texts in multiple genres. 3. Students should be able to identify, analyze, interpret and describe the critical ideas, values and themes that appear in different literary texts. 4. Students should be able to write analytically in variety of formats including descriptive writing, research papers and reflective writing. 5. Students should be able to ethically gather and synthesize informations from a variety of written and electronic sources. 6. Students should be able to synchronise technology with literature.		
6. Bachelor Programme in Chemistry (Honours)			
Programme Outcome	1. Development of interpersonal and communication skills, critical thinking ability and problem solving skills. 2. To identify, formulate and solve integrative chemistry problems. 3. To apply important chemical concepts and principles to draw conclusions about chemical reactions 4. To develop firm foundation in the fundamentals and application of current chemical and scientific theories including those in Analytical, Inorganic, Organic and Physical Chemistries. 5. To carry out scientific experiments as well as accurately record and analyze the results of such experiments. 6. To appreciate the central role of chemistry in our society and use this as a basis for ethical behavior in issues facing chemists including an understanding of safe handling of chemicals, environmental issues and key issues facing our society in energy, health and medicine.		

Programme Specific Outcome	1. In-depth understanding in the general principles of chemistry. 2. Introduction to specific areas of chemistry (analytical chemistry, biochemistry, inorganic chemistry, organic chemistry, and physical chemistry) in order to prepare them for PG courses. 3. Familiarization to experimental techniques and laboratory rules and regulations through practical courses in each semester. 4. Introduction to research environment by a six months long project in the sixth semester under the supervision of a faculty of the department.

Course Code	Course Name	Course Type	Outcome
SEMESTER I			
ENG-AE-1014	English Communications	Ability-Enhancement Compulsory Course (AECC)-1	To acquire skills in reading, writing, comprehension and communication, as also to use electronic media for scientific communication.
CHE-HC-1016	Inorganic Chemistry-I	Core Course C-1	i) To develop understanding of the concepts related to atomic and molecular structure, chemical bonding, periodic properties and redox behaviour of chemical species. ii) To develop hands on experience of standard solution preparation in different concentration units and learn volumetric estimation through acid-base and redox reactions.
	Inorganic Chemistry-I Lab		
CHE-HC-1026	Physical Chemistry-I	Core Course C- 2	i) To develop understanding of kinetic theory of gases, ideal gas and real gases, qualitative treatment of the
	Physical Chemistry-I Lab		

			structure of liquid along with the physical properties of liquid, viz, vapour pressure, surface tension and viscosity. ii) To introduce to the elementary idea of symmetry. This will be useful to understand solid state chemistry and group theory in some higher courses. iii) To learn the basic solid state chemistry, application of x-ray crystallography for the determination of some very simple crystal structures.
AAA-HG-1YY6	Generic Elective (GE)-1	Generic Elective	To develop students' different skills such as interpersonal and communication skills, critical thinking ability, leadership, etc. by exposing them to subjects their personal interest.
	Generic Elective - 1 Practical/Tutorial		
SEMESTER-II			
ENV-AE-2014	Ability-Enhancement Compulsory Course (AECC)-2	Environmental Studies	To acquire the conceptual knowledge of the environment and other issues relating to environment.
CHE-HC-2016	Organic Chemistry-I	Core Course C-3	To identify different classes of organic compounds, to describe their reactivity and explain/analyze their chemical and stereo chemical aspects.
	Organic Chemistry-I Lab		
CHE-HC-2026	Physical Chemistry-I	Core Course C- 4	i) To learn laws of thermodynamics, thermochemistry, thermodynamic functions, relations between
	Physical Chemistry-I Lab		

			thermodynamic properties, Gibbs Helmholtz equation, Maxwell relations etc. ii) To learn partial molar quantities, chemical equilibrium, solutions and colligative properties. iii) To develop an understanding of the chemical systems from thermodynamic point of view.
AAA-HG-2YY6	Generic Elective (GE)-2	Generic Elective	To develop students' different skills such as interpersonal and communication skills, critical thinking ability, leadership, etc. by exposing them to subjects their personal interest.
	Generic Elective - 2 Practical/Tutorial		
SEMESTER III			
CHE-HC-3016	Inorganic Chemistry-II	Core Course C- 5	i) To learn to apply theoretical principles of redox chemistry in the understanding of metallurgical processes. ii) To learn to identify the variety of s and p block compounds and comprehend their preparation, structure, bonding, properties and uses. iii) To introduce the students to preparative methods in inorganic chemistry.
	Inorganic Chemistry-II Lab		
CHE-HC-3026	Organic Chemistry-II	Core Course C- 6	To learn to describe and classify organic compounds in terms of their functional groups and reactivity
	Organic Chemistry-II Lab		
CHE-HC-3036	Physical Chemistry-III	Core Course C- 7	i) To develop an understanding of phase rule and its application
	Physical Chemistry-III Lab		

			in some specific systems. ii) To learn rate laws of chemical transformation, experimental methods of rate law determination, steady state approximation etc. iii) To understand different types of surface adsorption processes and basics of catalysis including enzyme catalysis, acid base catalysis and particle size effect on catalysis.
CHE-SE-3034	Basic Analytical Chemistry	Skill Enhancement Course (SEC)-1	To understand the basic principles of chemical analysis, design/implement microscale and semi-micro experiments, record, interpret and analyze data following scientific methodology.
AAA-HG-3YY6	Generic Elective (GE)-3	Generic Elective	To develop students' different skills such as interpersonal and communication skills, critical thinking ability, leadership, etc. by exposing them to subjects their personal interest.
	Generic Elective - 3 Practical/Tutorial		
SEMESTER IV			
CHE-HC-4016	Inorganic Chemistry-III	Core Course C- 8	i) To learn to name coordination compounds according to IUPAC, explain bonding in this class of compounds, understand their various properties in terms of CFSE and predict reactivity.
	Inorganic Chemistry-III Lab		

			ii) To learn to appreciate the general trends in the properties of transition elements in the periodic table and identify differences among the rows. iii) Familiarization with preparation, estimation or separation of metal complexes/compounds iv) To design experiments independently which they should be able to apply if and when required
CHE-HC-4026	Organic Chemistry-III	Core Course C- 9	i) To identify and classify different types of N-based derivatives, alkaloids and hetro cyclic compounds/explain their structure mechanism and reactivity/critically examine their synthesis and reactions mechanism.
	Organic Chemistry-III Lab		
CHE-HC-4036	Physical Chemistry-IV	Core Course C- 10	i) To learn theories of conductance and electrochemistry. ii) To develop an in-depth understanding on solubility and solubility products, ionic products of water, conduct metric titrations etc. iii) To understand the various parts of electrochemical cells along with Faraday's Laws of electrolysis. IV) To gain basic theoretical idea of electrical& magnetic
	Physical Chemistry-IV Lab		

			properties of atoms and molecules.
CHE-SE-4024	Green Methods in Chemistry	Skill Enhancement Course (SEC)-2	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.
AAA-HG-3YY6	Generic Elective (GE)-4	Generic Elective	To develop students' different skills such as interpersonal and communication skills, critical thinking ability, leadership, etc. by exposing them to subjects their personal interest.
	Generic Elective - 4 Practical		
SEMESTER V			
CHE-HC-5016	Organic Chemistry-IV	Core Course C- 11	To understand the important features of nucleic acids, amino acids and enzymes and to develop ability to examine their properties and applications.
	Organic Chemistry-IV Lab		
CHE-HC-5026	Physical Chemistry-V	Core Course C- 12	i) To understand the application of quantum mechanics in some simple chemical systems such as hydrogen atom or hydrogen like ions. ii) To learn chemical bonding in some simple molecular systems. iii) To understand the basics of various kinds of spectroscopic techniques and photochemistry
	Physical Chemistry-V Lab		

CHE-HE-5026	Analytical Methods in Chemistry	Discipline Specific Elective (DSE) -1	i) To develop theoretical understanding about choice of various analytical techniques used for qualitative and quantitative characterization of samples. ii) To gain hands on experience of the discussed techniques.
	Analytical Methods in Chemistry Lab		
CHE-HE-5056	Polymer Chemistry	Discipline Specific Elective-2	i) To learn the definition and classifications of polymers, kinetics of polymerization, molecular weight of polymers, glass transition temperature, and polymer solutions etc. ii) To learn the brief introduction of preparation, structure and properties of some industrially important and technologically promising polymers.
	Polymer Chemistry Lab		
SEMESTER VI			
CHE-HC-6016	Inorganic Chemistry-IV	Core Course C- 13	i) To learn about how ligand substitution and redox reactions take place in coordination complexes. ii) To 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. iii) To apply the use of concepts like solubility product.
	Inorganic Chemistry-IV Lab		

			common ion effect, pH etc. in analysis of ions iv) To synthesis of coordination compound and to calculate of 10Dq, controlling factors etc. in order to co-relate the concepts of theory in experiments.
CHE-HC-6026	Organic Chemistry-V	Core Course C- 14	i) To understand basic principles of different spectroscopic techniques and their importance in chemical/organic analysis. ii) To critically examine carbohydrates, polymers and dye materials.
	Organic Chemistry-V Lab		
CHE-HE-6026	Industrial Chemicals & Environment	Discipline Specific Elective (DSE)-4	i) To develop knowledge on the manufacture, applications and safe ways of storage and handling gaseous and inorganic industrial chemicals. ii) To know about industrial metallurgy and the energy generation industry. iv) To learn about environmental pollution by various gaseous, liquid wastes and nuclear wastes and their effects on living beings. v) To learn about industrial waste management, their safe disposal and the importance of environment friendly “green chemistry” in chemical industry.
	Industrial Chemicals & Environment Lab		

CHE-HE-6056	Dissertation	Discipline Specific Elective (DSE)-4	i) To learn how to design own experiments. ii) To critically analyze data and draw a fruitful conclusion out of it.
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7. Bachelor in Chemistry (Regular)

Programme specific outcome	1. Understanding the general principles of chemistry. 2. Introduction to specific areas of chemistry (analytical chemistry, biochemistry, inorganic chemistry, organic chemistry, and physical chemistry). 3. Familiarization to experimental techniques and laboratory rules and regulations by practical courses in each semester.
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Programme outcome	1. Development of interpersonal and communication skills, critical thinking ability and problem solving skills. 2. To identify, formulate and solve integrative chemistry problems. 3. To apply important chemical concepts and principles to draw conclusions about chemical reactions 4. To carry out scientific experiments as well as accurately record and analyze the results of such experiments. 5. To appreciate the central role of chemistry in our society and use this as a basis for ethical behavior in issues facing chemists including an understanding of safe handling of chemicals, environmental issues and key issues facing our society in energy, health and medicine.
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Course Outcomes:

Semester	Course Code	Course Name	Course Type	Outcome
Semester I	CHE-RC 1016	CHEMISTRY1: Atomic Structure, Bonding, General Organic Chemistry & Aliphatic Hydrocarbons	Core Course	i) To learn the atomic structure through the basic concepts of quantum mechanics. ii) To understand the chemical bonding through VB and MO approaches. iii) To learn basic ideas of organic chemistry, stereochemistry, functional groups, alkanes, alkenes, alkynes etc.
Semester II	CHE-RC 2016	CHEMISTRY2: s- and p-Block	Core Course	i) To learn periodic properties in main group

		Elements, Transition Elements, Coordination Chemistry States of Matter & Chemical Kinetics		elements, transition metals (3d series). ii) To learn the crystal field theory in coordination chemistry unit. iii) To learn kinetic theory of gases, ideal gas and real gases, surface tension, viscosity, basic solid state chemistry and chemical kinetics.
Semester III	CHE-RC 3016	- CHEMISTRY3: Chemical Energetics, Equilibria & Functional Group Organic Chemistry-I	Core Course	i) To understand the chemical system from thermodynamic points of view. ii) To develop an understanding on chemical equilibrium and ionic equilibrium. iii) To learn various classes of organic molecules-alkyl halides, aryl halides, alcohols, phenols, ethers, aldehydes and ketones.
Semester IV	CHE-RC 4016	- CHEMISTRY4: Solutions, Phase Equilibrium, Conductance, Electrochemistry & Functional Group Organic Chemistry	Core Course	i) To learn solutions, phase rule and its application in specific cases, basics of conductance and electrochemistry. ii) To learn some important topics of organic and biochemistry- carboxylic acids, amines, amino acids, peptides, proteins and carbohydrates.
Semester V	CHE-RE-5056	Polymer Chemistry	Core Course	i) To learn the definition and classifications of polymers, kinetics of polymerization, molecular weight of polymers, glass transition temperature, and polymer solutions etc. ii) To learn the brief introduction of preparation, structure and properties of some industrially important and technologically promising polymers.

Semester VI	CHE-RE-6026	Industrial Chemicals & Environment	Core Course	i) To develop knowledge on the manufacture, applications and safe ways of storage and handling gaseous and inorganic industrial chemicals. ii) To know about industrial metallurgy and the energy generation industry. iv) To learn about environmental pollution by various gaseous, liquid wastes and nuclear wastes and their effects on living beings. v) To learn about industrial waste management, their safe disposal and the importance of environment friendly “green chemistry” in chemical industry.
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8. Bachelor Programme in Computer Science (Regular)

Programme Outcome		Upon successful completion of a general course in computer science, students will be able to: 1. Demonstrate proficiency in problem-solving techniques using the computer. 2. Demonstrate proficiency in at least one high-level programming language and one operating system. 3. Demonstrate proficiency in the analysis of complex problems and the synthesis of solutions to those problems. 4. Demonstrate comprehension of modern software engineering principles. 5. Demonstrate a breadth and depth of knowledge in the discipline of computer science.	
Programme Specific Outcome		The goals of the computer science department are to prepare students for graduate training in some specialized area of computer science, to prepare students for jobs in industry, business or government, and to provide support courses for students in technology, mathematics and other fields requiring computing skills.	
Course Outcome			
Semester-I			
CSC-HG/RC -1016	Honors Generic/ Regular Core	Problem solving using Computer	This course is designed to demonstrate proficiency in problem-solving techniques using the computer.
Semester-II			
CSC-HG/RC -2016	Honors Generic/	Database Management System (DBMS)	The objective of the course is to present an introduction to

	Regular Core		database management systems, with an emphasis on how to organize, maintain and retrieve - efficiently, and effectively - information from a DBMS.
Semester-III			
CSC-HG/RC-3016	Honors Generic/Regular Core	Operating System (OS)	- To make the user convenient to use computer in an efficient manner. - To provide users a convenient interface to use the computer system
CSC-SE-3014	Skill Enhancement Course (SEC)-I	Office Automation Tools	Office tools course would enable the students in crafting professional word documents, excel spread sheets, power point presentations using the Microsoft suite of office tools. To familiarize the students in preparation of documents and presentations with office automation tools.
Semester-IV			
CSC-HG/RC-4016	Honors Generic/Regular Core	Computer System Architecture	To understand the structure, function and characteristics of computer systems. To understand the design of the various functional units and components of computers. To identify the elements of modern instructions sets and their impact on processor design.
CSC-SE-4014	Skill Enhancement Course (SEC)-II	HTML Programming	- Understand the principles of creating an effective web page, including an in-depth consideration of information architecture. - Become familiar with graphic design principles that relate to web design and learn how to implement theories into practice. - Develop skills in analyzing the usability of a web site.
Semester-V			
CSC-RE-5016	Regular Elective	Project Work/Dissertation	Develop proficiency in the analysis of complex problems and the synthesis

			of solutions to those problems. • Develop a breadth and depth of knowledge in the discipline of computer science.
CSC-SE-5024	Skill Enhancement Course (SEC)-III	PHP Programming	Analyze the basic structure of a PHP web application and be able to install and maintain the web server, compile, and run a simple web application. Learn how databases work and how to design one, as well as how to use php MyAdmin to work with MySQL.

Semester-VI

CSC-RE-6026	Regular Elective	Computer Networks	The course objectives include learning about computer network organization and implementation, obtaining a theoretical understanding of data communication and computer networks, and gaining practical experience in installation, monitoring, and troubleshooting of current LAN systems.
CSC-SE-6014	Skill Enhancement Course (SEC)-IV	Programming with SCILAB	It can be used for signal processing, statistical analysis, image enhancement, fluid dynamics simulations, numerical optimization, and modeling, simulation of explicit and implicit dynamical systems and (if the corresponding toolbox is installed) symbolic manipulations.

9. Bachelor Programme in Economics (Honours)

Programme Outcome	1. Students are able to gain the basic Knowledge regarding principles of microeconomic theory. 2. Deep understanding of basic mathematics that enables the study of economic theories. 3. Understanding the concepts like savings, investment, GDP, money, inflation, and the balance of payments 4. Introduces the students to various theoretical issues related to an open economy 5. Students can familiar with some basic concepts and terminology that are fundamental to statistical analysis and inference.
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			6. By goodness of the preparation they can turn into a banking staff, manager, Accountant, Stock Agents etc. and will prove themselves in different professional exams like SSC, banking exams, and other competitive exams.
Programme Specific Outcome			1. Demonstrate effectively oral and written communication 2. Demonstrate ability to understand compliance as per various economic up-downs, inflation, tax systems etc. 3. The students will acquire the knowledge, skill in different areas of communication, decision making, innovations and problem solving in day to day economic activities. 4. Students will gain systematic and subject skill within various disciplines of consumption function, production, consumption taxation, management, communication, computer data entry and analysis etc. 5. Students will be able to do their higher education and can make research in the field of production, poverty, society and economic issues.
Course Outcome			
Semester-I			
ECO-HC-1016	Core Course 1	Introductory Microeconomics	This course is designed to acquire the basic principles of microeconomic theory and microeconomic concepts can be applied to analyze real-life situations.
ECO-HC-1026	Core Course 2	Mathematical Methods for Economics-I	To help the students for illustrating the method of applying mathematical techniques to economic theory in general.
ECO-HG-1016	Generic Elective (GE)	Principles of Microeconomics I	This course intends to expose the student to the basic principles in Microeconomic Theory and illustrate with applications.
Semester-II			
ECO-HC-2016	Core Course 3	Introductory Macroeconomics	To introduce the students to the basic concepts of Macroeconomics and Macroeconomic variable like savings, investment, GDP, money, inflation, and the balance of payments.
ECO-HC-2026	Core Course 4	Mathematical Methods for	To enhance the skill of illustrating the method of applying

		Economics-II	mathematical techniques to economic theory in general.
ECO-HG-2016	Generic Elective (GE)	Principles of Microeconomics II	To develop the understanding of basic principles in Microeconomic Theory and illustrate with applications.
Semester-III			
ECO-HC-3016	Core Course 5	Intermediate Microeconomics-I	To develop the knowledge of the students regarding mathematical tools are used to facilitate understanding of the basic concepts like behaviour of the consumer and the producer and also covers the behaviour of a competitive firm.
ECO-HC-3026	Core Course 6	Intermediate Macroeconomics-I	Improves the students' knowledge regarding modeling of a macro-economy in terms of analytical tools, output and employment determination in a closed economy and introduces the students to various theoretical issues related to an open economy.
ECO-HC-3036	Core Course 7	Statistical Methods for Economics	To acquire skills regarding notion of probability, probability distributions, sampling techniques, survey data, and other various statistical tools that can help for data analysis etc.
ECO-SE-3014	Skill Enhancement Course (SEC)-I	Data Collection and Presentation	This course helps students in understanding use of data, presentation of data using computer soft-wares like MS-Excel. Students will be involved practically to preparation of questionnaires/interview schedules, collection of both primary and secondary data and its presentation.
ECO-HG-3016	Generic Elective (GE)	Principles of Macroeconomics I	To enhance the students understanding regarding definition, measurement of the macroeconomic variables like GDP, consumption, savings, investment and balance of payments etc.
Semester-IV			
ECO-HC-4016	Core Course 8	Intermediate Microeconomics-II	To provide the skill for use of mathematical tools and Reasoning to solve the problems of general

			equilibrium and welfare, imperfect markets and topics under information economics.
ECO-HC-4026	Core Course 9	Intermediate Macroeconomics-II	It improves students' micro-foundations to the various aggregative concepts used in the previous course.
ECO-HC-4036	Core Course 10	Introductory Econometrics	To familiarize the students with basic econometric concepts and techniques. It covers statistical concepts of hypothesis testing, estimation and diagnostic testing of simple and multiple regression models
ECO-SE-4014	Skill Enhancement Course (SEC)-II	Data Analysis	To orient students with data and statistical soft-wares like SPSS/PSPP to analyse data.
ECO-HG-4016	Generic Elective (GE)	Principles of Macroeconomics II	It introduces students to concept of inflation, its relationship with unemployment and some basic concepts in an open economy.
Semester-V			
ECO-HC-5016	Core Course 11	Indian Economy-I	To provide the students basic concepts regarding economic indicators and policy debates in India in the post-Independence period
ECO-HC-5026	Core Course 12	Development Economics-I	To familiarize the students' regarding aggregate models of growth and cross-national comparisons of the growth, axiomatic basis for inequality measurement is used to develop measures of inequality and connections between growth and inequality are explored.
ECO-HE-5016	Discipline Specific Elective (DSE) Courses-1	Economics of Health and Education	To provide the students' basic knowledge regarding importance of education and health in improving well-being.
ECO-HE-5026	Discipline Specific Elective (DSE) Courses-2	Money and Financial Markets	This paper exposes students to the theory and functioning of the monetary and financial sectors of the economy.
ECO-HE-5036	Discipline Specific	Public Finance	To provide the students' knowledge regarding efficiency

	Elective (DSE) Courses-3		and equity aspects of taxation, 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.
Semester-VI			
ECO-HC-6016	Core Course 13	Indian Economy-II	To enhance the students' knowledge regarding sector specific policies and their impact in shaping trends in key economic indicators in India.
ECO-HC-6026	Core Course 14	Development Economics-II	To orient 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.
ECO-HE-6016	Discipline Specific Elective (DSE) Courses-1	Environmental Economics	To provide the students' knowledge on economic causes of environmental problems, environmental questions and their management, economic incentives and environmental quality, quantification of environmental damages, tools for evaluation of environmental projects such as cost-benefit analysis and environmental impact assessments.
ECO-HE-6026	Discipline Specific Elective (DSE) Courses-2	International Economics	It helps the students' to develop 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.
ECO-HE-6036	Discipline Specific Elective (DSE) Courses-3	The Economy of Assam	To familiarize the students' regarding various issues related to Assam Economy.
10. Bachelor Programme in Economics (Regular)			
Programme Outcome		1. Introduces the students to various theoretical issues related to Micro and macro economy 2. Understanding the concepts like savings, investment, GDP, money, inflation, and the balance of payments	

	3. Students can familiar with some basic concepts and terminology like theory and functioning of the monetary and financial sectors of the economy, theory and functioning of the monetary and financial sectors of the economy. 4. By goodness of the preparation they can turn into a banking staff, manager, Accountant, Stock Agents etc. and will prove themselves in different professional exams like ssc, banking exams, and other competitive exams.		
Programme Specific Outcome	1. Demonstrate effectively oral and written communication 2. Demonstrate ability to understand to the basic principles of economics, its theory and illustrate with applications. 3. The students will acquire the knowledge, skill in different areas of communication, decision making, innovations and problem solving in day to day economic activities. 4. Students will gain systematic and subject relates knowledge like Microeconomics, Macroeconomics, development economics etc. 5. Students will be able to do their higher education and can make research in the field of production, poverty, society and economic issues.		
Course Outcome			
Semester-I			
ECO-RC-1016	First Semester Core	Principles of Microeconomics–I	This course is designed to acquire the knowledge intends to expose the student to the basic principles in Microeconomic Theory and illustrate with applications..
Semester-II			
ECO-RC-2016	Second Semester Core	Principles of Microeconomics–II	To introduce the students to the Fundamentals and important concepts of Microeconomics.
Semester-III			
ECO-RC-3016	Third Semester Core	Principles of Macroeconomics–I	To develop the knowledge of the students regarding definition, measurement of the macroeconomic variables like GDP, consumption, savings, investment and balance of payments.
Semester-IV			

ECO-RC-4016	Fourth Semester Core	Principles of Macroeconomics–II	It introduces students to concept of inflation, its relationship with unemployment and some basic concepts in an open economy.
Semester-V			
ECO-RE-5016	Fifth Semester DSE-1	Economic Development and Policy in India–I	To familiarize the students' regarding aggregate economic indicators in India and places these against the backdrop of major policy debates in India in the post-Independence period.
ECO-RE-5026	Fifth Semester DSE-2	Money and Banking	This course exposes students to the theory and functioning of the monetary and financial sectors of the economy.
ECO-RE-5036	Fifth Semester DSE-3	Environmental Economics	To provide the students' basic knowledge regarding Environmental problems and issues from the Indian and international context (especially global warming) are used to illustrate the concepts and methods presented in the course.
ECO-RG-5016	Fifth Semester GE	Economic Development and Policy in India–I	To enhance students' knowledge about aggregate economic indicators in India and places these against the backdrop of major policy debates in India in the post- Independence period.
Semester-VI			
ECO-RE-6016	Sixth Semester DSE-1	Economic Development and Policy in India–II	To enhance the students' knowledge regarding aggregative analysis of trends in the Indian Economy and Economic Development and Policy, key indicators and their implications in the post-Independence period.
ECO-RE-6026	Sixth Semester DSE-2	Economic History of India 1857-1947	To orient the students' with Indian economic development during the second half of British colonial rule. It investigates the place of the Indian economy in the wider colonial context, and the mechanisms that linked economic development in India to the compulsions of colonial rule.
ECO-RE-6036	Sixth Semester DSE-3	Public Finance	To provide the students' knowledge on government finances with special reference to India. It also orient students about equity aspects of taxation of the center, states and the

			local governments and the issues of fiscal federalism and decentralisation in India.
ECO-RG-6016	Sixth Semester GE	Economic Development and Policy in India–II	It helps the students' to understand aggregative analysis of trends in the Indian Economy, sector-specific trends in key indicators and their implications in the post-Independence period..

11. Bachelor Programme in English (Honours)		
Course/Code/	Name of the Course	Course Outcome
Paper 1/ ENG-HC-1016	Indian Classical Literature	Students are encouraged to link laterally about literature of the world and the possibility of cultural exchange.
Paper 2/ ENG-HC-1026	European Classical Literature	Adequate awareness is created among the students about the essentials of the creative exercises.
Paper 3/ ENG-HC-2016	Indian Writing in English	
Paper 4/ENG-HC-2026	British Poetry and Drama	Students will derive knowledge of the seminal issues and pre-occupations of the critnens and their ages as reflected in the texts prescribed.
Paper 5/ ENG-HC-3016	History to English Literature and Forms	Ground is prepared for the detailed study of the literature and besides providing a strong historical sense of literary development.
Paper 6/ ENT-HC-3026	American Literature	
Paper 7&8/ ENT-HC-3036 & 4014	British Poetry and Drama.	Students obtain a comprehensive knowledge of the Age publications which had witnessed some of the best works.
ENG-HC-4036	British Literature: The 19 th Century	The course outcome is to give students on overview of the 19 th century British Literature
ENG-HC-4026	British Romantic Literature	The course outcome is to acquaint students with the major Romantic poets and appreciate the essence of the Romantic vision.
Sem V/ ENG-HC-5016	British Literature: The 20 th Century	The course outcome is to acquaint students with the arts and literature of the era of Modernism and postmodernism.

ENG-HC-5026	Women's Writing	The course outcome is to acquaint students with women's writing from different geographical & social cultural settings. They will be acquainted with the themes of gender, sexual/ textual politics, feminism, body, identity, class, location, voice, space, gender and narrative.
ENG-HE-5016	Popular Literature	Students are equipped with the popular literature of the world with a critical consciousness.
ENG-HE-5036	Literature of the Indian Diaspora	the students are equipped with global literature and ideas of transnationalism, exile, migration and displacement.
Sem VI/ ENG-HC-6016	Modern European Drama	Students are acquainted with innovative dramatic works of playwrights from different locations of Europe, also aware with the avant-gards movements and trends and dramatic devices and techniques during the period of modernism.
ENG-HC-6026	Postcolonial Literature	Students are given opportunity to learn postcolonial literature from across the world which has shared experiences of the postcolonial condition.
ENG-HE-6036	Partition Literature	To acquaint students with partition literature of the Indian subcontinent
ENG-HE-6056	Life Writing	The course outcome is to teach life writing or Autobiography in theory and praxis.
12. Bachelor Programme in English (Regular)		
Course/ Paper Code	Name of the Course	Course outcome
ENG-CC-1016/2016	Compulsory course: English I & II	The course provides the students an opportunity to read and respond to representations of issues in contemporary life and culture in the English Language.
ALT-CC-3016/4016	Alternative English I & II	To acquaints students with the major genres of English literature through texts which are landmarks of each genre, to familiarize

		students with different forms of literature, texts and their social, cultural and political contexts.
ENG-SE-3014	Creative Writing	To build proficiency in reading and Writings through active class participation.
ENG-SE-4014	Translation: Principles and Practice	Students are provided basic skills in translation through training in practical translations.
ENG-SE-5014	Technical Writing	Students are well equipped with the skills of writing with a practical purpose. Besides, training for good writing, retraining and communication information with precision.
ENG-SE-6014	Business Communication	Achievement of effective communication in the business as well as professional world through special focus on written and oral communication by engaging in diverse group activities.
ENG-AE-1014	English Communication	To enable student's aquaria basic skills of both oral and written communication and application of the same in diverse day to day situations, both in personal and social contexts. `

13. Bachelor Programme in History (Honours/Regular)

Programme Outcomes	1. Sound Knowledge of different Historical Periods:
	Under the CBCS papers in each semester are devoted to the study of particular Historical phase in the historical events along with the study of a few major works by some stalwarts scholars of that period. These not only help the students to understand a historical period better, but also reduce the load of study in the concerned area.
	2. Knowledge of the Development of Historical perspective: While pursuing Honours course of studies in History it is mandatory that a student develops proper knowledge of the historical events. In this sphere also the present syllabus appears to be illuminating, as it's providing the students with standard and upto date knowledge of historical events, impact, war and history, gender, environment etc. The students may acquire knowledge of the historical events of the Ancient,

				Medieval, Modern and European history of the country and World as well as the history of Northeast India in new aspects. 3. Development of the Historical Perspectives: The current syllabus is well chosen to represent different events from different angles. They are not only meant to make the students familiar with the dominant events of different ages, but also to open out new perspectives, the student may acquire a knowledge of the changing nature of politics or kingdoms, state and social formation of the changing times.		
Programme Specific Outcomes				After completion of B.A.(Honours) in History the students may be able to: - 1. Understand the basic themes, concepts, chronology and the Scope of Indian History. 2. Acquaint with range of issues related to Indian History that span distinct eras. 3. Understand the history of countries other than India with comparative approach. 4. Think and argue historically and critically in writing and discussion. 5. Prepare for various types of Competitive Examinations 6. Critically recognize the Social, Political, Economic and Cultural aspects of History		
Semester	Core Course 14	AECC 2	SEC 2	DSE 4	GE 4	Course outcome (CO)
SEM 1 HIS – HC-1016:	History of India-I	-	-	-	-	HC-1016 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. HC-1026After 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
HIS -HC-1026	Social Formations and Cultural Patterns of the Ancient World.					

						civilizations in the ancient world as well as development of slave and polis societies in ancient Greece.
SEM 2 HIS-HC-2016	HISTORY OF INDIA- II					HIS-HC-2016: 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.
HIS-HC-2026	SOCIAL FORMATIONS AND CULTURAL PATTERNS OF THE MEDIEVAL WORLD					HIS-HC-2026 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.
SEM 3 HIS-HC-3016	HISTORY OF INDIA III (c. 750 -1206)					HC-3016: 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
HIS-HC-3026	RISE OF THE MODERN WEST – I					
HIS-HC-3036	HISTORY OF INDIA IV (c.1206 - 1550)					HC-3026 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. HC-3036 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.
SEM 4 HIS-HC-4016	RISE OF THE MODERN WEST – II				HC-4016 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 and revolutionary currents of both Europe and America at the beginning of the Modern age.
HIS-HC-4026	HISTORY OF INDIA V (c. 1550 - 1605)				HC-4026 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.
HIS-HC-4036	HISTORY OF INDIA VI (c. 1605 - 1750)				HC-4036 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 enable them to relate to the socio-
SEM V HIS-HC:5016	History of Modern Europe (1780-1939)				
SEM V HIS-HC:5026	History of India VII (1750-1857)				

					economic and religious orientation of the people of Medieval period in India. HC-5016 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 able 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. HC-5026 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 HE-5016 The paper will give a general idea of the history of early Brahmaputra-Barak Valley under the process of emergence of State formation process like Kamarupa, Harikela, Suromos, Dimasa, Tripuri etc The study of the paper will give a good
SEM V HIS – HE-5016	History of Assam upto c. 1228				
SEM V HIS – HE-5026	History of Assam (c. 1228- 1826)				

						insight into the information about early state in this part of Northeast India with a vivid description of the cultural heritage of the region. HE-5026 This paper will give a general outline of the history of Assam from the earliest times to the advent of the British. On completion of this paper, students will be able to identify major stages of developments in the political history of Assam from the earliest times to the occupation of Assam by the English East India Company in the first quarter of the 19th century.
SEM VI HIS-HC-6016	HISTORY OF INDIA VIII (c. 1857 - 1950)					HC-6016 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.
SEM VI HIS-HC-6026	HISTORY OF MODERN EUROPE II (c. 1780 -1939)					HC-6026 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
SEM VI HIS-HE-6016	HISTORY OF ASSAM (c. 1826 – 1947)					

SEM VI HIS-HE-6026	Assam Since Independence				ideological shifts of Europe in the period. HE-6016 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. HE-6026 Students will be able to assess the aftermath of Partition and other socio-economic 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.
SEM I HIS – RC-1016	History of India (From Earliest Times to 1206 AD)				RC-1016 Upon completion of this course, students will be able to explain the emergence of state system in North India, development of imperial state structure and state formation in South India in the early period. They will be able to understand the changes and transformations in polity, economy and society in early India and the linkages developed through contacts with the outside world.

SEM II HIS – RC-2016	History of India (c.1206 to 1757)					RC-2016 Upon completion of this course, students will be able to analyse the political and social developments in India between 1206-1757. Students will be able to explain the formation of different States during this period along with their administrative apparatuses, and the society, economy and culture of India in the 13th to mid-18th century period.
SEM III HIS-RC-3016	History of India (1757-1947)					RC-3016 Upon completion of this course, students will be able to understand the major factors that led to the establishment and consolidation of British rule in India. They will also be able to identify the process of growth of resistance against British colonial rule and the eventual growth of Indian nationalist movement, which ultimately led to the end of the British rule in the country
SEM III HIS-SE-3014	Historical Tourism in Northeast India					SE-3014 After completing this course, students will be able to explain Tourism in North East India with special reference to the historical monuments, cultural and ecological elements and places of the north east India country as tourist and heritage sites of the nation. They will be able to relate to the growing vocation of tourism as an industry and the applicability of historical knowledge for its growth.
SEM IV HIS – RC-4016	Social andEconomic History of Assam					RC-4016 Upon completion of this course, students will be able to analyse and explain the socio-economic history of Assam including among others the development

SEM IV HIS –SE- 4014	Oral Cultures and Oral Traditions				of caste system, religious beliefs, agriculture and land system, the social organization, trade and commerce, various agricultural regulations, plantation economy, development of modern industries, transport system, education, the emergence of middle class, development of literature and press, and growth of public associations. SE-4014 After this course the students will be able to explain complex interrelationships of structures or events in the context of broader social and cultural framework of societies through ‘public memory’ and use oral history to preserve oral culture and local history The students will be able to espouse the relevance to the North eastern region of India with its diverse culture and ethnic communities whose history is largely oral. The students will be able to use ‘Public memory’ as a tool and a source not only to write public history but also to explore new knowledge in the humanities social sciences and even in disciplines like architecture, communication studies, gender studies, English, history, philosophy, political science, religion, and sociology.
SEM V HIS-RE- 5016	History of Assam (Earliest times to 1826)				RE-5016 This paper will give a general outline of the history of Assam from the earliest times to the advent of the British. On completion of this paper, students will be able to identify major stages of developments in the political history of Assam from the earliest times to the
SEM V					

HIS-RG-5016	History of Europe (c. 1648 – 1870)				occupation of Assam by the English East India Company in the first quarter of the 19th century. RG-5016 After completing the course, the students will be able to explain the emergence of state system in Europe and the rise of modernity. They will also be able to analyse the revolutionary upheavals of Europe that finally shaped the world.
SEM VI HIS-RE-6016	History of Assam (c. 1826 – 1947)				RE-6016 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.
SEM VI HIS-RG-6016	History of Europe (c.1870 – 1939)				RG-6016 After completing the course, the students will be able to explain the major political developments in Europe from 1870 to 1939. The students will be able to delineate how the rise of two unified nations of Germany and Italy gave rise of intense imperialist contest the world over. The course would also enable the students to analyse the causes and consequences of World War I and the developments leading to World War II.

14. Bachelor Programme in Mathematics (Honours/ Regular)	
Programme Outcome	PO1. Students who choose BMATH(H) Programme, develop the ability to think critically, logically and analytically and hence use mathematical reasoning in everyday life. PO2. Pursuing a degree in mathematics will introduce the students to a number of interesting and useful ideas in preparations for a number of mathematics careers in education, research, government sector, business sector and industry. PO3. The program covers the full range of mathematics. The course lays a structured foundation of Calculus, Real and Complex analysis, Algebra, Differential equations and Mathematical modelling, Number theory, Graph theory, Mechanics and C-programming. PO4. An exceptionally broad range of topics covering Pure and Applied Mathematics: Linear Algebra, Metric spaces, Statistics, Linear Programming and Applications, Mathematical Finance, and Bio-Mathematics cater to varied interests and ambitions. Also, to carry out the hand on sessions in Computer lab using various CAS software to have a deep conceptual understanding of the above tools to widen the horizon of students' self-experience.
Programme Specific Outcomes	The completion of the BMATH(H) Programme shall enable a student to: PSO1. Communicate mathematics effectively by oral, written, computational and graphic means. PSO2. Create mathematical ideas from basic axioms. PSO3. Gauge the hypothesis, theories, techniques and proofs provisionally. PSO4. Utilize mathematics to solve theoretical and applied problems by critical understanding, analysis and synthesis. PSO5. Identify applications of mathematics in other disciplines and in the real world, leading to enhancement of career prospects in a plethora of fields. PSO6. Appreciate the requirement of lifelong learning through continued education and research.

1st Semester (Honours/Regular)	
Course	Course Outcome (CO)

MAT-HC-1016: Calculus (including practical)	This course will enable the students to: CO1. Learn first and second derivative tests for relative extremum and apply the knowledge in problems in business, economics and life sciences. CO2. Sketch curves in a plane using its mathematical properties in different coordinate systems. CO3. Compute area of surfaces of revolution and the volume of solids by integrating over cross- sectional areas. CO4. Understand the calculus of vector functions and its use to develop the basic principles of planetary motion.
MAT-HC-1026: Algebra	This course will enable the students to: CO1. Employ De Moivre's theorem in a number of applications to solve numerical problems. CO2. Learn about equivalent classes and cardinality of a set. CO3. Use modular arithmetic and basic properties of congruences. CO4. Recognize consistent and inconsistent systems of linear equations by the row echelon form of the augmented matrix. CO5. Learn about the solution sets of linear systems using matrix method and Cramer's rule.
MAT-HG-1016/ MAT-RC-1016: Calculus	The students who take this course will be able to: CO1. Understand continuity and differentiability in terms of limits. CO2. Describe asymptotic behavior in terms of limits involving infinity. CO3. Use derivatives to explore the behavior of a given function, locating and classifying its extrema, and graphing the function. CO4. Understand the importance of mean value theorems.
MAT-HG-1026: Analytic Geometry	This course will enable the students to: CO1. Transform coordinate systems, conic sections CO2. Learn polar equation of a conic, tangent, normal and related properties CO3. Have a rigorous understanding of the concept of three dimensional coordinate systems. CO4. Understand geometrical properties of dot product, cross product of vectors.
2nd Semester (Honours/Regular)	
MAT-HC-2016: Real Analysis	This course will enable the students to: CO1. Understand many properties of the real line R, including completeness and Archimedean properties. CO2. Learn to define sequences in terms of functions from N to a subset of R. CO3. Recognize bounded, convergent, divergent, Cauchy and monotonic sequences and to calculate their limit superior, limit inferior, and the

	limit of a bounded sequence. CO4.Apply the ratio, root, alternating series and limit comparison tests for convergence and absolute convergence of an infinite series of real numbers.
MAT-HC-2026: Differential Equations (including practical)	The course will enable the students to: CO1.Learn basics of differential equations and mathematical modeling. CO2.Formulate differential equations for various mathematical models. CO3.Solve first order non-linear differential equations and linear differential equations of higher order using various techniques. CO4.Apply these techniques to solve and analyze various mathematical models.
MAT-HG-2016/ MAT-RC-2016: Algebra	This course will enable the students to: CO1.Learn how to solve the cubic and biquadratic equations, also learn about symmetric functions of the roots for cubic and bi-quadratic. CO2.Employ De Moivre's theorem in a number of applications to solve numerical problems. CO3.Recognize consistent and inconsistent systems of linear equations by the row echelon form of the augmented matrix. Finding inverse of a matrix with the help of Cayley-Hamilton theorem. CO4.Recognize the mathematical objects that are groups, and classify them as abelian, cyclic and permutation groups, ring etc. CO5.Learn about the concept of linear independence of vectors over a field, and the dimension of a vector space.
MAT-HG-2026: Discrete Mathematics	After the course, the student will be able to: CO1.Understand the notion of ordered sets and maps between ordered sets. CO2.Learn about lattices, modular and distributive lattices, sublattices and homomorphisms between lattices. CO3.Become familiar with Boolean algebra, Boolean homomorphism, Karnaugh diagrams, switching circuits and their applications.
3rd Semester (Honours/Regular)	
MAT-HC-3016: Theory of Real Functions	This course will enable the students to: CO1.Have a rigorous understanding of the concept of limit of a function. CO2.Learn about continuity and uniform continuity of functions defined on intervals. CO3.Understand geometrical properties of continuous functions on closed and bounded intervals. CO4.Learn extensively about the concept of differentiability using limits, leading to a better understanding for applications. CO5.Know about applications of mean value theorems and Taylor's theorem.

MAT-HC-3026: Group Theory I	The course will enable the students to: CO1.Recognize the mathematical objects that are groups, and classify them as abelian, cyclic and permutation groups, etc. CO2.Link the fundamental concepts of groups and symmetrical figures. CO3.Analyze the subgroups of cyclic groups and classify subgroups of cyclic groups. CO4.Explain the significance of the notion of cosets, normal subgroups and factor groups. CO5.Learn about Lagrange's theorem and Fermat's Little theorem. CO6.Know about group homomorphisms and group isomorphisms.
MAT-HC-3036: Analytical Geometry	This course will enable the students to: CO1.Learn conic sections and transform co-ordinate systems CO2.Learn polar equation of a conic, tangent, normal and properties. CO3.Have a rigorous understanding of the concept of three dimensional coordinates systems.
MAT-SE-3014: Computer Algebra Systems and Related Software	This course will enable the students to: CO1.Use of softwares; Mathematica/MATLAB/Maxima/Maple etc. as a calculator, for plotting functions and animations CO2.Use of CAS for various applications of matrices such as solving system of equations and finding eigenvalues and eigenvectors. CO3.Understand the use of the statistical software R as calculator and learn to read and get data into R.
MAT-SE-3024: Combinatorics and Graph Theory	This course will enable the students to: CO1.Learn about the counting principles, permutations and combinations, Pigeonhole principle CO2.Understand the basics of graph theory and learn about social networks, Eulerian and Hamiltonian graphs, diagram tracing puzzles and Knight's tour problem.
MAT-HG-3016/ MAT-RC-3016: Differential Equations	The course will enable the students to: CO1.Learn basics of differential equations and mathematical modelling. CO2.Solve first order non-linear differential equations and linear differential equations of higher order using various techniques.
MAT-HG-3026: Linear Programming	This course will enable the students to: CO1.Learn about the graphical solution of linear programming problem with two variables. CO2.Learn about the relation between basic feasible solutions and extreme points. CO3.Understand the theory of the simplex method used to solve linear programming problems.

	CO4. Learn about two-phase and big-M methods to deal with problems involving artificial variables. CO5. Learn about the relationships between the primal and dual problems. CO6. Solve transportation and assignment problems. CO7. Apply linear programming method to solve two-person zero-sum game problems.
4th Semester (Honours/Regular)	
MAT-HC-4016: Multivariate Calculus	This course will enable the students to: CO1. Learn the conceptual variations when advancing in calculus from one variable to multivariable discussion. CO2. Understand the maximization and minimization of multivariable functions subject to the given constraints CO3. Learn about inter-relationship amongst the line integral, double and triple integral formulations. CO4. Familiarize with Green's, Stokes' and Gauss divergence theorems.
MAT-HC-4026: Numerical Methods (including practical)	The course will enable the students to: CO1. 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. CO2. 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. CO3. Interpolation techniques to compute the values for a tabulated function at points not in the table. CO4. Applications of numerical differentiation and integration to convert differential equations into difference equations for numerical solutions.
MAT-HC-4036: Ring Theory	On completion of this course, the student will be able to: CO1. Appreciate the significance of unique factorization in rings and integral domains. CO2. Learn about the fundamental concept of rings, integral domains and fields. CO3. Know about ring homomorphism and isomorphism theorems of rings. CO4. Learn about the polynomial rings over commutative rings, integral domains, Euclidean domains, and UFD.
MAT-SE-4014: R Programming	This course will enable the students to: CO1. Become familiar with R syntax and to use R as a calculator. CO2. Understand the concepts of objects, vectors and data types. CO3. Know about summary commands and summary table in R. CO4. Visualize distribution of data in R and learn about normality test.

	CO5. Plot various graphs and charts using R.
MAT-SE-4024: LaTeX and HTML (practical)	After studying this course the student will be able to: CO1. Create and typeset a LaTeX document. CO2. Typeset a mathematical document using LaTeX. CO3. Learn about pictures and graphics in LaTeX. CO4. Create beamer presentations. CO5. Create web page using HTML.
MAT-HG-4016/ MAT-RC-4016: Real Analysis	This course will enable the students to: CO1. Understand many properties of the real line $\mathbb{R}$, including completeness and Archimedean properties. CO2. Learn to define sequences in terms of functions from $\mathbb{R}$ to a subset of $\mathbb{R}$. CO3. Recognize bounded, convergent, divergent, Cauchy and monotonic sequences and to calculate their limit superior, limit inferior, and the limit of a bounded sequence. CO4. Apply the ratio, root, alternating series and limit comparison tests for convergence and absolute convergence of an infinite series of real numbers.
MAT-HG-4026: Numerical Analysis	The course will enable the students to: CO1. 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. CO2. Know about iterative and non-iterative methods to solve system of linear equations. CO3. Know interpolation techniques to compute the values for a tabulated function at points not in the table. CO4. Integrate a definite integral that cannot be done analytically. CO5. Find numerical differentiation of functional values. CO6. Solve differential equations that cannot be solved by analytical methods.
5th Semester (Honours/Regular)	
MAT-HC-5016: Riemann Integration and Metric spaces	The course will enable the students to: CO1. Learn about some of the classes and properties of Riemann integrable functions, and the applications of the Fundamental theorems of integration. CO2. Know about improper integrals including, beta and gamma functions. CO3. 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. CO4. Analyse how a theory advances from a particular frame to a general

	frame. CO5. Appreciate the mathematical understanding of various geometrical concepts, viz. Balls or connected sets etc. in an abstract setting. CO6. 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. CO7. Learn about the two important topological properties, namely connectedness and compactness of metric spaces.
MAT-HC-5026: Linear Algebra	The course will enable the students to: CO1. Learn about the concept of linear independence of vectors over a field, and the dimension of a vector space. CO2. Basic concepts of linear transformations, dimension theorem, matrix representation of a linear transformation, and the change of coordinate matrix. CO3. 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. CO4. Compute inner products and determine orthogonality on vector spaces, including Gram–Schmidt orthogonalization to obtain orthonormal basis. CO5. Find the adjoint, normal, unitary and orthogonal operators.
MAT-HE-5016/ MAT-RE-5016: Number Theory	This course will enable the students to: CO1. 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. CO2. Know about number theoretic functions and modular arithmetic. CO3. Solve linear, quadratic and system of linear congruence equations.
MAT-HE-5026: Mechanics	The course will enable the students to: CO1. Know about the concepts in statics such as moments, couples, equilibrium in both two and three dimensions. CO2. Understand the theory behind friction and center of gravity. CO3. Know about conservation of mechanical energy and work-Energy equations. CO4. Learn about translational and rotational motion of rigid Bodies.
MAT-HE-5036: Probability and Statistics	This course will enable the students to: CO1. Learn about probability density and moment generating functions. CO2. Know about various univariate distributions such as Bernoulli, Binomial, Poisson, gamma and exponential distributions. CO3. Learn about distributions to study the joint behavior of two random variables.

	CO4. 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. CO5. 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.
MAT-HE-5046: Linear Programming	This course will enable the students to: CO1. Learn about the graphical solution of linear programming problem with two variables. CO2. Learn about the relation between basic feasible solutions and extreme points. CO3. Understand the theory of the simplex method used to solve linear programming problems. CO4. Learn about two-phase and big-M methods to deal with problems involving artificial variables. CO5. Learn about the relationships between the primal and dual problems. CO6. Solve transportation and assignment problems. CO7. Apply linear programming method to solve two-person zero-sum game problems.
MAT-HE-5056: Spherical Trigonometry and Astronomy	This course will enable the students to: CO1. Learn about the properties of spherical and polar triangles CO2. Know about fundamental formulae of spherical triangles. CO3. Learn about the celestial sphere, circumpolar star, rate of change of zenith distance and azimuth CO4. Learn about Kepler's law of planetary motion, Cassini's hypothesis, differential equation for fraction.
MAT-HE-5066: Programming in C (including practical)	After completion of this paper, student will be able to: CO1. Understand and apply the programming concepts of C which is important to mathematical investigation and problem solving. CO2. Learn about structured data-types in C and learn about applications in factorization of an integer and understanding Cartesian geometry and Pythagorean triples. CO3. Use of containers and templates in various applications in algebra. CO4. Use mathematical libraries for computational objectives. CO5. Represent the outputs of programs visually in terms of well formatted text and plots.
MAT-RE-5026: Discrete Mathematics	After the course, the student will be able to: CO1. Understand the notion of ordered sets and maps between ordered sets. CO2. Learn about lattices, modular and distributive lattices, sublattices and homomorphisms between lattices.

	CO3. Become familiar with Boolean algebra, Boolean homomorphism, Karnaugh diagrams, switching circuits and their applications.
6th Semester (Honours/Regular)	
MAT-HC-6016: Complex Analysis (including practical)	Completion of the course will enable the students to: CO1. Learn the significance of differentiability of complex functions leading to the understanding of Cauchy–Riemann equations. CO2. Learn some elementary functions and can evaluate the contour integrals. CO3. Understand the role of Cauchy–Goursat theorem and the Cauchy integral formula. CO4. 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.
MAT-HC-6026: Partial Differential Equations (including practical)	The course will enable the students to: CO1. Formulate, classify and transform first order PDEs into canonical form. CO2. Learn about method of characteristics and separation of variables to solve first order PDE's. CO3. Classify and solve second order linear PDEs. CO4. Learn about Cauchy problem for second order PDE and homogeneous as well as no-homogeneous wave equations. CO5. Apply the method of separation of variables for solving second order PDEs.
MAT-HE-6016: Boolean Algebra and Automata Theory	The course will enable the students to: CO1. Learn about the order isomorphism, Hasse diagrams, building new ordered set. CO2. Learn about the algebraic structure lattices, properties of modular and distributive lattices. CO3. Get ideas about the Boolean algebra, Switching circuits and applications of switching circuits. CO4. Appreciate the theory of automata and its applications.
MAT-HE-6026: Bio- Mathematics	The course will enable the students to: CO1. Learn the development, analysis and interpretation of bio mathematical models such as population growth, cell division, and predator-prey models. CO2. Learn about the mathematics behind heartbeat model and nerve impulse transmission model. CO3. Appreciate the theory of bifurcation and chaos. CO4. Learn to apply the basic concepts of probability to molecular evolution and genetics.
MAT-HE-6036: Mathematical	The course will enable the students to:

Modelling (including practical)	CO1. Know about power series solution of a differential equation and learn about Legendre's and Bessel's equations. CO2. Use of Laplace transform and inverse transform for solving initial value problems. CO3. Learn about various models such as Monte Carlo simulation models, queuing models, and linear programming models.
MAT-HE-6046: Hydromechanics	The course will enable the students to: CO1. Know about Pressure equation, rotating fluids. CO2. Learn about Fluid pressure on plane surfaces, resultant pressure on curved surfaces, Gas law, mixture of gases. CO3. Learn about the Eulerian and Lagrangian method. CO4. Learn about equation of continuity, examples, acceleration of a fluid at a point.
MAT-HE-6056: Rigid Dynamics	The course will enable the students to: CO1. Know how to find the moments and products of inertia. CO2. Learn about the motion of the centre of inertia CO3. Learn about the D'Alembert's principle and Lagrange's equations CO4. Learn about motion of a body in two dimension
MAT-HE-6066: Group Theory II	The course shall enable students to: CO1. Learn about automorphisms for constructing new groups from the given group. CO2. Learn about the fact that external direct product applies to data security and electric circuits. CO3. Understand fundamental theorem of finite abelian groups. CO4. Be familiar with group actions and conjugacy in S_n. CO5. Understand Sylow theorems and their applications in checking non-simplicity.
MAT-HE-6076: Mathematical Finance	On completion of this course, the student will be able to: CO1. Know the basics of financial markets and derivatives including options and futures. CO2. Learn about pricing and hedging of options, as well as interest rate swaps. CO3. Learn about no-arbitrage pricing concept and types of options. CO4. Learn stochastic analysis (Ito formula, Ito integration) and the Black-Scholes model. CO5. Understand the concepts of trading strategies and valuation of currency swaps.
MAT-RE-6016: Numerical Analysis	The course will enable the students to:

	CO1. 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. CO2. Know about iterative and non-iterative methods to solve system of linear equations CO3. Know interpolation techniques to compute the values for a tabulated function at points not in the table. CO4. Integrate a definite integral that cannot be done analytically. CO5. Find numerical differentiation of functional values. CO6. Solve differential equations that cannot be solved by analytical methods.
MAT-RE-6026: Programming in C	After completion of this paper, student will be able to: CO1. Understand and apply the programming concepts of C which is important to mathematical investigation and problem solving. CO2. Learn about structured data-types in C and learn about applications in factorization of an integer and understanding Cartesian geometry and Pythagorean triples. CO3. Use of containers and templates in various applications in algebra. CO4. Use mathematical libraries for computational objectives. CO5. Represent the outputs of programs visually in terms of well formatted text and plots.
MAT-SE-6014: LaTeX and HTML(P)	After studying this course the student will be able to: CO1. Create and typeset a LaTeX document. CO2. Typeset a mathematical document using LaTeX. CO3. Learn about pictures and graphics in LaTeX. CO4. Create beamer presentations. CO5. Create web page using HTML.
15. Bachelor Programme in Physics (Honours/Regular)	
Programme Outcome	To acquire adequate knowledge of the subject. To Craft a foundation for higher learning. To introduce into the basics of research. To imbibe sound moral and ethical values. To make conscious of environmental and societal responsibilities. Attain skills for communication and career. Teach to tolerate diverse ideas and different points of view. To make students become empowered to face the challenges of the changing universe. To produce graduates who excel in the competencies and values required for leadership to serve a rapidly evolving global community.
Programme Specific Outcome	To understand the basic laws and explore the fundamental concepts of physics. To understand the concepts and significance of the various physical phenomena.

			To carry out experiments to understand the laws and concepts of Physics. To apply the theories learnt and the skills acquired to solve real time problems. To acquire a wide range of problem solving skills, both analytical and technical and to apply them. To enhance the student’s academic abilities, personal qualities and skills, this will give them an opportunity to develop as responsible citizens. To introduces students to the methods of experimental physics with laboratory techniques specially the importance of accuracy of measurements. Providing a hands-on learning experience such as in measuring the basic concepts in properties of matter, heat, optics, electricity and electronics.
Course Outcome			
Semester I			
PHY-HC-1016	Honours Course - 1	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.
PHY-HC-1026	Honours Course - 2	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.
PHY-RC/HG-1016	Regular Course-1/ Honours Generic-1	Mechanics	Upon completion of this course, students are expected to understand the role of vectors and coordinate systems in Physics, solve Ordinary Differential Equations, laws of motion and their application to various dynamical situations, Inertial reference frames their transformations, concept of conservation of energy, momentum, angular momentum and apply them to basic problems, phenomenon of simple harmonic motion, motion under central force, concept of time dilation, Length contraction using special teory of relativity. In the laboratory course, after acquiring knowledge of how to handle measuring instruments (like screw gauge, Vernier calipers, travelling microscope) student shall embark on verifying various principles and associated measurable parameters.
Semester II			

PHY-HC-2016	Honours Course - 3	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 Kirchhoff's law in different circuits, applications of network theorem in circuits.
PHY-HC-2026	Honours Course - 4	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.
PHY-RC/HG-2016	Regular Course-2/Honours Generic-2	Electricity & Magnetism	Upon completion of this course, students are expected to apply Gauss's law of electrostatics to solve a variety of problems, calculate the magnetic forces that act on moving charges and the magnetic fields due to currents, have brief idea of magnetic materials, understand the concepts of induction, and apply them to solve variety of problems. In the Lab course, students will be able to measure resistance (high and low), Voltage, Current, self and mutual inductance, capacitor, strength of magnetic field and its variation, study different circuits RC, LCR etc.
Semester III			
PHY-HC-3016	Honours Course -5	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.
PHY-HC-3026	Honours Course-6	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.
PHY-HC-3036	Honours Course-7	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

PHY-RC/HG-3016	Regular Course-3/Honours Generic-3	Thermal Physics & Statistical Mechanics	Upon completion of this course, students are expected learn the basic concepts of thermodynamics, the first and the second law of thermodynamics, the concept of entropy and the associated theorems, the thermodynamic potentials and their physical interpretations, Maxwell's thermodynamic relations, fundamentals of the kinetic theory of gases, Maxwell-Boltzman distribution law, equipartition of energies, mean free path of molecular collisions, viscosity, thermal conductivity, diffusion and Brownian motion, black body radiations, Stefan- Boltzmann's law, Rayleigh-Jean's law and Planck's law and their significances, quantum statistical distributions, viz., the Bose-Einstein statistics and the Fermi-Dirac statistics. In the laboratory course, the students will be able to Measure of Planck's constant using black body radiation, determine Stefan's Constant, coefficient of thermal conductivity of a bad conductor and a good conductor, determine the temperature coefficient of resistance, study variation of thermo emf across two junctions of a thermocouple with temperature etc.
PHY-SE-3014	Skill Enhancement-1	Physics Workshop Skills	The aim of this course is to enable the students to familiar and experience with various mechanical and electrical tools through hands-on mode
Semester IV			
PHY-HC-4016	Honours Course-8	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
PHY-HC-4026	Honours Course-9	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

PHY-HC-4036	Honours Course-10	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.
PHY-RC/HG-4016	Regular Course-4/Honours Generic-4	Waves & Optics	Upon completion of this course, students are expected to understand Simple harmonic oscillation and superposition principle, importance of classical wave equation in transverse and longitudinal waves and solving a range of physical systems on its basis, concept of normal modes in transverse and longitudinal waves: their frequencies and configurations, interference as superposition of waves from coherent sources derived from same parent source, Demonstrate understanding of Interference and diffraction experiments, Polarization. In the laboratory course, student will gain hands-on experience of using various optical instruments and making finer measurements of wavelength of light using Newton Rings experiment, Fresnel Biprism etc. Resolving power of optical equipment, the motion of coupled oscillators, study of Lissajous figures and behaviour of transverse, longitudinal waves.
PHY-SE-4074	Skill Enhancement -2	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
Semester V			
PHY-HC-5016	Honours Course-11	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.

PHY-HC-5026	Honours Course-12	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.
PHY-HE-5046	Discipline Specific Elective-1	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.
PHY-HE/RE-5056	Discipline Specific Elective-2/Regular Elective-1	Particle and Nuclear 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.
Semester VI			
PHY-HC-6016	Honours Course-13	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.
PHY-HC-6026	Honours Course-14	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.
PHY-HE/RE-6046	Discipline Specific Elective-3/Regular Elective-2	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.
PHY-HE-6056	Discipline Specific Elective-4	Classical Dynamics	Upon completion of this course, students will have the overview of Newton's Laws of Motion, Special Theory of Relativity by 4-vector 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.

16. Bachelor Programme in Political Science (Honours/ Regular)

BA Regular Programme/Course in Political Science

Semester -I (Regular)

Paper- POL RC 1016 Introduction to Political Theory

Course Objective: This course aims to introduce certain key aspects of conceptual analysis in political theory and the skills required to engage in debates surrounding the application of the concepts.

Course Outcomes:

1. To introduce the key concepts in political theory
2. To make students understand the aspects of conceptual analysis
3. To engage in application of concepts and limitations

Semester-II (Regular)

POL RC 2016 Indian Government and Politics

Course objective: This course acquaints students with the approaches to the study of Indian politics and the changing nature of the state. Students will also understand the basic features of the Indian constitution and its institutional functioning, the changing role of caste, class and patriarchy and their impact on politics and the dynamics of social movements in India.

Course outcomes:

After reading the course the student will be able to

1. Appreciate the approaches to the study of Indian politics and the changing nature of the state

2. Understand the basic features of the Indian constitution and its institutional functioning
3. Examine the changing role of caste, class and patriarchy and their impact on politics
4. Understand the dynamics of social movements in India.

Semester- III (Regular)

POL RC 3016 Comparative Government and Politics

Course objective: This is a foundational course in comparative politics. The purpose is to familiarize students with the basic concepts and approaches to the study of comparative politics. More specifically the course will focus on examining politics in a historical framework while engaging with various themes of comparative analysis in developed and developing countries.

Course Outcomes:

1. To make students have a basic understanding of comparative political analysis,
2. To make students learn the classification of political systems from a comparative politics framework.
3. To make students learn the classification of governments and the political behavior of institutions and the changes in the nature of the nation-state.

Skill Enhancement Course (SEC)

POL SE 3014 Parliamentary Procedures and Practices

Course Objective: The course attempts to make the students familiar with legislative practices in India with an orientation to equip them with the adequate skills of participation in deliberative processes and democratic decision making. The introductory unit of the course aims to provide basic understanding on the constitutional provisions related to the process of legislations as well as the kinds of bills. The second unit of this course seeks to enhance proper understanding related to the procedures, practices related to the passage of a bill from drafting to that of the passing of the Bill. Third unit is about different Committees in the House, and the Fourth unit is on hours and motions in the House.

Course outcomes:

1. To help students in understanding the practical approaches to legislative practices and procedures,
2. To make students understand the procedures and processes related to drafting a Bill and the passage of the Bill,
3. To enable students to have an understanding of the importance of Parliamentary Committees,
4. To make students learn about the basic functioning of Parliament.

Semester-IV (Regular)

POL RC 4016 Introduction to International Relations

Course Objective: This Course is designed to give students a sense of some important theoretical approaches to understand international relations; a history from 1945 onwards to the present; and an outline of the evolution of Indian foreign policy since independence and its possible future trajectory.

Course Outcomes:

1. To demonstrate basic understanding of scientific methods of inquiry in international relations.
2. To understand how international relations influence societies.
3. To demonstrate a basic understanding of the foundational theories and concepts in international relations.
4. To analyse the current world events and their implications on the Indian Foreign policy decision making process by applying prominent theories of international relations and generate substantial research question on the topics.

Skill Enhancement Course (SEC)

POL SE 4014 Panchayati Raj in Practice

Course objective: This course acquaints students with the Panchayati Raj Institutions and their actual working. It further encourages a study of PRIs in their mutual interaction and their interaction with the people.

Course outcomes:

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

Semester-V (Regular)

POL RE/RG 5016 Public Administration- I

After reading this course the students will be able to understand the basics of public administration. Students will also understand the different approaches, principles of organisation and structures of public administration.

Course outcomes:

1. Students will be able to understand the basics of public administration.
2. This paper is an integral part of public services examinations. Students will be well versed with ideas of administration.

Skill Enhancement Course (SEC)

POL SE 5014 Public Opinion and Survey Research

Course Objective: this course will introduce the students to the debates, principles and practices of public opinion polling in the context of democracies, with special reference to India. It will familiarize the students with how to conceptualize and measure public opinion

using quantitative methods, with particular attention being paid to developing basic skills pertaining to the collection, analysis and utilization of quantitative data.

Semester-VI(Regular)

POL RE/RG 6016 Public Administration- II

Course objectives:

After reading this course the students will be in a position acquaint with the different layers and structures of public administration and also to know how public administration contributes towards development. One will also be in a position to know about the principles and processes of budgeting etc.

Course outcomes:

1. Students will be able to understand the different layers and structures of public administration.
2. This paper is an integral part of public services examinations. Students will be well versed with ideas of public administration.

Skill Enhancement Course (SEC)

POL SE 6014 Conflict and Peace Building

Course Objectives: This course is designed to help build an understanding of a variety of conflict situations among students in a way that they can relate to them through their lived experiences. It's an interdisciplinary course that draws its insights from various branches of social sciences and seeks to provide a lively learning environment for teaching and training students how to bring about political and social transformations at the local, national and international levels. The course encourages the use of new information technologies and innovative ways of understanding these issues by teaching student's skills of managing and resolving conflicts and building peace through techniques such as role-play, simulations, street theatre, cinema and music on the one hand and by undertaking field visits, interacting with different segments of the civil society including those affected by conflicts as well as diplomats, journalists and experts, on the other.

BA Honors Programme/Course in Political Science

Semester-I (Honours)

POL HC 1016 Paper I- Understanding Political Theory

Course Objective: This course is divided into two sections. Section A introduces the students to the idea of political theory, its history and approaches, and an assessment of its critical and contemporary trends. Section B is designed to reconcile political theory and practice through reflections on the ideas and practices related to democracy.

Course Outcomes:

1. To introduce the idea of political theory and various approaches

2. To enable the students to assess the contemporary trends of political theory
3. To reconcile theory and practice in relation to democracy

POL HC 1026 Constitutional Government and Democracy in India

Course objective: This course acquaints students with the constitutional design of state structures and institutions, and their actual working overtime. The Indian Constitution accommodates conflicting impulses (of liberty and justice, territorial decentralization and a strong union, for instance) within itself. The course traces the embodiment of some of these conflicts in constitutional provisions, and shows how these have played out in political practice. It further encourages a study of state institutions in their mutual interaction, and in interaction with the larger extra-constitutional environment.

Course Outcomes:

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

Semester-II (Honours)

POL HC 2016 Political Theory-Concepts and Debates

Course Objective: This course is divided into two sections. Section A helps the student familiarize with the basic normative concepts of political theory. Each concept is related to a crucial political issue that requires analysis with the aid of our conceptual understanding. This exercise is designed to encourage critical and reflective analysis and interpretation of social practices through the relevant conceptual toolkit. Section B introduces the students to the important debates in the subject. These debates prompt us to consider that there is no settled way of understanding concepts and that in the light of new insights and challenges, besides newer ways of perceiving and interpreting the world around us, we inaugurate new modes of political debates.

Course outcomes:

After reading the course, the students would

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

POL HC 2026 Political Process in India

Course objective: Actual politics in India diverges quite significantly from constitutional legal rules. An understanding of the political process thus calls for a different mode of analysis -that offered by political sociology. This course maps the working of 'modern' institutions, premised on the existence of an individuated society, in a context marked by communitarian solidarities, and their mutual transformation thereby. It also familiarizes students with the working of the Indian state, paying attention to the contradictory dynamics of modern state power.

Course outcomes:

1. Understand the working of major political institutions in India
2. Understand the major debates in Indian politics along the axes of caste, gender, region and religion
3. Understand the changing nature of the Indian state and the contradictory dynamics of modern state power

Semester-III (Honours)

POL HC 3016 Introduction to Comparative Government and Politics

Course objective: This is a foundational course in comparative politics. The purpose is to familiarize students with the basic concepts and approaches to the study of comparative politics. More specifically the course will focus on examining politics in a historical framework while engaging with various themes of comparative analysis in developed and developing countries.

Course Outcomes:

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

POL HC 3026 Perspectives on Public Administration

Objective: The course provides an introduction to the discipline of public administration. This paper encompasses public administration in its historical context with an emphasis on the various classical and contemporary administrative theories. The course also explores some of the recent trends, including feminism and ecological conservation and how the call for greater democratization is restructuring public administration. The course will also attempt to provide the students a comprehensive understanding on contemporary administrative developments.

Course Outcomes:

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

POL HC 3036 Perspectives on International Relations and World History

Course Objective: This paper seeks to equip students with the basic intellectual tools for understanding International Relations. It introduces students to some of the most important theoretical approaches for studying international relations. The course begins by historically contextualizing the evolution of the international state system before discussing the agency structure problem through the levels-of-analysis approach. After having set the parameters of the debate, students are introduced to different theories in International Relations. It provides a fairly comprehensive overview of the major political developments and events starting from the twentieth century. Students are expected to learn about the key milestones in world history and equip them with the tools to understand and analyze the same from different perspectives. A key objective of the course is to make students aware of the implicit Euro - centricism of International Relations by highlighting certain specific perspectives from the Global South.

Course outcomes:

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

POL SE 3014 Parliamentary procedures and Practices

Course Objective: The course attempts to make the students familiar with legislative practices in India with an orientation to equip them with the adequate skills of participation in deliberative processes and democratic decision making. The introductory unit of the course aims to provide basic understanding on the constitutional provisions related to the process of legislations as well as the kinds of bills. The second unit of this course seeks to enhance proper understanding related to the procedures, practices related to the passage of a bill from drafting to that of the passing of the Bill. Third unit is about different Committees in the House, and the Fourth unit is on hours and motions in the House.

Course outcomes:

1. To help students in understanding the practical approaches to legislatives practices and procedures,
2. To make students understand the procedures and processes related to drafting a Bill and the passage of the Bill,
3. To enable students to have an understanding of the importance of Parliamentary Committees,
4. To make students learn about the basic functioning of Parliament.

Semester-IV (Honours)

POL HC 4016 Political Processes and Institutions in Comparative Perspective

Course objective: In this course students will be trained in the application of comparative methods to the study of politics. The course is comparative in both what we study and how we

study. In the process the course aims to introduce undergraduate students to some of the range of issues, literature, and methods that cover comparative politics.

Course Outcomes:

1. 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.
2. To demonstrate critical thinking about key issues of political system of different forms, political process and public policy.
3. To use the contents and sub-units of the course as yardsticks for comparing these political systems and processes.

POL HC 4026 Public Policy and Administration in India

Objectives: The paper seeks to provide an introduction to the interface between public policy and administration in India. The essence of public policy lies in its effectiveness in translating the governing philosophy into programs and policies and making it a part of the community living. It deals with issues of decentralization, financial management, citizens and administration and social welfare from a non-western perspective.

Course Outcomes:

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

POL HC 4036 Global Politics

Course objective: This course introduces students to the key debates on the meaning and nature of globalization by addressing its political, economic, social, cultural and technological dimensions. In keeping with the most important debates within the globalization discourse, it imparts an understanding of the working of the world economy, its anchors and resistances offered by global social movements while analyzing the changing nature of relationship between the state and trans-national actors and networks. The course also offers insights into key contemporary global issues such as the proliferation of nuclear weapons, ecological issues, international terrorism, and human security before concluding with a debate on the phenomenon of global governance.

Course Outcomes:

1. 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.
2. To have knowledge of the essential theoretical assumptions underlying globalisation's conceptual frameworks and their relationships to policy interventions.
3. 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.

POL SE 4014 Panchayati Raj in Practice

Course objective: This course acquaints students with the Panchayati Raj Institutions and their actual working. It further encourages a study of PRIs in their mutual interaction and their interaction with the people.

Course outcomes:

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

Semester-V (Honours)

POL HC 5016 Classical Political Philosophy

Course objective: This course goes back to Greek antiquity and familiarizes students with the manner in which the political questions were first posed. Machiavelli comes as an interlude inaugurating modern politics followed by Hobbes and Locke. This is a basic foundation course for students.

Course Outcomes:

1. To interpret ideas underlying traditions in classical political philosophy
2. To analyze the debates and arguments of leading political philosophers belonging to different traditions of the period
3. To appraise the relevance of classical political philosophy in understanding contemporary politics

POL HC 5026 Indian Political Thought-I

Course objective: This course introduces the specific elements of Indian Political Thought spanning over two millennia. The basic focus of study is on individual thinkers whose ideas are however framed by specific themes. The course as a whole is meant to provide a sense of the broad streams of Indian thought while encouraging a specific knowledge of individual thinkers and texts. Selected extracts from some original texts are also given to discuss in class. The list of additional readings is meant for teachers as well as the more interested students.

Course Outcomes:

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

Discipline Specific Elective

POL HE 5016 Human Rights

Course Outcomes:

1. To describe the basic concepts of human rights
2. To comprehend different approaches regarding human rights
3. To familiarise the role of UNO in the growth and development of human rights
4. To describe different measures taken for the protection of human rights

POL HE 5046 Select Constitutions-I

Course Objective: The course introduces the constitutional and political systems of two (2) countries. Students will have a stronger and more informed perspective on approaches to studying the constitutional and political systems of these countries in a comparative manner.

Course outcomes:

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

Semester-VI (Honours)

POL HC 6016 Modern Political Philosophy

Course objective: Philosophy and politics are closely intertwined. We explore this convergence by identifying four main tendencies here. Students will be exposed to the manner in which the questions of politics have been posed in terms that have implications for larger questions of thought and existence.

Course Outcome:

1. To interpret ideas underlying traditions in modern political philosophy
2. To analyze the debates and arguments of leading political philosophers of different philosophical traditions
3. To appraise the relevance of modern political philosophy in understanding contemporary politics

POL HC 6026 Indian Political Thought-II

Course objective: Based on the study of individual thinkers, the course introduces a wide span of thinkers and themes that defines the modernity of Indian political thought. The objective is to study general themes that have been produced by thinkers from varied social and temporal contexts. Selected extracts from original texts are also given to discuss in the class. The list of additional readings is meant for teachers as well as the more interested students.

Course Outcomes:

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

Discipline Specific Elective

POL HE 6016 Human Rights in India

Course Outcomes:

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

POL HE 6046 Select Constitutions-II

Course Objective: The course introduces the constitutional and political systems of two (2) countries. Students will have a stronger and more informed perspective on approaches to studying the constitutional and political systems of these countries in a comparative manner.

Course outcomes:

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

17. Bachelor in Botany (Honours/ Regular)
Programme outcomes (PO)
PO1. Knowledge and understanding: 1. Diversity of plants in terms of structure, function, reproduction and ecological roles. 2. The evaluation and assessment of plant diversity. 3. Plant systematics and classification including flora of India and major biomes of the world. 4. The role of plants in the functioning of the global ecosystem. 5. Application of Statistics in biological data. 6. Application of computer and bioinformatics- utilization of biological data <i>in silico</i> .
PO2. Intellectual skills – able to: 1. Logical interpretation of ideas and concepts into a organised form. 2. Accumulate and organise knowledge and ideas through reading and searching in internet. 3. Transformation of knowledge-based concepts from one area to another within the subject. 4. Plan hypothesis and test. 5. Propose and carry out independent survey or research in various areas of the subject.
PO3. Practical skills: Giving opportunities to students to conduct experiments practically both in field and laboratory. Hands on practical helps the students to gain proficiency and skills in different topics of modules offered to them. 1. Study of plant morphology and anatomy. 2. Character correlation for Plant identification. 3. Study of structure and composition of vegetations. 4. Photo-chemical analyses of plant materials to establish the presence of various chemicals with reference to plant physiology and biochemistry. 5. Study

of plant diseases with reference to economic crops. 6. Accumulation and analysis of biological data using statistical methods. 7. Knowledge and use of computers.

PO4. Transferable skills: 1. Use of information technology for accumulation and sharing of data. 2. Dissemination of scientific ideas in writing and orally. 3. Creation of team spirit. 4. Access of library resources. 5. Regularity, punctuality, devotion and Career planning.

PO5. Scientific Knowledge: Use of principles of basic science and fundamental process to study and analyse the plant forms.

PO6. Problem analysis: Recognise and solve the problems of the plant world, Extraction of research literature, formulate independent research related to Botany.

PO7. Design/development of solutions: Formulate new concepts for a green world, sustainable development, betterment of human health specifically from medicinal plants, new formulation of phyto-chemical contents to meet specific need and eco-friendly environment.

PO8. Conduct investigations of complex problems: Carry out knowledge-based research, use of research methodology including design of experiments, critical analysis of research data, and creation of logical conclusions.

PO9. Modern tool usage: Select and application of proper techniques and modern instruments for Biochemical experiments, Molecular Biology, Biotechnology, *in vitro* culture techniques, cytogenetical and physiological activities of plants.

PO10. The Botanist and society: Apply resource-based knowledge to assess and access plant diversity, its importance for society and ecology, health and hazards, legal and environmental issues and conservation of biodiversity practice with responsibility.

PO11. Environment and sustainability: Aware and understand the role of the plants in environmental issues, and propagate the knowledge for sustainable development.

PO12. Ethics: Application of moral and ethical principles to mitigate environmental issues and biodiversity conservation.

PO13. Individual and team work: Work with responsibilities as an individual, or as a member or leader in team works, or in multidisciplinary approaches.

PO14. Communication: Communicate effectively the scientific temperaments for the betterment of the society, propagate effective reports, proper documentation, effective presentations, and deliver clear instructions.

PO15. Project management and finance: Apply knowledge and understanding the principles of engineering and management and utilize those in various capacities either as a member or a leader in a team to carry out projects in multidisciplinary fields.

Programme Specific Outcome

1. Critically evaluation of ideas and arguments by collection relevant information about the plants, so as recognize the position of plant in the broad classification and phylogenetic level.
2. Identify problems and independently propose solutions using creative approaches, acquired through interdisciplinary experiences, and a depth and breadth of knowledge/expertise in the field of Plant Identification.
3. Accurately interpretation of collected information and use taxonomical information to evaluate and formulate a position of plant in taxonomy.
4. Students will be able to apply the scientific method to questions in Botany by formulating testable hypotheses, collecting data that address these hypotheses, and analysing those data to assess the degree to which their scientific work supports their hypotheses.
5. Students will be able to present scientific hypotheses and data both orally and in writing in the formats that are used by practicing scientists.
6. Students will be able to access the primary literature, identify relevant works for a particular topic, and evaluate the scientific content of these works.
7. Students will be able to apply fundamental mathematical tools (statistics, calculus) and physical principles (physics, chemistry) to the analysis of relevant biological situations.
8. Students will be able to identify the major groups of organisms with an emphasis on plants and be able to classify them within a phylogenetic framework. Students will be able to compare and contrast the characteristics of plants, algae, and fungi that differentiate them from each other and from other forms of life.
9. Students will be able to use the evidence of comparative biology to explain how the theory of evolution offers the only scientific explanation for the unity and diversity of life on earth. They will be able to use specific examples to explicate how descent with modification has shaped plant morphology, physiology, and life history.
10. Students will be able to explain how Plants function at the level of the gene, genome, cell, tissue, Flower development. Drawing upon this knowledge, they will be able to give

specific examples of the physiological adaptations, development, reproduction and mode of life cycle followed by different forms of plants.

11. Students will be able to explain the ecological interconnectedness of life on earth by tracing energy and nutrient flow through the environment. They will be able to relate the physical features of the environment to the structure of populations, communities, and ecosystems.

12. Students will be able to demonstrate proficiency in the experimental techniques and methods of analysis appropriate for their area of specialization within biology.

Course outcomes (CO)

Honours Course

1st Semester

Core Papers

BOT-HC-1016: Phycology and Microbiology

CO1. Detailed knowledge on microbes, viruses and bacteria, and their importance in agriculture and medicine

CO2. Knowledge on Algal classification, Economic and ecological importance of Algae

CO3. Practical knowledge on structure of T-Phage and TMV, lytic and lysogenic life cycle

CO4. Practical knowledge on microscopy of bacteria and algae

BOT-HC-1026: Biomolecules and Cell Biology

CO1. Knowledge on structure, classification and physicochemical properties of biomolecules and enzymes

CO2. Detailed knowledge on structure, properties and functions of cell and its components

CO3. Practical knowledge on properties of cell and cell membrane, DNA staining techniques and microscopy of plant cell

CO4. Knowledge on qualitative tests of biomolecules

2nd Semester

Core Papers

BOT-HC-2016: Mycology and Phytopathology

CO1. Detailed knowledge on different classes of fungi, their structure, classification, life cycle and reproduction

CO2. Knowledge on diseases in plants caused by viruses, bacteria and fungi and biotechnological applications of fungi

CO3. Structural analysis of different classes of fungi and their reproductive stages **CO4.** Knowledge on structures of symbiotic associations (Lichens, Mycorrhiza)

BOT-HC-2026: Archegoniate

CO1. Detailed knowledge on morphology, anatomy, classification and properties of bryophytes, pteridophytes and gymnosperms

CO2. Knowledge on reproduction and economic importance and ecological significance of bryophytes, pteridophytes and gymnosperms

CO3. Practical knowledge on morphology and reproductive structures of archegoniates

CO4. Spore morphology analysis and detailed knowledge on male and female reproductive structures in gymnosperms

3rd Semester

Core Papers

BOT-HC-3016: Morphology and Anatomy of Angiosperms

CO1. Knowledge on morphology of angiosperms and developmental biology of plant body

CO2. Knowledge on structural and anatomical organization of tissue system in plants and their classification

CO3. Practical knowledge on inflorescences and fruits of angiosperms

CO4. Practical knowledge on anatomical features of plant body parts

BOT-HC-3026: Economic Botany

CO1. Knowledge on morphology, uses and economic importance of crop plants

CO2. Knowledge on uses of industrially important plants

CO3. Practical knowledge on economically important plant parts and their products

BOT-HC-3036: Genetics

CO1. Knowledge on Mendelian concepts in genetics; structure, functions and properties of chromosome; chromosomal aberration

CO2. Knowledge on gene structures and gene mutations, population genetics

CO3. Practical knowledge on chromosomal mapping and gene interaction studies

CO4. Practical visualization of chromosomal anomalies

Skill Enhancement Paper

BOT-SE-3014: Bio-fertilizers

CO1. Basic knowledge on the microbes used as bio-fertilizer and understand the process of their isolation, identification, mass multiplication, carrier-based inoculants and knowledge on Actinorrhizal symbiosis

CO2. Concept on the general characteristics, isolation, mass multiplication carrier-based inoculants of *Azospirillum* and *Azotobacter* also the knowledge on the crop response to *Azotobacter*

CO3. Basic knowledge on Cyanobacteria including factors affecting growth of Cyanobacteria, concept on the nitrogen fixation and use of blue green algae in rice cultivation

CO4. Brief knowledge on the Mycorrhizal association and understand the details of various types, taxonomy, occurrence, distribution and growth parameters of Mycorrhiza

CO5. Details about the organic farming, maintenance and recycling of biodegradable waste material and understand the methods of making bio-compost and vermicompost with application

4th Semester

Core Papers

BOT-HC-4016: Molecular Biology

CO1. Detailed knowledge on architecture of nucleic acids, organization of DNA in organisms, models of replication and the factors associated with it

CO2. Detailed knowledge on transcriptional and post transcriptional events in a cell, translation of proteins

CO3. Practical acquaintance of isolation and quantification of DNA from plants

CO4. Knowledge on photographic study of RNA polymerases and RNA modification machinery

BOT-HC-4026: Plant Ecology and Phytogeography

CO1. Knowledge on origin, formation and properties of abiotic components of the ecosystem, interactions and adaptation of plants with biotic and abiotic factors

CO2. Knowledge on properties of communities in a population and trophical and habitat organization in an ecosystem

CO3. Practical knowledge on property analysis of abiotic components of the ecosystem

CO4. Practical knowledge on vegetation study and different ecological sites

BOT-HC-4036: Plant Systematics

CO1. Knowledge on plant identification and classification systems, plant nomenclature

CO2. Knowledge on phylogenetic and evolutionary relationships of angiosperms

CO3. Practical knowledge on foliar morphology and taxonomical study of angiosperms

Skill Enhancement Paper

BOT-SE-4014: Nursery and Gardening

CO1. Brief idea about objectives, scope, infrastructure and maintenance of Nursery

CO2. Concept on structure, types and dormancy of seeds and brief idea about seed storage including types and process and knowledge on seed production technology

CO3. Knowledge on various modes of vegetative propagation and maintenance of plants in green house

CO4. Brief idea about development and maintenance of gardening including scope and types and understand the various gardening operations including management of pests and diseases

CO5. Detail knowledge on managements of seeds and seedlings and concept about cultivation, storage and marketing of important vegetables

5th Semester

Core Papers

BOT-HC-5016: Reproductive Biology of Angiosperms

CO1. Knowledge on detailed morphological and anatomical study of reproductive structures of angiospermic plants

CO2. Knowledge on embryology and embryological abnormalities in angiosperms

CO3. Structural documentation of reproductive structures of angiosperms

CO4. Practical knowledge on developmental biology of embryo and endosperms

BOT-HC-5026: Plant Physiology

CO1. Knowledge on mechanisms of water, minerals and nutrient absorption of plants

CO2. Knowledge on roles of plant hormones and mechanism of flowering in plants

CO3. Practical knowledge on effects of growth regulators on plant parts

CO4. Practical knowledge on determination of osmotic and water potential

Discipline Specific Elective (DSE) Papers

BOT-HE-5016: Natural Resource Management

CO1. Comprehensive knowledge on different types of natural resources and their ecological, economical and socio-cultural values

CO2. Basic understandings of land, water and forest resources

CO3. Overall knowledge on resource degradation, their judicious use and management for sustainability

CO4. Knowledge on biodiversity - its importance, management and Bioprospecting

CO5. Knowledge on IPR, and global arena on resource management, conservation and benefit sharing

CO6. Hands on experience on the domestic solid waste estimation and determining its impact on land degradation

CO7. Hands on experience on forest study using tools like GPS/GIS, and understanding of ecological importance of forest resources

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

CO1. Basic understandings on Horticultural science and its importance in employment generation and socio-economic development

CO2. Classification of horticultural crops, identification of potential horticultural crops – their cultivation, production, management and commercialization

CO3. Knowledge on horticultural techniques, landscaping and gardening

CO4. Overall knowledge on post-harvest technology, disease management, and germplasm management for horticulture

CO5. Field knowledge of gardening, nurseries, standing crops of horticultural importance

6th Semester

Core Papers

BOT-HC-6016: Plant Metabolism

CO1. Detailed knowledge of metabolic events of photosynthesis and nutrient metabolism

- CO2. Knowledge of signalling molecules and pathways in the plant cell
- CO3. Practical knowledge on different types of chromatographic techniques
- CO4. Estimation of TAN, sugar and protein contents in plant sample

BOT-HC-6026: Plant Biotechnology

- CO1. Knowledge on applications of tissue culture techniques, construction of recombinant DNA and transformation into hosts, construction of DNA libraries
- CO2. Knowledge on development of transgenic plants for agricultural or industrial use
- CO3. Practical utility on isolation of plasmid DNA, its digestion and separation of fragments through gel electrophoresis
- CO4. Preparation of media for tissue culture techniques and photographic study of plant tissue culture
- CO5. Photographic study of generating transgenic plants for agriculture

Discipline Specific Elective (DSE) Papers

BOT-HE-6016: Industrial and Environmental Microbiology

- CO1. Understanding the roles of microbes in industries and environment
- CO2. Basic knowledge of different kinds of bioreactors and fermentation processes
- CO3. Knowledge on production processes of some microbial products in industries through site visits
- CO4. Knowledge on application of enzymes in industries
- CO5. Diversity and distribution of microbes in air, water and soil
- CO6. Basic understandings on water microbiology and water analysis methods
- CO7. Usefulness of microbes in agriculture and bioremediation of contaminated soils
- CO8. Practical experiences on basic microbiological techniques and handlings

BOT-HE-6036: Project Work/Dissertation

- CO1. Practical knowledge on addressing relevant scientific questions through experimentation

Regular Course

1st Semester

Generic Elective Paper

BOT-HG-1016: Biodiversity (Microbes, Algae, Fungi and Archegoniate)

CO1. Knowledge on structure and reproduction of viruses and bacteria, and their economic importance

CO2. Describe general characteristics, morphological diversity, thallus organization, life cycles, ecological and economic importance of algae

CO3. Describe general characteristics, morphological diversity, thallus organization, life cycles, ecological and economic importance of fungi

CO4. General characteristics, classification, morphological diversity and evolutionary significance of bryophytes

CO5. General characteristics and classification of pteridophytes; evolution of stele, heterospory and seed habit in pteridophytes

CO6. Classify gymnosperms, and describe their general characteristics and economic importance

CO7. Practical knowledge on staining and slide preparation to study bacteria, algae and fungi under the microscope

CO8. Practical knowledge on vegetative and reproductive structures of some representative bryophytes, pteridophytes and gymnosperms

2nd Semester

Generic Elective Paper

BOT-HG-2016: Plant Ecology and Taxonomy

CO1. Understanding soil, water, light and temperature as ecological factors

CO2. Knowledge on adaptive characters of hydrophytes and xerophytes

CO3. Knowledge on plant community types and their succession

CO4. Knowledge on ecosystem, trophic levels and energy flow in ecosystems

CO5. Knowledge on biogeochemical cycling with an emphasis on carbon, nitrogen and phosphorus cycles

CO6. General idea on phytogeography and endemism

CO7. Knowledge on plant taxonomy, principles, ICN rules, ranks and hierarchy

CO8. Knowledge on different systems of plant classification and cluster analysis

CO9. Practical knowledge on soil temperature measurement, humidity measurement, rainfall estimation and light intensity measurement

CO10. Adaptive morphological characterization of hydrophytes and xerophytes

CO11. Quadrature size determination for herbaceous plant studies in ecology

CO12. Estimation of frequency distribution of herbaceous plants using quadrature method

CO13. Practical knowledge on plant identification upto the family level that belongs to Brassicaceae, Solanaceae and Lamiaceae; Preparation of herbarium specimens

3rd Semester

Generic Elective Paper

BOT-HG-3016: Plant Physiology and Metabolism

CO1. Understanding the roles of water in plant physiology, transpiration, and guttation

CO2. Knowing of macro- and micro-nutrients and mineral uptakes in plants

CO3. Understanding the transportations of minerals and foods in plants

CO4. Knowledge on photosynthetic pigments, photosynthetic reactions and photorespiration

CO5. Understanding of respiration processes – glycolysis, TCA and PPP pathways

CO6. Knowledge on enzyme properties, actions and inhibitions

CO7. Knowledge on biological nitrogen fixation

CO8. Knowledge on plant hormones, and plant responses to light and temperature

CO9. Determine osmotic potentials of plant cells and effect of light on transpiration

CO10. Calculate stomatal index and frequency

CO11. Demonstrate the effect of pH and concentrations in catalase activity

CO12. Demonstrate the effect of bicarbonate concentration on O₂ evolution in photosynthesis

4th Semester

Generic Elective Paper

BOT-HG-4016: Plant Anatomy and Embryology

CO1. Knowledge on different types of tissues and their organizations in plants

CO2. Knowledge on secondary growth and anomalous structures in plants

CO3. Knowledge on adaptive and protective characters of plants

CO4. Understanding the reproductive units of a flower; ovule types, ovary types, pollination and fertilization mechanisms; embryo and endosperm developments and functions

CO5. Hands on experiences on slide preparation for anatomical studies of leaf, stem and root

CO6. Flower dissection and study of flower reproductive parts and events

5th Semester

Discipline Specific Elective Papers

BOT-RE-5016: Cell and Molecular Biology

- CO1.** Understand the basic principle, function and working of microscopy used in research
- CO2.** Learn about the basics of cell and cell theory
- CO3.** Learn about the structure, composition and function of different cell organelles
- CO4.** Understand the structure and functions of cell membrane, membrane proteins and carbohydrates, membrane permeability and cell wall
- CO5.** Learn about cell cycle and its regulation at molecular level
- CO6.** Knowledge on history of DNA discovery, experiments related to DNA as the genetic material, structure and types of DNA and different modes of replication
- CO7.** Learn about types and structure of RNA, various types of RNA polymerases, basic knowledge on prokaryotic and eukaryotic translation and genetic code
- CO8.** Understand about regulation of gene expression in prokaryotes and eukaryotes
- CO9.** Practical knowledge on prokaryotic cells (bacteria), viruses and eukaryotic cells with the help of light and electron micrographs
- CO10.** Practical knowledge on photomicrographs of cell organelles
- CO11.** Practical knowledge on the structure of plant cell through temporary mounts
- CO12.** Practical knowledge on mitosis and meiosis
- CO13.** Practical knowledge on plasmolysis and deplasmolysis
- CO14.** Practical knowledge on micrometry
- CO15.** Understand the structure of nuclear pore complex by photograph and learn about special chromosomes either by slides or photographs.
- CO16.** Practical knowledge on micrograph study of DNA packaging
- CO17.** Practical knowledge on karyotype and ideogram preparation

Skill Enhancement Paper

BOT-SE-5014: Medicinal Botany

- CO1.** Knowledge on medicinal plants and indigenous medicinal sciences/systems of India
- CO2.** Understanding about the endangered and endemic medicinal plants, conservation issues and types

CO3. Knowledge on ethno-medicinal gardens, nursery and its classifications and components

CO4. Understanding ethno-botany, folk medicines and ethnic communities; Knowledge on applications of ethno-medicine/natural products for treatment of jaundice, cardiac, infertility, diabetics, blood pressure and skin diseases

6th Semester

Discipline Specific Elective Paper

BOT-RE-6016: Analytical Techniques in Plant Sciences

CO1. Learn about principle of microscopy, flow cytometry, applications of fluorescence microscopy, chromosome banding, FISH, chromosome painting; transmission and scanning electron microscopy – sample preparation for electron microscopy, cryofixation, negative staining, shadow casting, freeze fracture, freeze etching

CO2. Knowledge on different types of centrifugation, marker enzymes

CO3. Learn about use of Radioisotopes in biological research, auto-radiography, pulse chase experiment

CO4. Learn about principle and application of spectrophotometer in biological research

CO5. Knowledge on different chromatographic techniques used in research

CO6. Learn about mass spectrometry, X-ray diffraction, X-ray crystallography, characterization of proteins and nucleic acids, electrophoresis

CO7. Understand various statistical methods of analysis, measures of central tendency: arithmetic mean, mode, median; measures of dispersion: Range, mean deviation, variation, standard deviation, chi-square test for goodness of fit

Skill Enhancement Paper

BOT-SE-6014: Ethnobotany

CO1. Understanding the concept of ethno-botany and its relation to other branches of science, Knowledge on ethnic/tribal groups of India, their life styles and plants used by them for various purposes and their role in conservation of medicinal plants

CO2. Knowledge on methodologies of ethno-botanical studies, importance of ethno-botany in modern medicine and to protect the interest of ethnic groups.

18. Bachelor Programme in Education (Honours)	
	1. Students are acquainted with sound principles of Education.

Programme Outcome	2. Total curriculum aims to develop a holistic and multidimensional understanding of the process of Education. 3. It attempts to approach new areas of learning, develop competencies in the students thereby opening various avenues for self- discovery, academic understanding and employment. 4. Interpersonal and Communication Skills. 5. Introduces students to application of Information and communication Technology in teaching-learning process. 6. Includes many areas of pre-service teacher training course.		
Programme Specific Outcome	1. Demonstrate effectively oral and written communication. 2. Provides combined knowledge of various disciplines such as Philosophy, Psychology, Sociology, Statistics etc. 3. Introduces students to innovative methods and techniques of teaching. 4. Provides knowledge of value Education on national integration, international understanding, peace education etc. 5. Enhances the skills like public speaking skill, facing interview, developing teaching skill, Project report writing etc. throughout the semesters. 6. Students will be able to do their higher education and can make research in the field of Education, Psychology, and Sociology.		
Course Outcome			
Semester I			
EDU-HC-1016	Core Course C-6	Principles of Education	Acquaint the students with the sound principles of education in a democratic country like India.
EDU-HC-1026	Core Course C-4+2	Psychological Foundations of Education and Practical	Provides knowledge about the need of Educational Psychology and the concept of different mental abilities of learners which are important in teaching learning process and assessment.
EDU-HG-1016	Generic Elective	Foundations of Education	Acquaint the students with the sound principles of education and gives a brief introduction of Philosophy, Psychology and sociology in relation to Education.
EDU-HC-1016	Ability-Enhancement Compulsory Course (AECC)-2	English/MIL communication	Provide knowledge of oral and written communication.
Semester II			
EDU-HC-2016	Ability-Enhancement Compulsory Course (AECC)-2	Environmental Science	To acquire the conceptual knowledge of the environment and other issues relating to environment.

EDU-HC-2016	Core Course C-6	Philosophical and sociological Foundations of Education	To acquire the conceptual knowledge of philosophy and sociology and their relationship with Education.
EDU-HC-2026	Core Course C-6	Development of Education in India-I	Acquiring Knowledge of Development of Education in India since Vedic period till British period.
EDU-HG-2016	Generic Elective	Psychology of Adolescents.	Enable the students to understand the developmental aspects of adolescence ,its importance and the problems associated with this stage.
Semester III			
EDU-HC-3016	Core Course C-6	Development of Education in India-II	Acquiring Knowledge of Development of Education in India since Independence till the recent time.
EDU-HC-3026	Core Course C-6	Educational Technology and Teaching Methods.	To provide basic knowledge and equip students with application ICT in teaching learning process and Different teaching methods and strategies.
EDU-HC-3036	Core Course C-6	Value and peace Education	To provide the student with an understanding of strategies and skills in promoting value and peace Education at institutional level.
EDU-HG-3016	Generic Elective (GE)C-6	Guidance and Counselling	To provide knowledge of guidance and counseling and their importance in Education.
EDU-SE-3014	Skill-Enhancement Elective Course (SEC)C-4	Public Speaking Skill	After completing this course, students will be able to acquire the capacities of public speaking skill.
Semester IV			
EDU-HC-4016	Core Course C-6	Great Educational Thinkers	To enable the students learn about educational thoughts of some great Indian and Western Educational Thinkers.
EDU-HC-4026	Core Course C-6	Educational Statistics and Practical	To familiarize students with different statistical procedures used in Education.
EDU-HC-4036	Core Course C-6	Emerging Issues in Education	To acquaint students with the various issues in education that

			are emerging in the recent years in higher education system.
EDU-HG-4016	Generic Elective (GE)/C-6	History of Education in India	Acquiring Knowledge of Development of Education in India since British Period till the recent time.
EDU-SE-4014	Skill-Enhancement Elective Course (SEC)C-4	Writing Biodata and Facing an Interview.	After completing this course, students will be able to Write biodata and will develop confidence to face different types of interview.
Semester V(DSE=5016/5026&5036/5046)			
EDU-HC-5016	Core Course C-6	Measurement and Evaluation in Education and Practical	To enable the students to learn about measurement, evaluation, assessment, test, Examination etc. and test construction.
EDU-HC-5026	Core Course C-6	Guidance and Counselling	To provide knowledge of guidance and counseling and their importance in Education.
EDU-HE-5016/EDU-RE-5016	Discipline Specific Elective (DSE)-1, C-6	Continuing Education	To Provide knowledge about different aspects and agencies of continuing education and its significance .
EDU-HE-5026/EDU-RE-5026	Discipline Specific Elective (DSE)-1, C-6	Developmental Psychology	To provide knowledge of developmental aspects of the four stages of human growth and development and their relevance to education.
EDU-HE-5036/EDU-RE-5036	Discipline Specific Elective (DSE)-2, C-6	Human Rights Education	To familiarize with Human Rights Education
EDU-HE-5046/EDU-RE-5046	Discipline Specific Elective (DSE)-2, C-6	Teacher Education in India	To provide knowledge of different aspects of teacher education and professional ethics.
Semester VI(DSE=6016/6026&6036/6046)			
EDU-HC-6016	Core Course C-6	Education and Development	To provide knowledge about relation between education and different fields of development.
EDU-HC-6026	Core Course C-6	Project	After completion of the course, the learner will be able to explain the process of conducting a project and prepare a project report.
EDU-DSE-6016	Discipline Specific	Mental Health and Hygiene	Provide knowledge of mental health and hygiene, positive

	Elective (DSE)-1, C-6		psychology, stress management in relevance with education.
EDU-DSE-6026	Discipline Specific Elective (DSE)-1, C-6	Special Education	Provide knowledge of special and inclusive education as an important aspect of education and optimum development of children.
EDU-DSE-6036	Discipline Specific Elective (DSE)-2, C-6	Educational Management	Enable the students to know about educational management, planning, administration etc.
EDU-DSE-6046	Discipline Specific Elective (DSE)-2, C-6	Women and Society	To understand status of women in society, their education and empowerment for nation building.

19. Bachelor Programme in Education (Regular)			
Programme Outcome	1. Students are acquainted with sound principles of Education. 2. Total curriculum aims to develop a holistic and multidimensional understanding of the process of Education. 3. It attempts to approach new areas of learning, develop competencies in the students thereby opening various avenues for self- discovery, academic understanding and employment. 4. Interpersonal and Communication Skills. 5. . Includes many areas of pre-service teacher training course.		
Programme Specific Outcome	1. Demonstrate effectively oral and written communication. 2. Provides combined knowledge of various disciplines such as Philosophy, Psychology, Sociology, Statistics etc. 3. Introduces students to innovative methods and techniques of teaching. 4. Provides knowledge of value Education on national integration, international understanding, peace education etc. 5. Enhances the skills like public speaking skill, facing interview, developing teaching skill, Project report writing etc. throughout the semesters.		
Course Outcome			
Semester I			
EDU-RC-1016	Ability-Enhancement Compulsory Course (AECC)-2	English/MIL communication	Provide knowledge of oral and written communication.
EDU-RC-1016	Regular Core Course C-6	Foundations of Education	Acquaint the students with the sound principles of education and gives a brief introduction of Philosophy,

			Psychology and sociology in relation to Education.
Semester II			
EDU-RC-2016	Ability-Enhancement Compulsory Course (AECC)-2	Environmental Science	To acquire the conceptual knowledge of the environment and other issues relating to environment.
EDU-RC-2016	Regular course C-6	Psychology of Adolescents.	Enable the students to understand the developmental aspects of adolescence ,its importance and the problems associated with this stage.
Semester III			
RC-3016	Regular Course (GE)C-6	Guidance and Counselling	To provide knowledge of guidance and counseling and their importance in Education.
EDU-SE-3014	Skill-Enhancement Elective Course (SEC) C-4	Public Speaking Skill	After completing this course, students will be able to acquire the capacities of public speaking skill.
Semester IV			
EDU-RC-4016	Regular Course C-6	History of Education in India	Acquiring Knowledge of Development of Education in India since British Period till the recent time.
EDU-SE-4014	Skill-Enhancement Elective Course (SEC) C-4	Writing Biodata and Facing an Interview.	After completing this course, students will be able to Write biodata and will develop confidence to face different types of interview.
Semester V(DSE=5016/5026/5046/5046)			
EDU-RE-5016	Discipline Specific Elective (DSE)-1, C-6	Continuing Education	To Provide knowledge about different aspects and agencies of continuing education and its significance .
EDU-RE-5026	Discipline Specific Elective (DSE)-, C-6	Developmental Psychology	To provide knowledge of developmental aspects of the four stages of human growth and development and their relevance to education.
EDU-RE-5036	Discipline Specific Elective (DSE)-, C-6	Human Rights Education	To familiarize with Human Rights Education

EDU-RE-5046	Discipline Specific Elective (DSE)-, C-6	Teacher Education in India	To provide knowledge of different aspects of teacher education and professional ethics.
EDU-RG-5016	Generic Elective	Distance Education	Acquaint the students with the growing need of distance education and to know its different programmes.
EDU-SE-5014	Skill-Enhancement Elective Course (SEC)C-4	Extension Activities	After completeing this course, Students will be able to do extension activities.

Semester VI(DSE=6016/6026/6036/6046)

EDU-DSE-6016	Discipline Specific Elective (DSE)-1, C-6	Mental Health and Hygiene	Provide knowledge of mental health and hygiene, positive psychology, stress management in relevance with education.
EDU-DSE-6026	Discipline Specific Elective (DSE)-1, C-6	Special Education	Provide knowledge of special and inclusive education as an important aspect of education and optimum development of children.
EDU-DSE-6036	Discipline Specific Elective (DSE)-2, C-6	Educational Management	Enable the students to know about educational management,planning,administration etc.
EDU-DSE-6046	Discipline Specific Elective (DSE)-2, C-6	Women and Society	To understand status of women in society, their education and empowerment for nation building.
EDU-SEC-6014	Skill-Enhancement Elective Course (SEC)C-4	Developing Teaching Skill	After completing this course ,students will be able to develop understanding about different teaching skills which are used in classroom communication.
EDU-RG-6016	Generic Elective	Mental Health and Hygiene	Provide knowledge of mental health and hygiene, positive psychology, stress management in relevance with education.

20. Bachelor in Zoology (Honours/ Regular)

Program Outcome:

	1. PO1 - Students gain knowledge and skill in the fundamentals of animal sciences, understands the complex interactions among various living organisms 2. PO2 – Analyse complex interactions among the various animals of different phyla, their distribution and their relationship with the environment 3. PO3 – Apply the knowledge of internal structure of cell, its functions in control of various metabolic functions of organisms. 4. PO4 – Understands the complex evolutionary processes and behaviour of animals 5. PO5 – Correlates the physiological processes of animals and relationship of organ systems 6. PO6 – Understanding of environmental conservation processes and its importance, pollution control and biodiversity and protection of endangered species 7. PO7 – Gain knowledge of Agro based Small Scale industries like sericulture, fish farming and apiculture. 8. PO8 – Understands about various concepts of genetics and its importance in human health 9. PO9 - Apply ethical principles and commit to professional ethics and responsibilities in delivering his duties 10. PO10 – Apply the knowledge and understanding of Zoology to one's own life and work 11. PO11 – Develops empathy and love towards the animals
Program Specific Outcomes:	1. PSO1. Understand the nature and basic concepts of cell biology, genetics, taxonomy, physiology, ecology and applied Zoology 2. PSO2. Analyse the relationships among animals, plants and microbes 3. PSO3. Perform procedures as per laboratory standards in the areas of Taxonomy, Physiology, Ecology, Cell biology, Genetics, Applied Zoology, tools and techniques of Zoology, Toxicology, Entomology, Sericulture, Biochemistry, Fish biology, Animal biotechnology, Immunology and research methodology 4. PSO4. Understand the applications of biological sciences in Apiculture, Aquaculture, Agriculture and Medicine 5. PSO5. Gains knowledge about research methodologies, effective communication and skills of problem solving methods 6. PSO6. Contributes the knowledge for Nation building.

Course Outcome B. Sc (Honours)			
SEMESTER	PAPER CODE	PAPER NAME	COURSE OUTCOME

1 st Semester	ZOO-HC-1016	Non Chordates I: Protists to Pseudocoelomates	To provide knowledge on general taxonomic rules on animal classification, study the structure and diversity in Protists upto Pseudocoelomates. Origin of Metazoans: Diploblastic and triploblastic organization; symmetries; body cavities; protostomes and deuterostomes. Special features and structural diversity in sponges. Cnidarians: Special features; transition of third germ layer; polymorphism and division of labour; coral reef forming Cnidarians. The acoelomates: Basic organization and adaptive radiations in flatworms. Pseudo coelomates; Basic organization and adaptive radiations in roundworms.
1 st Semester	ZOO-HC-1026	Principles of Ecology	To develop an understanding of the discipline of ecology, interaction of biota abiota, impart knowledge to the student regarding environment and conservation biology. Provide knowledge on types of ecosystem – freshwater, marine and terrestrial, community and population characteristics and dynamics – conceptual approach, Growth curves and pyramids; sigmoid curve, age structure; logistic equation and concepts relating to growth, food chain and biogeochemical cycles. The students will have a better understanding on biodiversity and conservation of natural landscapes, wildlife and ecosystems and acquires theories and practical methods in preserving environments and organisms.
2 nd Semester	ZOO-HC-2016	Non-Chordates II : Coelomates	The course aims to provide knowledge on coelomates: Basic organization and adaptive radiations in Arthropods- Crustaceans, Myriapods, Chelicerates, Insects, etc. Basic organization and diversity in Annelids. Basic organization and diversity in Molluscs. Basic organization of Echinoderms; their affinity to Chordates.

2 nd Semester	ZOO-HC-2026	Cell Biology	Provides knowledge and understanding on the structural and functional aspects of basic unit of life i.e. cell concepts
3 rd Semester	ZOO-HC-3016	Diversity of Chordata	Imparts conceptual knowledge of vertebrates, their adaptations and associations in relation to their environment. Classify phylum Protochordates to Mammalia and complex Vertebrate interactions. Distribution of fauna in different realms interaction.
3 rd Semester	ZOO-HC-3026	Animal Physiology: Controlling and Coordinating Systems	Students gain fundamental knowledge of physiology and endocrine systems. Detailed concepts of bones and cartilage, reproductive systems and the functioning of nerves and muscles are covered.
3 rd Semester	ZOO-HC-3036	Fundamentals of Biochemistry	Biochemical understanding through scientific enquiry into the nature of mechanical, physical, and biochemical functions of humans, their organs, and the cells of which they are composed. Interactions and interdependence of physiological and biochemical processes
3 rd Semester	ZOO-SE-3014	Ornamental Fish and Fisheries	Understands concepts of fisheries, fishing tools and site selection. Understand the nature, status and scope of aquaculture at national and international levels and to acquire knowledge on the importance of aquaculture. Demonstrate knowledge and understanding of candidate species, their diversity, and biology. Critically evaluate the problems faced in aquaculture and its possible solutions and to inculcate thorough knowledge on the prospects and importance of aquaculture. It enhances the knowledge of ornamental fish breeding which is highly professional and attractive avenue for youth.
3 rd Semester	ZOO-SE-3024	Apiculture	Understands basic knowledge of the biology, morphology, and physiology of honeybees. The learner will be able to understand the primary life cycle of the honeybees, beekeeping tools and equipment. The learner will be able to

			learn and manage beehives for honey production and pollination. Understand the importance of honeybees (as critical pollinators). Control the pests and diseases of honeybees. Have a broad idea of international research in apiculture
4 th Semester	ZOO-HC-4016	Comparative Anatomy of Vertebrates	Imparts fundamental knowledge of animal physiology –integumentary, skeletal, digestive, respiratory, circulatory, urinogenital, nervous systems and sense organs. Students are taught the detailed concepts of digestion, respiration, excretion, the functioning of nerves and muscles, etc.
4 th Semester	ZOO-HC-4026	Animal Physiology: Life Sustaining Systems	Seeks to understand the mechanisms that work to keep the human body alive and functioning. Physiological and biochemical understanding through scientific enquiry into the nature of mechanical, physical, and biochemical functions of humans, their organs, and the cells of which they are composed. Interactions and interdependence of physiological and biochemical processes
4 th Semester	ZOO-HC-4036	Biochemistry of Metabolic processes	Biochemical understanding through scientific enquiry into the nature of mechanical, physical, and biochemical functions of humans, their organs, and the cells of which they are composed. Metabolism of carbohydrate, lipid, protein, oxidative phosphorylation are studied. Through this course the students are exposed to importance of biological macromolecules. They acquire knowledge in the quantitative and qualitative estimation of biomolecules. They study the influence and role of structure in reactivity of biomolecules
4 th Semester	ZOO-SE-4014	Non-mulberry Sericulture	Gives knowledge of silk worm rearing, host plant cultivation, pests and diseases associated with silk worm, processes involved in silk production. It is an agro based cottage industry in India that enables them to get self-employment. Sericulture is a

			comprehensive subject that gives in depth knowledge of the study of silkworms both physiological as well as commercial purposes including the various processes involved in the formation of silk. Students gain knowledge about various systems study of silkworms and cocoons, other defective cocoons. Reeling and significant diseases seen in the silkworms.
4 th Semester	ZOO-SE-4024	Wildlife Photography and Ecotourism	This course develops knowledge about animals, their behaviour and the natural environment, apart from being skilled in photography and other technicalities. Learning of the use of the tools, techniques, lights and lenses. Recognising and understanding learning in tourism. Management and planning, of visitors in ecotourism areas, marketing procedures are covered.
4 th Semester	ZOO-SE-4024	Research Methodology	The course provides wide knowledge about research, experimental & sampling design, data collection, analysis & interpretation of data and allows student to present the research data in scientific method. Gains skill to solve problems using inferential statistical tools. Learns to collect literature collection, literature citation, and components of research report – Text, tables, figures, bibliography. Writing of dissertations, project proposals, project reports, research papers. Intellectual Property Rights – Biopiracy, copyrights, patent and traditional knowledge and plagiarism. Understanding of Laboratory safety measures, laboratory good practices, animal model systems, animal ethics- animal welfare guidelines for care and use of animals.
5 th Semester	ZOO-HC-5016	Molecular Biology	The course teaches the students about genes at molecular level. They learn about DNA, RNA and their replication, mutations, DNA repair mechanism. The course outcome is to train the students in understanding

			genetics and relate modern DNA technology for disease diagnostics and therapy
5 th Semester	ZOO-HC-5026	Principles of Genetics	Imparts knowledge and basic concepts on Mendelian and non Mendelian inheritance, linkage, crossing over, chromosomal mapping, mutations and sex determination.
5 th Semester	ZOO-HE-5016	Computational Biology and Biostatistics	Students gain knowledge about various tools & techniques used in biological systems and gives them insight about their use in research. Biostatistics teaches them to use the best data analysis methods in their research projects. Students gains knowledge about statistical methods like measures of central tendencies, Probability. Learns about hypothesis testing and inferential statistics. Learns the problem-solving methods
5 th Semester	ZOO-HE-5026	Animal Biotechnology	Imparts the Knowledge to culture animal cells in artificial media. Knowledge of animal cells in culture, growth of cell lines. Use in recombinant DNA technology, genetic manipulations and in a variety of industrial processes.
5 th Semester	ZOO-HE-5036	Endocrinology	This course is designed to provide a broad overview of vertebrate endocrinology. Upon completion of this course students should be capable of effectively communicating how endocrine systems function. Develop the ability to integrate across multiple endocrine systems to better understand the complexity of endocrine-related disorders.
5 th Semester	ZOO-HE-5046	Parasitology	Understanding of pathology of diseases caused by various microorganisms such as bacteria, virus, parasites and fungus
6 th Semester	ZOO-HC-6016	Developmental Biology	Gains knowledge about early embryonic development- gametogenesis, cleavage mechanisms, gastrulation, development of Chick, Frog. Late embryonic development- fate of germ layers, extra-embryonic membranes,

			placenta. Post embryonic development - role of hormones in metamorphosis and regeneration. The implications of developmental Biology.
6 th Semester	ZOO-HC-6026	Evolutionary Biology	Theories of Evolution, Knowledge of eras and evolution of species
6 th Semester	ZOO-HE-6016	Biology of Insecta	Knowledge of how they interact with their environment, other species and humans. Classification of Insects
6 th Semester	ZOO-HE-6016	Fish and Fisheries	Course provides them comprehensive understanding about aquatic ecosystem and various economical important fishes. Students gain knowledge in the areas of responses characterization and classification of Ostracoderms, placoderms, acanthodians, holocephali, elasmobranchs. Students gain knowledge of integumentary system - basic structure of skin, dermal and epidermal pigments, fins, and scales. Understanding of embryogenesis - Early development and post embryonic development. Understanding of fish habits and habitats and their functional anatomy. The students will be well equipped to become very competent in research or teaching fields. It is one of the small scale industry which can provide the student employment opportunity.
6 th Semester	ZOO-HE-6036	Reproductive Biology	In this course, students will learn the biological processes of reproduction, including the endocrinology and physiology of male and female reproduction. They will gain an understanding of the determinants of fertility and infertility, and how reproductive biotechnology is used to overcome poor fertility.
6 th Semester	ZOO-HE-6046	Wildlife Conservation and Management	Wildlife conservation explores natural landscapes, species and ecosystems and acquires theories and practical methods in preserving environments and organisms. It not only includes the conservation of endangered species but also to every organism, including microbes and fungi.

			It aims to increase awareness and understanding of how human life depends on preserving animal species and natural ecosystems. It is connected to similar disciplines like environmental science, natural resources management and animal sciences. Management actions that are used to mitigate threats to biodiversity, including selecting nature reserves, connectivity and wildlife corridors, ecosystem restoration and control of pest plants and animals.
6 th Semester	ZOO-HE-6056	Dissertation	The inclusion of dissertation will help the students make research proposals, construct tool of data collection, learn fieldwork modalities, understand the process of data analysis and writing of research report.

Course Outcome (Generic Elective Courses)			
SEMESTER	PAPER CODE	PAPER NAME	COURSE OUTCOME
1 st Semester	ZOO-HG-1016	Animal Diversity	Imparts conceptual knowledge of invertebrates and vertebrates, their adaptations and associations in relation to their environment, Classify phylum Protochordates to Mammalia, Complex Vertebrate interactions
2 nd Semester	ZOO-HG-2016	Comparative Anatomy and Developmental Biology of Vertebrates	Students gain fundamental knowledge of animal physiology – respiration, digestion, circulatory system, skeletal system and nervous system. Gains knowledge about gametogenesis, cleavage mechanisms, gastrulation and role of hormones in metamorphosis and regeneration, Development of Chick, Frog.
3 rd Semester	ZOO-RC-3016	Physiology and Biochemistry	Seeks to understand the mechanisms that work to keep the human body alive and functioning. Physiological and biochemical understanding through scientific enquiry into the nature of mechanical, physical, and biochemical functions of humans, their organs, and the cells of which

			they are composed. Interactions and interdependence of physiological and biochemical processes
4 th Semester	ZOO-RC-4016	Genetics and Evolutionary Biology	Imparts knowledge and basic concepts on Mendelian and non Mendelian inheritance, linkage, crossing over, chromosomal mapping, mutations and sex determination. Theories of Evolution, Knowledge of eras and evolution of species, macro-evolutionary principles, role of extinction in evolution are also studied.

21. Bachelor in Geology (Honours/ Regular)

PROGRAMME SPECIFIC OUTCOME

B. SC. GEOLOGY (HONOURS):

The Bachelor of Science in Geology (Honours) programme of Lumding College under Gauhati University includes graded semester system which combines detailed theoretical knowledge, practical knowledge and extensive field survey/field work. The primary goal of this undergraduate programme is to provide students' academic competencies, ethical values and professional skills that facilitate their transition from undergraduate to post graduate work or professional positions.

This programme inspires geology graduates to be life-long learners in a diverse global community and prepare them to pursue a geology career through innovative and hands-on engagement in the classroom, laboratory, and field.

Students will acquire a solid base of knowledge in the science of geology as a whole as well as earth materials, earth history, mineralogy, petrology and stratigraphy, deformational processes and structural features, and geomorphic processes and landforms.

Students will understand how geologic resources form, how they can be exploit and use and about their economic value and resource areas.

Students will develop proficiency in conveying complex geologic concepts in clear, technically correct writing; apply theoretical, conceptual, and observational knowledge to the analysis and solution of geologic data and problems.

Students will develop proficiency in complex geologic concepts and communicate clearly and articulately their geologic knowledge, findings and interpretations in oral presentation.

Students will develop the aptitudes and dispositions necessary to help democratize society by obtaining and maintaining employment as a professional geologist.

Students will be able to Interpret, analyze, discuss, and critique topics about geological problems.

They will be able to produce high quality written analyses of data, results, interpretations, and conclusions in a scientific format.

As geology is mainly a field work based subject so students are to be trained to carry out extensive field work and to do advanced geological and scientific analysis, there by imparting practical knowledge/ hands- on training in the geological field work for augmenting practical/ professional knowledge which has implication in near future. Students will greatly strengthen their observational accuracy in the field, and this skill will translate into other aspects of data description and interpretation and they will gain new field experience, perspective, competence,

and confidence as a field geologist.

Students will develop the capability to produce geologic maps and cross sections of unknown terrains working individually and/or in groups. Production of geologic maps will allow students to demonstrate the capacity for synthesizing and interpreting field data and compiling that information into a working understanding of the assigned field area.

Course learning outcome(Honours):

1st SEMESTER

Paper Code: GLG-HC-1016

Paper Name: EARTH SYSTEM SCIENCE

This course is designed to learn the basic concept of geology which includes learning about scope of geology, Origin of Earth, Earth and its relation to Universe, Learning about the major surface features of the continents and ocean basins, Earth's interior, major internal processes of the Earth, Volcanism and Earthquake. They will be able to articulate the relationship between volcanoes, earthquakes, and mountain belts and tectonic plate boundaries.

They will learn basic concept about plate tectonics which includes different types of tectonic plate boundaries, how they operate and the resulting landforms or features occurred due to plate movement and classical concept about geosynclines

Getting a clear concept about topics related to climatology and oceanography. Understand the energy budget, the latitudinal and altitudinal thermal gradients, the pressure belts and wind system, monsoon phenomena. Understand the mechanism of formation of the surface ocean currents and their movement which affects the climate system in the Earth.

Brief discussion about geological time scale and evolution of through the geologic time. They will understand the scientific basis for both relative and absolute ages in geologic time.

Learning about composition of Earth, Distribution of elements in solar system and in Earth and general concept about geochemical cycles and mass balance

Study of major geomorphic features and their relationships with outcrops through physiographic models. Detailed study of topographic sheets and preparation of physiographic description of an area

Paper Code: GLG-HC-1026

Paper Name: MINERAL SCIENCE

Minerals are geological resources of major economic importance, most of them are crystalline which explains the important role played by crystallography in their study. So, this course includes concepts about process of crystallization and crystal growth, unit cell, point group and bravais lattice, study of various crystal systems and determination of axial ratio, parameters and indices.

Students will learn about crystal intergrowth and twinning, twin law and twinning types. They will be able to learn how to do crystallographic projection of different crystal systems. They will get a basic idea about principles of X-Ray crystallography and mineral identification by X Ray diffractometry.

Physical mineralogy is concerned with the physical properties and descriptions of minerals. Minerals can be described using several physical attributes, including hardness, specific gravity, luster, colour, streak, and cleavage. In this course students will learn scope, classification and properties of mineral.

Optical mineralogy is used to identify the mineralogical composition of geological materials in

order to help reveal their origin and evolution. In the course students will learn about scope and utility of optical mineralogy, basic ideas about properties of light (polarization, dispersion, reflection and absorption).

To study properties of isotropic and anisotropic mineral and their configuration. They will get concept of Optical indicatrix, isotropic minerals, anisotropic minerals; Mineral colour and pleochroism, Interference phenomena, Interference figures.

Study and identification of different minerals is a very important part of mineralogy. In this practical class the students will get to know the physical and optical properties of minerals practically.

They will be able to classify, characterize, and identify major rock-forming minerals in hand specimen and thin section. Use identified minerals to infer conditions of associated geologic environments.

2nd Semester:

Paper Code: GLG-HC-2016

Paper Name: ELEMENTS OF GEOCHEMISTRY

This course combines elementary concept of geochemistry.

They will get to know composition of Earth reservoirs and the nuclides and radioactivity, distribution of major, minor and trace elements in different kind of rock.

Interpret abundance of elements in the interior of the earth. Composition of different Earth reservoirs and the nuclides and radioactivity. Conservation of mass, isotopic and elemental fractionation

To learn concept of radiogenic isotopes in geochronology and isotopic tracers

Use appropriate techniques for determining abundance of major, trace and rare earth elements in rocks.

To learn how to carry out geochemical data analysis and interpretation of common geochemical plots, Geochemical analysis of geological materials, Geochemical variation diagrams and its interpretations.

Paper Code: GLG-HC-2026

Paper Name: STRUCTURAL GEOLOGY

This course combines subject's structural geology and geotectonics. After successful completion of this course, a student will be able to know accurate geometric description of the structures observed in natural deformed rocks.

They will learn the classification of faults and fractures, fold and fold systems, the terminology used to describe them and the means by which they are measured and analyzed

Know the types of foliation and lineation, their origin, and their relationship to folding and fabric.

Understand the concepts of stress and strain and their measurement, normal and shear stresses, the principal stress axes, hydrostatic and deviatoric stresses, the strain ellipse and its graphical representation, pure and simple shear, and progressive deformation.

Students will learn how to read geologic maps and solve simple map problems using strike lines and cross sections for areas showing dipping strata, unconformities, faults and folds.

Learn how to use the stereographic projection to plot planar and linear data, determine angular relationships, solve rotational problems, and analyze complex structural data in areas involving

folding and faulting.

3rd Semester:

Paper Code: GLG-HC-3016

Paper Name: IGNEOUS PETROLOGY

Petrology combines concepts of igneous, sedimentary and metamorphic geology.

Igneous petrology subject is intended to emphasize on how the final appearance of characteristics of igneous rocks is controlled by chemical and physical properties of magmas and their surroundings.

Study of igneous rocks is a key component of geology curriculum (because these rocks not only abundant throughout the crust of the Earth, but, dominate some crustal and upper mantle environments) that provides understanding of melt generation and crystallization mechanisms, diverse rock types and their link to tectonic settings. In this course the students will learn mode of occurrence, texture and structure of igneous rocks and classification of igneous rocks based on mineralogical and chemical criteria.

Understand Binary and Ternary Phase diagrams in understanding crystal-melt equilibrium in basaltic and granitic magmas, Magma generation in crust and mantle, their emplacement and evolution

To learn about Magmatism in different tectonic settings and Petrogenesis of Igneous rocks

This practical course helps students to identify various types of igneous rocks in hand specimen and hence to study texture and structure of these rocks and to interpret the environment and process of formation.

Paper Code: GLG-HC-3026

Paper Name: SEDIMENTARY PETROLOGY

Sedimentary rocks are storehouse of many basic necessities of modern civilization viz. water, hydrocarbon etc. Major objective of the subject is to make students understand fundamentals, sedimentary processes and their products.

Learning process of formation of sedimentary rock, diagenesis.

To learn about sediment granulometry which includes study of texture and structure of sedimentary rocks and hence to analyze transportational history and environment of deposition.

Learning Paleocurrent analysis- Paleocurrents for different sedimentary environments

To study different types of sedimentary rocks, their process of formation, composition, use etc.

Practical exercises on sedimentary structures, Particle size distribution and statistical treatment

To study petrography of clastic and non-clastic rocks through hand specimens and thin sections

Paper Code: GLG-HC-3036

Paper Name: PALEONTOLOGY

This course intends to give the students a basic idea about palaeontology which includes mode of preservation of fossil and importance of fossil in various aspects of geological studies.

They will learn study of morphological characteristics and geological distribution and functional adaptation of various classes for eg. Foraminifera, brachiopoda, Anthozoa, Mollusca, Arthropoda, Echinodermata and Graptoloidea.

They will study evolutionary trend of Man, Proboscidea from the study of vertebrate fossils. Micropaleontology, the science of microfossils and nannofossils has become very important due to its significance in deciphering paleoclimate and its use in oceanographic studies. In this course students will study microfossil and their importance in oil exploration.

Learning application of Fossils and paleobiogeography, biogeographic provinces, dispersals and barriers Paleocology – fossils as a window to the evolution of ecosystems.

The practical course helps students to learn identification of different genera of fossils by their external morphology and stratigraphic ranges.

4th Semester:

Paper Code: GLG-HC-4016

Paper Name: METAMORPHIC PETROLOGY

Dynamic nature of lithosphere leads to solid state transformations of rocks which hold clue to the past processes which are not possible to reconstruct by other means. This subject aims to enable students to identify critical data as well as provide theoretical basis for interpreting this data for past geodynamic processes, especially the orogenic events. In this subject students will learn basics of metamorphic petrology, types of metamorphism, depth zone of metamorphism. And finally to learn about facies and facies series of metamorphism, textures and structures of metamorphic rock.

Metamorphic Petrology part combines concepts of phase diagrams and reactions, Prograde and retrograde metamorphism, Characteristic mineral assemblage and mineral reactions of mafic, basic and calcareous rock.

Also they will get a clear concept about description of Metamorphic rock associations.

Megascopic and microscopic study (textural and mineralogical) of various metamorphic rocks: Laboratory exercises in graphic plots for petrochemistry and interpretation of assemblages.

Paper Code: GLG-HC-4026

Paper Name: STRATIGRAPHIC PRINCIPLES AND INDIAN STRATIGRAPHY

The course is intended to familiarise the student with stratigraphic principles and nomenclature, major stratigraphic units, methods of stratigraphic correlation.

Students will understand basic principles of stratigraphy, different types of stratigraphic units and how they are named and different types of stratigraphic classification and nomenclature

Brief discussion about geological time scale and evolution of through the geologic time. They will understand the scientific basis for both relative and absolute ages in geologic time.

They will learn preliminary concepts of very emerging subjects of geology related to sequence stratigraphy, magneto stratigraphy and seismic stratigraphy.

This course is intended to study various depositional environments and tectonostratigraphic framework of various lithostratigraphic units of India spanning Archaean to Holocene, and mass extinction boundaries.

Know the crustal evolution during the Precambrian in peninsular India and how the biosphere responded to the Precambrian-Cambrian boundary events.

Learn about Phanerozoic Stratigraphy of India, Volcanic provinces of India and Stratigraphic boundaries.

Paper Code: GLG-HC-4036

Paper Name: HYDROGEOLOGY

Water is a basic life supporting system. The rise in global population and the quest for better living standard has greatly stressed the water resources. The course content primarily focuses on groundwater, which being easily available is amenable to greater exploitation. Thus this course aims to enable students to acquire knowledge about the physical and chemical attributes, occurrence, movement and exploration of the groundwater resources. The students will learn about occurrence of groundwater, water bearing properties of formations, aquifer types and aquifer parameters.

The course imparts knowledge about water table definition and location, and how to select sites for sinking wells, construction, design and development of water wells,

The students will get an idea about basics of remote sensing, how sensors work, about the geostationary satellites with special reference to Indian Satellites. They will learn about the application of remote sensing in geomorphological, structural and lithological mapping and natural hazard mitigation and basics of GIS and data analysis.

Preparation and interpretation of water table maps and analysis of rainfall data.

To learn Graphical representation of chemical quality data and water classification (C-S and Trilinear diagrams) Simple numerical problems related to: determination of permeability in field and laboratory, Groundwater flow, Well hydraulics etc.

5th Semester:

Paper Code: GLG-HC-5016

Paper Name: ECONOMIC GEOLOGY

In this course they will get a detailed concept about the process of formation of economic mineral deposit, mode of formation of ore deposit and classification of economic mineral deposit.

To learn about structural, physic chemical and stratigraphic control of ore localization.

Learning Exploration and exploitation techniques, Remote Sensing, Geophysical and Geochemical Explorations

Learning Metallogenic provinces and epochs, Important deposits of India including atomic minerals, Non-metallic and industrial rocks and minerals, in India.

Megascopic identification of ore minerals: Iron, copper, Manganese, Lead and Zinc, Aluminum, Chromium

Study of microscopic properties of ore forming minerals (Oxides and sulphides) and assessment of grade of ore and reserve estimation

Paper Code: GLG-HC-5026

Paper Name: GEOMORPHOLOGY

Students will get a clear concept about topics related to geomorphology which includes the role of climate and tectonics on landscape development, weathering processes, mass wasting and hill slope evolution. They will understand the basic agents and processes that impact the Earth's surface including rivers, glaciers, wind and oceans.

They will study Endogenic- Exogenic interactions, Rates of uplift and denudation, Tectonics and drainage development, Sea-level change, Long-term landscape development.

Finally, to get an overview of Indian Geomorphology, Extraterrestrial landforms.

Student will learn reading of topographic maps, Concept of scale Preparation of a topographic

profile, Preparation of longitudinal profile of a river, Calculating Stream length gradient index, Morphometry of a drainage basin

To learn preparation of geomorphic map and Interpretation of geomorphic processes from the geomorphology of the area

Paper Code: GLG-HE-5016

Paper Name: EXPLORATION GEOLOGY

In this paper the students will get to learn Resource reserve definitions, Mineral resources in industries, brief overview of classification of mineral deposits with respect to processes of formation in relation to exploration strategies. The students will learn Prospecting and Exploration techniques, methodology and stages, Sampling, subsurface sampling including pitting, trenching and drilling, Geochemical exploration. The students will get the scope to learn about Drilling and Logging techniques, planning of bore holes and location of boreholes on ground. In addition to these they will be able to study principles of reserve estimation, density and bulk density, factors affecting reliability of reserve estimation, to do reserve estimation based on geometrical models (square, rectangular, triangular and polygon blocks)

To identify anomaly, to prepare Geological cross-section and Models of reserve estimation.

Paper Code: GLG-HE-5026

Paper Name: Earth and Climate

To learn components of the climate system, climate forcing, climate controlling factors, Heat budget of Earth.

To learn atmosphere and ocean interaction and its effect on climate

To learn Global oceanic conveyor belt and its control on earth's climate

To learn response of biosphere to Earth's climate

To learn future perspectives

To learn about Orbital cyclicity and climate

To learn glacial-interglacial stages

To learn mechanism of monsoon and its variation through time

To learn factors associated with monsoonal intensity

In practical classes students able to study of distribution of major climatic regimes of India on map, to know distribution of major wind patterns on World map, to prepare of palaeogeographic maps.

6th Semester:

Core Courses

Paper Code: GLG-HC-6016

Paper Name: ENGINEERING GEOLOGY

Engineering geologists provide geological and geotechnical recommendations, analysis, and design associated with human development and various types of structures. To familiarize students about role of geologist in various engineering construction sites for eg. Tunnels, dam, highways and bridges. To learn Foundation treatment: Grouting, Rock Bolting and other support mechanisms, Intact Rock and Rock Mass properties, Rock aggregates; Significance as Construction Material. To understand Concept, Mechanism and Significance of, Rock Quality

Designation (RQD), Rock Structure Rating (RSR), Rock Mass Rating (RMR), Tunneling Quality Index (Q)'

To understand Causes, Factors and corrective/Preventive measures of Landslides and Earthquakes. In practical classes they will be able to learn Computation of reservoir area, catchment area, reservoir capacity and reservoir life, Index properties of rocks, Computation of RQD, RSR, RMR and 'Q'.

Paper Code: GLG-HC-6026

Paper Name: REMOTE SENSING AND GIS

The students will get an idea about basics of remote sensing, how sensors work, about the geostationary satellites with special reference to Indian Satellites. They will learn about the application of remote sensing in geomorphological, structural and lithological mapping and natural hazard mitigation and basics of GIS and data analysis.

They will learn Concepts of GPS, Integrating GPS data with GIS and Applications in earth system sciences

Understanding Digital Image Processing, Image Errors, Rectification and Restoration, FCC, Image Enhancement, Filtering, Image Rastering, Image classification and accuracy assessment. GIS integration and Case studies-Indian Examples.

In practical course students will learn Aerial Photo interpretation, identification of sedimentary, igneous and metamorphic rocks and various aeolian, glacial, fluvial and marine landforms

Introduction to DIP and GIS softwares. Digital Image Processing exercises including analysis of satellite data in different bands and interpretation of various objects on the basis of their spectral signatures Creating a FCC from raw data, Registration of satellite data with a toposheet of the area

Core Courses

Paper Code: GLG-HE-6016

Paper Name: FUEL GEOLOGY

To get the understanding about the mechanism of hydrocarbon generation from organic material
To learn the relationship between temperature, pressure and other physical parameters and its effect on distribution and migration of hydrocarbons.

To study oil fields of NE India.

To comprehend fundamentals of coal, definition and coal forming sedimentary environments, definition.

To understand analytical techniques in coal and its importance in coal classification and utilization for various industries,

Concept of macerals, its gross diagnostic properties under microscope and implications in climate and paleogeography.

Getting an idea about Coal Bed Methane (CBM): global and Indian scenario, Underground coal gasification and Coal liquefaction.

Paper Code: GLG-HE-6026

Paper Name: INTRODUCTION TO GEOPHYSICS

Geophysics is specifically the study of the PHYSICS of the earth. In this course students will learn Interrelationship between geology and geophysics, Role of geological and

geophysical data in explaining geodynamical features of the earth. To understand Different types of geophysical methods - gravity, magnetic, electrical and seismic; their principles and applications, Concepts and Usage of corrections in geophysical data

To study Different types of surveys, grid and route surveys, profiling and sounding techniques Scales of survey, Presentation of geophysical data

To learn Application of Geophysical method in Regional geophysics, oil and gas geophysics, ore geophysics, groundwater geophysics, engineering geophysics etc.

After the completion of three years of B.Sc. Geology(Honours) the students would gain through understanding in the fundamental concepts of geological sciences required to appear for job selections in various services as recruited by UPSC, State and Central Government organizations. Students would be able to take up higher studies and ultimately research in different sub disciplines of the subject in India and abroad.

22.B.Sc. (Geology Regular) Programme

PROGRAMME OUTCOME

The Bachelor of Science in Geology (General) programme of Lumding College under Gauhati University includes graded semester which combines basics of all subject's theoretical knowledge, practical knowledge and field survey/field work to train students in advanced geological and scientific analysis there by imparting practical knowledge/ hands- on training in the geological field work for augmenting practical/ professional knowledge which has implication in near future.

Student outcomes describe what students are expected to know and be able to do by the time of graduation. These relate to the knowledge, skills, and behaviors that students acquire as they progress through the program. The geology general programme will produce graduates who have—

An ability to apply knowledge of geology in various branches of science and ability to design and conduct experiments, as well as to analyze and interpret geological data.

An ability to formulate or design a system, process or programme to meet desired needs and function on multidisciplinary teams.

An ability to identify and solve geological problems and understanding of professional and ethical responsibility.

An ability to communicate effectively and the broad education necessary to understand the impact of geological solutions in a global economic, environmental and societal context.

This programme inspires any graduates having geology as general course to be life-long learners in a diverse global community and prepare them to pursue a geology related career through innovative and hands-on engagement in the classroom, laboratory, and field.

Course learning outcomes:

FIRST SEMESTER:

Paper Code: GLG-RC-1016

Paper Name: GENERAL GEOLOGY AND STRUCTURAL GEOLOGY

Learning about introduction to geology, Earth and its relation to Universe.

Learning about Basics of petrology and the major surface features of the continents and ocean basins and to learn geological actions and landforms introduced by rivers, wind, glaciers, sea and their associated landforms.

Accurate geometric description of the structures observed in natural deformed rocks, for eg Foliation, Lineation, Fold, Fault, Fractures and joint.

Basic description about various process of deformation—stress, strain behaviour of rocks under stress.

PRACTICAL: In practical classes students will be able to learn about the topographical maps and their interpretation and identify different geomorphic features from models. The students will also be able to study clinometer and Brunton Compass, identify different types of structures from models and prepare geological cross-section. In addition to these the students will be able to plot different structural parameters on Wul's stereographic net and determine their values.

SECOND SEMESTER:

Paper Code: GLG-RC-2016

Paper Name: CRYSTALLOGRAPHY, MINERALOGY, OPTICAL MINERALOGY

Learning about process of crystallization and crystal growth, unit cell, point group and bravais lattice.

Study of various crystal systems and determination of axial ratio, parameters and indices.

To learn scope, classification and properties of mineral.

To study physical and optical properties of different groups of mineral for eg. Garnet, olivine, pyroxene, amphibole etc. Study of mineralogy of various individual minerals.

To learn about scope and utility of optical mineralogy.

To study polarization, dispersion, reflection and absorption of light.

To study properties of isotropic and anisotropic mineral and their configuration.

To learn about properties of various minerals in thin section and distinguishing optical property of some non-opaque mineral.

PRACTICAL: In practical classes the students will be able to learn about the forms and symmetry elements of crystals belonging to different classes. They will learn to study different crystal models and hence determine twinning and learn stereographic projection and determine axial ratios. Study and identification of different minerals is a very important part of mineralogy. In this practical class the students will get to know the physical and optical properties of minerals practically.

As geology is mainly a field study oriented subject so students have to go for a minimum of ten days' field work where students are trained to take readings like strike, dip, plunge, pitch, front bearing, back bearing with the help of clinometer and brunton compass and plot on a base map. They will have to prepare a field report.

THIRD SEMESTER:

PAPER Code: GLG-RC-3016

Paper Name: PETROLOGY

In this course the students will learn mode of occurrence and texture and structure of igneous rocks. Classification of igneous rocks based on mineralogical and chemical criteria.

In sedimentary petrology the students will be able to learn about the processes of sedimentary rocks, their texture and structures.

In metamorphic petrology they will learn about types of metamorphism, depth zone of metamorphism, facies series of metamorphism, textures and structures of metamorphic rock.

PRACTICAL:

In practical classes the students will be able to identify different types of igneous rocks. Sedimentary rocks are storehouse of many basic necessities of modern civilization viz. water, hydrocarbon etc. Major objective of the course is to make students understand fundamentals, sedimentary processes and their products. Students will learn about texture and structures of sedimentary rock and metamorphic rocks in hand specimens as well as under the microscope.

FOURTH SEMESTER

Paper Code: GLG-RC-4016

Paper Name: STRATIGRAPHY AND PALAEOONTOLOGY

The course is intended to familiarise the student with stratigraphic principles and nomenclature, major stratigraphic units, methods of stratigraphic correlation etc.

To Understand basic principles of stratigraphy, different types of stratigraphic units and how they are named.

To learn about geological time scale and evolution of through the geologic time.

To learn about different types of stratigraphic classification and nomenclature.

To know the crustal evolution during the Precambrian in peninsular India and how the biosphere responded to the Precambrian-Cambrian boundary events.

To get basic idea about palaeontology, mode of preservation of fossil and importance of fossil in various aspects of geological studies.

To study of morphological characteristics and geological distribution of various classes for eg. Foraminifera, brachiopoda, Anthozoa, Mollusca, Arthropoda, Echinodermata and Graptoloidea.

To gain knowledge about plant fossils of India with special reference to Gondwana flora and their palaeogeographic significance

PRACTICAL: Students will know how to study and identify different kinds of rocks (igneous, sedimentary and metamorphic) of important geological formations of Indian stratigraphy in hand specimen and able to prepare lithostratigraphic maps of India. Students will learn identification of different genera of fossils by their external morphology and stratigraphic ranges. Interpretation and determination of stratigraphic range from the fossil assemblages from Cretaceous of Trichinopoly and Jurassic of Kutch.

FIFTH SEMESTER

Paper Code: GLG-RE-5016

Paper Name: ECONOMIC GEOLOGY AND HYDROGEOLOGY

To understand the process of formation of economic mineral deposit, mode of formation of ore deposit and classification of economic mineral deposit.

To learn about different methods of prospecting.

In this course students will study the mineralogy, mode of occurrence, origin and use of the metallic mineral deposits, non-metallic mineral deposits

To study of basic concepts of hydrogeology.

To study hydrological cycle, vertical distribution of ground water, aquifers

To study surface and sub-surface geophysical and geological methods of groundwater exploration

To study groundwater provinces of India

PRACTICAL: In practical classes the students will familiar with common ore minerals and their identifying criteria at various scales of study. They will identify and study economic mineral assemblages required for various industries.

They will prepare maps showing distribution of important metallic and non-metallic deposits of India. In practical classes the students will study hydrogeological models and estimate porosity and permeability for different situations. The students will prepare and interpret water table maps of different situations.

Sixth Semester:

Paper Code: GLG-RE-6016

Paper Name: ELEMENTS OF APPLIED GEOLOGY

To learn about process of soil formations

To learn engineering properties of rocks and soil and soil types of India

To learn about dams and geological and environmental considerations of dams and geological problems of reservoirs

To learn about tunnels and geological considerations of tunnel and seepage problems

To learn about landslides, causes and mitigations

To learn about different methods of mineral exploration

To learn about different types of mining and impacts of mining on environment

PRACTICAL: In practical classes students will be able to study different building stones in hand specimens. They will do plane table/prismatic survey. The students will study different types of landslides and dams from models. They will study soil profile. To familiarize students about role of geologist in various engineering construction sites for eg. Tunnels, dam, highways and bridges.

23. Bachelor Programme in Statistics (Regular)

Programme Outcome	1. To acquire adequate knowledge of the subject. 2. To Craft a foundation for higher learning. 3. To introduce into the basics of research. 4. To imbibe sound moral and ethical values. 5. To make conscious of environmental and societal responsibilities. 6. Attain skills for communication and career. 7. Teach to tolerate diverse ideas and different points of view. 8. To make students become empowered to face the challenges of the changing universe. 9. To produce graduates who excel in the competencies and values required for leadership to serve a rapidly evolving global community.
Programme Specific Outcome	1. Demonstrate the ability to use skills in Statistics and different practicing areas for formulating and tackling Statistics related problems and identifying and applying appropriate principles and methodologies to solve a wide range of problems associated with Statistics. 2. Acquire (i) fundamental/systematic or coherent understanding of the academic field of Statistics and its different learning areas and applications. (ii) procedural knowledge that creates different types of professionals related to subject area of Statistics, including professionals engaged in government/public service and private sectors; (iii) skills in areas related to one's specialization area within the disciplinary/subject area of Statistics and emerging developments in the field of Statistics. 3. Recognize the importance of statistical modeling and computing, and the role of approximation and mathematical approaches to analyze the real problems using various statistical tools. 4. Plan and execute Statistical experiments or investigations, analyze and interpret data/information collected using appropriate methods, including the use of appropriate statistical software including programming languages, and report accurately the findings of the experiment/investigations. 5. Demonstrate relevant generic skills and global competencies such as (i) problem-solving skills that are required to solve different types of Statistics related problems with well-defined solutions, and tackle open-ended problems that belong to the disciplinary-area boundaries; (ii) investigative skills, including skills of independent thinking of Statistics-related issues and problems; (iii) communication skills involving the ability to listen carefully, to read texts and reference material analytically and to present

	information in a concise manner to different groups/audiences of technical or popular nature; (iv) analytical skills involving paying attention to detail and ability to construct logical arguments using correct technical language related to Statistics and ability to translate them with popular language when needed; (v) ICT skills; (vi) personal skills such as the ability to work both independently and in a group. 6. Demonstrate professional behavior such as (i) being objective, unbiased and truthful in all aspects of work and avoiding unethical, irrational behavior such as fabricating, falsifying or misrepresenting data or committing plagiarism; (ii) the ability to identify the potential ethical issues in work-related situations; (iii) appreciation of intellectual property, environmental and sustainability issues; and (iv) promoting safe learning and working environment.
Course Outcomes	After completion of the course, the student will gather knowledge about the concept of random sample from a distribution, sampling distribution of a statistic, standard error of important estimates such as mean and proportions. Furthermore, the students will acquire knowledge about important inferential aspects such as point estimation, test of hypotheses and associated concepts, inferences from Binomial, Poisson and Normal distributions as illustrations. Students will gather more knowledge about the concept of non-parametric method and some important non-parametric tests. Concomitant to the above, students will acquire more information regarding basic knowledge of complete enumeration and sample, sampling frame, sampling Distribution, sampling and non-sampling errors, principal steps in sample surveys, Limitations of sampling etc. Moreover, students will be able to know how to perform sampling and to design the experimental methodologies so as to complete any research paper. This course is meant to acquaint the students with some important but useful concepts on topics in time series analysis so that the students can get an important background material for taking up an advanced course in data analysis. After going through this course, the students will have an idea of income distributions and their fitting in real life situations, commonly used measures of demography pertaining to its three basic aspects, viz. the fertility, mortality and migration. various data collection methods enabling them to have a better insight in policy making, Planning and systematic implementation.

