PANDIT DEENDAYAL UPADHYAYA ADARSHA MAHAVIDYALAYA, AMJONGA

Programme Outcome (PO), Programme Specific Outcome (PSO) and Course Outcome

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Content

PROGRAM OUTCOMES (POs)

Bachelor of Science (B.Sc.)

After completing B.Sc. the students are expected to acquire:

- The knowledge with facts and figures related to various subjects in pure sciences. Understand the underlying ideas, guiding principles, and scientific theories pertaining to a variety of scientific phenomena and how they apply to daily life.
- Become proficient in using scientific equipment and organizing and carrying out laboratory investigations. The capacity for making observations and deriving conclusions from scientific experiments.
- Capacity to critically and methodically evaluate the provided scientific evidence, and has the ability to arrive at impartial conclusions.
- Possess the capacity for original thought to suggest new ideas.
- Recognize the value of interdisciplinary approaches in generating fresh perspectives and improved solutions for sustainable development. Develop a scientific outlook on life in all its facets, not just with regard to science disciplines. A highly cultured and civilized personality is the result of ingesting ethical, moral, and social ideals in one's personal and social life.

B.Sc. in Botany (CBCS)

Department of Botany of PDUAM, Amjonga follows the syllabus of Gauhati University. This syllabus contain papers for honors and generic programmes. The honors paper on the other hand are divided into core paper, discipline specific paper and skill enhancement paper and are distributed in all the six semesters. The programmes specific outcome of department of Botany prescribed by Gauhati University are as follows:

- 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.
- Acquire depth and breadth of knowledge/expertise in the field of Plant Identification.
- Interpretation of collected information and use taxonomical information to evaluate and formulate a position of plant in taxonomy.
- Students will be able to collect data, formulate and analyze the collecting data but applying scientific methods.
- Students will be able to present scientific hypotheses and data both orally and in writing in the formats.
- Students will be able to access the primary literature, identify relevant works for a particular topic, and evaluate the scientific content of these work

- Students will be able to use physical principles (physics, chemistry) for bio- chemical analysis and also analyze data by using statistical and mathematical formulas.
- Students will be able to identify the major groups_ plants and be able to classify them within a phylogenetic framework. They 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.
- Students will be able to use the evidence of comparative biology to explain the theory of evolution for the unity and diversity of life on earth. They will be able to use specific examples to explain how modification has shaped plant morphology, physiology, and life history.
- Students will be able to explain the functions at the level of gene, genome, cell, tissue, flower development of plants. They can also be able to give specific examples of physiological adaptations, reproductions, development and mode of life cycle of different forms of plants.
- Students will be able to explain the ecological interconnections among different life forms on earth by tracing nutrient and energy flow through environment and structure of populations, communities and ecosystems.
- Students will be able to explain the experimental techniques and methods of analysis for their area of specialization within biology.

COURSE OUTCOME

Course structure

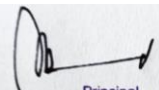**Scheme for Choice Based Credit System in B. Sc. Botany Honours**

Semester		CORE COURSE(14)		Ability Enhancement Compulsory Course(AEC)(2)	Skill Enhancement Course (SEC) (2)	Discipline Specific Elective (DSE) (4)	Generic Elective: (GE) (4)
I	Core Course I	Phycology and Microbiology		English Communication			GE-1
	Core Course II	Biomolecules and Cell Biology					
II	Core Course III	Mycology and Phytopathology		Environmental Studies			GE-2
	Core Course IV	Archegoniate					
III	Core Course V	Morphology and Anatomy of Angiosperm			SEC -1		GE-3
	Core Course VI	Economic Botany					
	Core Course VII	Genetics					
IV	Core Course VIII	Molecular Biology			SEC -2		GE-4
	Core Course IX	Plant Ecology and Phytogeography					
	Core Course X	Plant Systematics					
V	Core Course XI	Reproductive Biology of Angiosperms				DSE-1	
	Core Course XII	Plant Physiology				DSE-2	
VI	Core Course XIII	Plant Metabolism				DSE -3	
	Core Course XIV	Plant Biotechnology				DSE-4	

Course Structure for CBCS in B. Sc. Botany Hounours as per requirement of UGC

SEMESTER	COURSE OPTED	COURSE NAME	Credits
I	ENG-AE-1014	English communications	4
	BOT-HC-1016	Phycology and Microbiology	4
	BOT-HC-1016 (Practical)	Phycology and Microbiology	2
	BOT-HC-1026	Biomolecules and Cell Biology	4
	BOT-HC-1026 (Practical)	Biomolecules and Cell Biology-Practical	2
II	ENV-AE-2014	Environmental Studies	4
	BOT-HC-2016	Mycology and Phytopathology	4
	BOT-HC-2016 (Practical)	Mycology and Phytopathology-Practical	2
	BOT-HC-2026	Archegoniate	4
	BOT-HC-2026 (Practical)	Archegoniate- Practical	2
III	BOT-HC-3016	Morphology Anatomy and of Angiosperm	4
	BOT-HC-3016 (Practical)	Morphology Anatomy and of Angiosperm –Practical	2
	BOT-HC-3026	Economic Botany	4
	BOT-HC-3026 (Practical)	Economic Botany-Practical	2
	BOT-HC-3036	Genetics	4
	BOT-HC-3036 (Practical)	Genetics- Practical	2
	1. BOT-SE-3014 2. BOT-SE-3024	SEC-1 (any one) 1. Biofertilizers 2. Herbal Technology	4
IV	BOT-HC-4016	Molecular Biology	4
	BOT-HC-4016 (Practical)	Molecular Biology- Practical	2
	BOT-HC-4026	Plant Ecology and Phytogeography	4
	BOT-HC-4026 (Practical)	Plant Ecology and Phytogeography – Practical	2
	BOT-HC-4036	Plant Systematics	4
	BOT-HC-4036 (Practical)	Plant Systematics Practical	2
	1. BOT-SE-4014 2. BOT-SE-4024 3. BOT-SE-4034	SEC-II (any one) 1. Nursery and Gardening 2. Floriculture 3. Intellectual Property Rights	4
V	BOT-HC-5016	Reproductive Biology of Angiosperms	4
	BOT-HC-5016 (Practical)	Reproductive Biology of Angiosperm – Practical	2
	BOT-HC-5026	Plant Physiology	4
	BOT-HC-5026 (Practical)	Plant Physiology- Practical	2
	BOT-HE-5016	DSE-1 Natural Resource Management	4
	BOT-HE-5016 (Practical)	DSE-1 Practical Natural Resource Management – Practical	2
	BOT-HE-5026	DSE-2 Horticultural Practices and Post-Harvest Technology	4
	BOT-HE-5026 (Practical)	DSE-2 Practical Horticultural Practices and Post-Harvest Technology-Practical	2
VI	BOT-HC-6016	Plant Metabolism	4
	BOT-HC-6016 (Practical)	Plant Metabolism- Practical	2
	BOT-HC-6026	Plant Biotechnology	4
	BOT-HC-6026 (Practical)	Plant Biotechnology- Practical	2
	BOT-HE-6016	DSE-3 Industrial and Environmental Microbiology	4
	BOT-HE-6016 (Practical)	DSE-3 Industrial and Environmental Microbiology-Practical	2
	Discipline Centric Elective-4 (Theory & practical / Project Work)	Either 1 or 2 below	
	1.BOT-HE-6026	DSE-4 1.Analytical Techniques in Plant Sciences	4
	1.BOT-HE-6026 (Practical)	DSE-4 1.Analytical Techniques in Plant Sciences-Practical	2 — 6
	2.BOT-HE-6036	DSE-4 2. Project Work/ Dissertation	6
		Total Credits in B. Sc. Botany Honours: 116	

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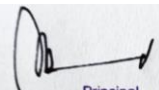IQAC, PDUAM, Amjonga
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Honors papers in Botany:

Semester	Paper title	Paper code	Course outcome
Semeseter-I	**Phycology and Microbiology**	**BOT-HC-1016**	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
	Biomolecules and Cell Biology	**BOT-HC-1026**	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
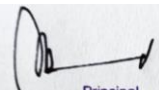
Semester	Paper title	Paper code	Course outcome
Semester-II	**Mycology and Phytopathology**	**BOT-HC-2016**	CO1. Detailed knowledge on different classes of fungi, their structure, classification, life cycle and reproduction CO2. Knowledge on diseases in plants caused by viruses, bacteria and fungi and 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)
	Archegoniate	**BOT-HC-2026**	CO1. Detailed knowledge on morphology, anatomy, classification and properties of bryophytes, pteridophytes and gymnosperms

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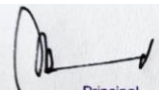
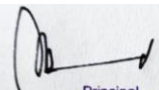|			
			CO2. Knowledge on reproduction and economic importance and ecological significance of bryophytes, pteridophytes and gymnosperms CO3. Practical knowledge on morphology and reproductive structures of archegoniates CO4. Spore morphology analysis and detailed knowledge on male and female reproductive structures in gymnosperms
Semester-III	**Morphology and Anatomy of Angiosperms**	**BOT-HC-3016**	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

Semester	Paper title	Paper code	Course outcome
Semester-III	**Economic Botany**	**BOT-HC-3026**	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
Semester-III (Skill Enhancement Courses)	**Biofertilizers**	**BOT-SE-3014**	CO1. Basic knowledge on the microbes used as biofertilizer 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 biocompost and vermicompost with application

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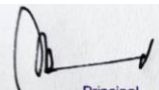Adarsha Mahavidyalaya, Amjonga

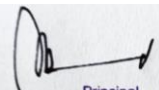| Semester	Paper title	Paper code	Course outcome
Semester-III (Skill Enhancement Courses	**Herbal Technology**	**BOT-SE-3024**	CO1. Concept on the plants used as traditional medicine, and understanding the process of cultivation, harvesting, processing, storage, marketing and utilization of medicinal plants CO2. Brief knowledge on medicinal drugs obtained from plants and comprehensive idea about systematic position, medicinal uses of Tulsi, Ginger, Fenu greek, Indian goose berry and Ashoka CO3. Concept on the phytochemistry of medicinal herbs and identification, utilization of medicinal plants CO4. Basic knowledge on quality control, owing the medicinal properties of herbal drugs including the secondary metabolites and concept of drug adulteration, types, methods of drug evaluation CO5. Understand the process of micro propagation of important medicinal plant species
Semester-IV	**Molecular Biology**	**BOT-HC-4016**	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

Semester	Paper title	Paper code	Course outcome
Semester-IV	**Plant Ecology and Phytogeography**	**BOT-HC-4026**	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
	Plant Systematics	**BOT-HC-4036**	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
Semester-IV **(Discipline specific courses)**	**Nursery and Gardening**	**BOT-SE-4014**	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
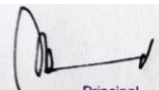
Semester	Paper title	Paper code	Course outcome
Semester-IV **(Discipline specific courses)**	**Floriculture**	**BOT-SE-4024**	CO1. Basic knowledge including history, importance and scope of floriculture CO2. Brief idea about Nursery management and garden operations and knowledge on the terms related to gardening and concept about role of plant growth regulators CO3. Covers the knowledge of various ornamental plants and concept of cultivations of plants in pots and knowledge about Bonsai CO4. Idea about various garden designs and features of such gardens and knowledge about some famous gardens of India CO5. Knowledge about the process of making garden more attractive
	Intellectual Property Rights	**BOT-SE-4034**	CO1. Knowledge on IPR, their types and infringement CO2. Understanding about traditional knowledge and their protection, bio-prospecting and bio-piracy. CO3. Knowledge on protection of plant varieties, farmer rights CO4. Knowledge on Information technology related IPR; data, database, chips and domain name protection CO5. Knowledge on novelty, bio-based patenting, and moral issues associated with biotechnological inventions

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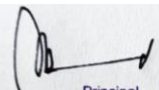Pandit Deendayal Upadhyaya
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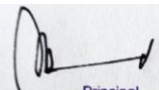| Semester	Paper title	Paper code	Course outcome
Semester-V **(Core paper)**	**Reproductive Biology of Angiosperms**	**BOT-HC-5016**	CO1. Knowledge on detailed morphological and anatomical study of reproductive structures of angiospermic plants CO2. Knowledge on embryology and embryological abnormalities in angiosperms CO3. Structural documentation of reproductive structures of angiosperms CO4. Practical knowledge on developmental biology of embryo and endosperms
	Plant Physiology	**BOT-HC-5026**	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
Semester-V **(Discipline Specific Elective)**	**Natural Resource Management**	**BOT-HE-5016**	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

Semester	Paper title	Paper code	Course outcome
Semester-V **(Discipline Specific Elective)**	**Natural Resource Management**	**BOT-HE-5016**	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
	Horticultural Practices and Post-Harvest Technology	**BOT-HE-5026**	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
Semester-VI (Core papers)	**Plant Metabolism**	**BOT-HC-6016**	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
	Plant Biotechnology	**BOT-HC-6026**	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

Semester	Paper title	Paper code	Course outcome
Semester-VI (Core paper)	**Plant Biotechnology**	**BOT-HC-6026**	CO4. Preparation of media for tissue culture techniques and photographic study of plant tissue culture CO5. Photographic study of generating transgenic plants for agriculture
Semester-VI (Discipline Specific Elective)	**Industrial and Environmental Microbiology**	**BOT-HE-6016**	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
	Analytical Techniques in Plant Sciences	**BOT-HE-6026**	CO1. Knowledge on microscopy and imaging in plant science CO2. Principles and application of centrifuge, spectroscopy and chromatography in biology CO3. Basic knowledge on biostatistics including measures of central tendency and dispersions, statistical data analysis and representations CO4. Practical knowledge on microscopy, chromatography, centrifugation and spectroscopy
	Project Work/Dissertation	**BOT-HE-6036**	CO1. Practical knowledge on addressing relevant scientific questions through experimentation

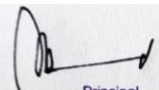# Generic Elective Courses in Botany

Semester	Paper title	Paper code	Course outcome
Semester-I	**Biodiversity (Microbes, Algae, Fungi and Archegoniate)**	**BOT-HG-1016**	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
Semester-II	**Plant Ecology and Taxonomy**	**BOT-HG-2016**	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

Semester	Paper title	Paper code	Course outcome
Semester-II	**Plant Ecology and Taxonomy**	**BOT-HG-2016**	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. Quadrate size determination for herbaceous plant studies in ecology
			CO12. Estimation of frequency distribution of herbaceous plants using quadrate method
			CO13. Practical knowledge on plant identification upto the family level that belongs to Brassicaceae, Solanaceae and Lamiaceae; Preparation of herbarium specimens
Semester-III	**Plant Physiology and Metabolism**	**BOT-HG-3016**	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

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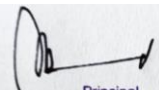Pandit Deendayal Upadhyaya
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Semester	Paper title	Paper code	Course outcome
Semester-III	**Plant Physiology and Metabolism**	**BOT-HG-3016**	CO8. Knowledge on plant hormones, and plant responses to light and temperature
			CO9. Determine osmotic potentials 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 O_2 evolution in photosynthesis
	Environmental Biotechnology	**BOT-HG-3026**	CO1. Knowledge on environment and the cause of environmental pollutions CO2. Knowledge on the methods of pollution measurement and bioremediation CO3. Knowledge on waste water treatment processes CO4. Knowledge on xenobiotics – their types and bioremediation CO5. Knowledge on application of immobilized cells/enzymes in industries CO6. Knowledge on national legislations and international treaties for environmental protection and pollution management CO7. Practical knowledge on determining basic properties of soil and water like DO, salinity, pH, total hardness, etc CO8. Practical knowledge on gravimetric analysis of effluents CO9. Practical knowledge on the assessment of microorganisms in air and water samples

Semester	Paper title	Paper code	Course outcome
Semester-IV	**Plant Anatomy and Embryology**	**BOT-HG-4016**	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
	Economic Botany and Plant Biotechnology	**BOT-HG-4026**	CO1. Understanding the concept of 'centre of origin of crop plants' and their distribution with a special emphasis on wheat
			CO2. Overall knowledge on economically important crops with their botanical characters and parts used
			CO3. Knowledge on plant tissue culture and the basic molecular techniques used in biotechnology
			CO4. Basic concept of bioinformatics and its application

B.Sc. in Chemistry (CBCS)

Programme specific outcome

Being an affiliated institution, PDUAM Amjonga must implement the program-specific curriculum created by the parent university because it is an affiliated institution. The curriculum and syllabi established by Gauhati University do not explicitly indicate the program-specific outcomes. However, we took the help of UGC document on "learning outcome-based curriculum framework in Chemistry" to conceptualize the learning outcomes of an undergraduate program in chemistry by. The following skills can be attained by a student who earns a B.Sc. (Honors) in chemistry from our college:

Core competency: Students will acquire core competency in the subject Chemistry, and in allied subject areas.

(i) Systematic and coherent understanding of the fundamental concepts in Physical chemistry, Organic Chemistry, Inorganic Chemistry, Analytical Chemistry and all other related allied chemistry subjects.

(ii) Students will be able to use the evidence based comparative chemistry approach to explain the chemical synthesis and analysis.

(iii) The students will be able to understand the characterization of materials.

(iv) Students will be able to understand the basic principle of equipment, instruments used in the chemistry laboratory.

(v) Students will be able to demonstrate the experimental techniques and methods of their area of specialization in Chemistry.
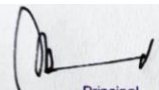
(vi) Disciplinary knowledge and skill: A graduate student is expected to be capable of demonstrating comprehensive knowledge and understanding of both theoretical and experimental/applied chemistry knowledge in various fields of interest like Analytical Chemistry, Physical Chemistry, Inorganic Chemistry, Organic Chemistry, Material Chemistry, etc. Further, the student will be capable of using of advanced instruments and related soft-wares for in-depth characterization of materials/chemical analysis and separation technology.

(vii) Skilled communicator: The course curriculum incorporates basics and advanced training in order to make a graduate student capable of expressing the subject through technical writing as well as through oral presentation.

(viii) Critical thinker and problem solver: The course curriculum also includes components that can be helpful to graduate students to develop critical thinking ability by way of solving problems/numerical using basic chemistry knowledge and concepts.

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Adarsha Mahavidyalaya, Amjonga

(ix) Sense of inquiry: It is expected that the course curriculum will develop an inquisitive characteristics among the students through appropriate questions, planning and reporting experimental investigation.

(x) Team player: The course curriculum has been designed to provide opportunity to act as team player by contributing in laboratory, field based situation and industry.
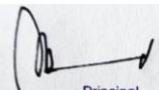
 (xi) Skilled project manager: The course curriculum has been designed in such a manner as to enabling a graduate student to become a skilled project manager by acquiring knowledge about chemistry project management, writing, planning, study of ethical standards and rules and regulations pertaining to scientific project operation.

(xii) Digitally literate: The course curriculum has been so designed to impart a good working knowledge in understanding and carrying out data analysis, use of library search tools, and use of chemical simulation software and related computational work.

(xiii) Ethical awareness/reasoning: A graduate student requires to understand and develop ethical awareness/reasoning which the course curriculum adequately provide.

(xiv) Lifelong learner: The course curriculum is designed to inculcate a habit of learning continuously through use of advanced ICT technique and other available techniques/books/journals for personal academic growth as well as for increasing employability opportunity.

Course structure:
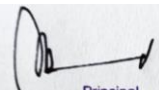
SCHEME FOR CHOICE BASED CREDIT SYSTEM IN B. Sc. Honours (Chemistry)

SEMESTER	COURSE CODE	COURSE NAME	Credits
I	ENG-AE-1014	English Communications	4
	CHE-HC-1016	Inorganic Chemistry-I Inorganic Chemistry-I Lab	4+2=6
	CHE-HC-1026	Physical Chemistry-I Physical Chemistry-I Lab	4+2=6
	AAA-HG-1YY6*	GE-1 Generic Elective -1 Practical/Tutorial	4+2/5+1=6
Total Credits in Semester I			**22**
II	Ability Enhancement Compulsory Course-II**	Environmental Studies	4
	CHE-HC-2016	Organic Chemistry-I Organic Chemistry-I Lab	4+2=6
	CHE-HC-2026	Physical Chemistry-II Physical Chemistry-II Lab	4+2=6
	AAA-HG-2YY6*	GE-2 Generic Elective -2 Practical/Tutorial	4+2/5+1=6
Total Credits in Semester II			**22**
III	CHE-HC-3016	Inorganic Chemistry-II Inorganic Chemistry-II Lab	4+2=6
	CHE-HC-3026	Organic Chemistry-II Organic Chemistry-II Lab	4+2=6
	CHE-HC-3036	Physical Chemistry-III Physical Chemistry-III Lab	4+2=6
	CHE-SE-3YY4†	SEC-1	4
	AAA-HG-3YY6*	GE-3 Generic Elective -3 Practical/Tutorial	4+2/5+1=6
Total Credits in Semester III			**28**
IV	CHE-HC-4016	Inorganic Chemistry-III Inorganic Chemistry-III Lab	4+2=6
	CHE-HC-4026	Organic Chemistry-III Organic Chemistry-III Lab	4+2=6
	CHE-HC-4036	Physical Chemistry-IV Physical Chemistry-IV Lab	4+2=6
	CHE-SE-4YY4†	SEC -2	4
	AAA-HG-4YY6*	GE-4 Generic Elective -4 Practical	4+2/5+1=6
Total Credits in Semester IV			**28**
V	CHE-HC-5016	Organic Chemistry-IV	4+2=6
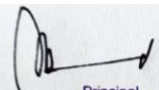
		Organic Chemistry-IV Lab	
	CHE-HC-5026	Physical Chemistry-V	4+2=6
		Physical Chemistry-V Lab	
	CHE-HE-5YY6‡	DSE-1	4+2=6
		DSE-1 Lab	
	CHE-HE-5YY6‡	DSE-2	4+2=6
		DSE-2 Lab	
	Total Credits in Semester V		**24**
VI	CHE-HC-6016	Inorganic Chemistry-IV	4+2=6
		Inorganic Chemistry-IV Lab	
	CHE-HC-6026	Organic Chemistry-V	4+2=6
		Organic Chemistry-V Lab	
	CHE-HE-6YY6‡	DSE-3	4+2=6
		DSE-3 Lab	
	CHE-HE-6YY6‡	DSE-4	4+2=6
		DSE-3 Lab/tutorial	
	Total Credits in Semester VI		**24**
	Grand Total Credits		**148**
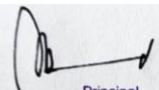
Honors papers in Chemistry:

Semester	Paper title	Paper code	Course outcome
Semester-I	**INORGANIC CHEMISTRY-I**	**CHE-HC-1016**	On successful completion, students would have clear understanding of the concepts related to atomic and molecular structure, chemical bonding, periodic properties and redox behaviour of chemical species. Students will also have hands on experience of standard solution preparation in different concentration units and learn volumetric estimation through acid-base and redox reactions.
	PHYSICAL CHEMISTRY I	**CHE-HC-1026**	In gaseous state unit the students will learn the kinetic theory of gases, ideal gas and real gases. In liquid state unit, the students are expected to learn the qualitative treatment of the structure of liquid along with the physical properties of liquid, viz, vapour pressure, surface tension and viscosity. In the molecular and crystal symmetry unit they will be introduced to the elementary idea of symmetry which will be useful to understand solid state chemistry and group theory in some higher courses. In solid state unit the students will learn the basic solid state chemistry application of x-ray crystallography for the determination of some very simple crystal structures. The students will also learn another important topic "ionic equilibria" in this course.
Semester II	**ORGANIC CHEMISTRY I**	**CHE-HC-2016**	Students will be able to identify different classes of organic compounds, describe their reactivity and explain/analyze their chemical and stereo chemical aspects.
	PHYSICAL CHEMISTRY II	**CHE-HC-2026**	In this course the students are expected to learn laws of thermodynamics, thermochemistry, thermodynamic functions, relations between thermodynamic properties, Gibbs Helmholtz equation, Maxwell relations etc. Moreover the students are expected to learn partial molar quantities, chemical equilibrium, solutions and colligative properties.

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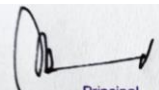Pandit Deendayal Upadhyaya
Adarsha Mahavidyalaya, Amjonga

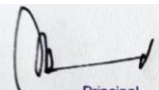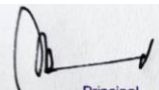| Semester	Paper title	Paper code	Course outcome
Semester-II			After completion of this course, the students will be able to understand the chemical systems from thermodynamic point of view.
Semester III	**INORGANIC CHEMISTRY-II**	**CHE-HC-3016**	On successful completion of this course, students would be able to apply theoretical principles of redox chemistry in the understanding of metallurgical processes. Students will be able to identify the variety of s and p block compounds and comprehend their preparation, structure, bonding, properties and uses. Experiments in this course will boost their quantitative estimation skills and introduce the students to preparative methods in inorganic chemistry.
	ORGANIC CHEMISTRY-II	**CHE-HC-3026**	Students will be able to describe and classify organic compounds in terms of their functional groups and reactivity.
	PHYSICAL CHEMISTRY-III	**CHE-HC-3036**	The students are expected to learn phase rule and its application in some specific systems. They will also learn rate laws of chemical transformation, experimental methods of rate law determination, steady state approximation etc. in chemical kinetics unit. After attending this course the students will be able to understand different types of surface adsorption processes and basics of catalysis including enzyme catalysis, acid base catalysis and particle size effect on catalysis.
Semester IV	**INORGANIC CHEMISTRY-III**	**CHE-HC-4016**	On successful completion, students will be able name coordination compound according to IUPAC, explain bonding in this class of compounds, understand their various properties in terms of CFSE and predict reactivity. Students will be able to appreciate the general trends in the properties of transition elements in the periodic table and identify differences among the rows.

			Through the experiments students not

Semester	Paper title	Paper code	Course outcome
Semester-III **(Skill Enhancement Courses)**	**IT SKILLS FOR CHEMISTS**	**CHE-SE-3024**	Course learning outcomes focus on skill development related to basic computer operations and information technology. After completing the course the incumbent is able to use the computer for basic purposes of preparing his personnel/business letters, viewing information on Internet (the web), sending mails, using internet banking services etc. After opting this course the students are expected to accumulate the skills in writing activities and Handling numeric data.
	BASIC ANALYTICAL CHEMISTRY	**CHE-SE-3034**	Upon completion of this course, students shall be able to explain the basic principles of chemical analysis, design/implement microscale and semi micro experiments, record, interpret and analyze data following scientific methodology.
	CHEMICAL TECHNOLOGY & SOCIETY	**CHE-SE-3044**	Students shall be familiarized with processes and terminologies in chemical industry, like mass balance, energy balance etc. Learners will be able to use chemical and scientific literacy as a means to better understand the topics related to the society.
	CHEMOINFORMATICS	**CHE-SE-3054**	On the successful completion of the course, the students should be able to explain, interpret and critically examine the utility of computers and software tools to solving chemistry related problems. Recognize, apply, compare and predict chemical structures, properties, and reactivity and; solve chemistry related problems. Employ critical thinking and scientific reasoning to design and safely implement laboratory experiments and keep the records of the same. Compile, interpret and analyze the qualitative/quantitative data and

			communicate the same in a scientific literature

Semester	Paper title	Paper code	Course outcome
Semester-III **(Skill Enhancement Courses)**	**BUSINESS SKILLS FOR CHEMISTS**	**CHE-SE-3064**	students shall be able to explain and/or analyze the important steps of business operations, finance and intellectual property as applied to chemical industry.
	INTELLECTUAL PROPERTY RIGHTS (IPR)	**CHE-SE-3074**	After completing this course, students will have in-depth understanding about the importance and types of IPR. This course will also provide the clarity on the legal and economic aspects of the IP system.
Semester IV **(Core paper)**	**INORGANIC CHEMISTRY-III**	**CHE-HC-4016**	On successful completion, students will be able name coordination compounds according to IUPAC, explain bonding in this class of compounds, understand their various properties in terms of CFSE and predict reactivity. Students will be able to appreciate the general trends in the properties of transition elements in the periodic table and identify differences among the rows. Through the experiments students not only will be able to prepare, estimate or separate metal complexes/compounds but also will be able to design experiments independently which they should be able to apply if and when required.
	ORGANIC CHEMISTRY-III	**CHE-HC-4026**	Students shall demonstrate the ability to identify and classify different types of N-based derivatives, alkaloids and hetrocyclic compounds/explain their structure mechanism and reactivity/critically examine their synthesis and reactions mechanism.
	PHYSICAL CHEMISTRY-IV	**CHE-HC-4036**	In this course the students will learn theories of conductance and electrochemistry. Students will also understand some very important topics such as solubility and solubility products, ionic products of water, conductometric titrations etc.

Semester	Paper title	Paper code	Course outcome
Semester-IV **(Skill Enhancement Courses)**			The students are also expected to understand the various parts of electrochemical cells along with Faraday's Laws of electrolysis. The students will also gain basic theoretical idea of electrical & magnetic properties of atoms and molecules.
	ANALYTICAL CLINICAL BIOCHEMISTRY	**CHE-SE-4014**	Students will be able to identify various molecules relevant to a particular pathological condition and their estimation protocols.
	GREEN METHODS IN CHEMISTRY	**CHE-SE-4024**	Students shall be able to describe and evaluate chemical products and processes from environmental perspective, define and propose sustainable solutions and critically assess the methods for waste reduction and recycling.
	PHARMACEUTICAL CHEMISTRY	**CHE-SE-4034**	Students will be able to appreciate the drug development process, identify various small molecules used for treatments different ailments and other physiological processes.
	CHEMISTRY OF COSMETICS & PERFUMES	**CHE-SE-4044**	Students will learn about the preparation and chemistry involved with the production different cosmetic. This may encourage students to take up entry level jobs at cosmetics industry or venture into commercial production of cosmetics as an entrepreneur.
	PESTICIDE CHEMISTRY	**CHE-SE-4054**	Students will be able to explain or describe and critically examine different types of pesticides, their activity/toxicity and their application and the need for the search of an alternative based on natural products.
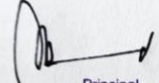
Semester	Paper title	Paper code	Course outcome
	FUEL CHEMISTRY	CHE-SE-4064	At the end of this course students will learn about the classes of renewable and non-renewable energy sources. Students will learn about the composition of coal and crude petroleum, their classification, isolation of coal and petroleum products and their usage in various industries. They will also learn to determine industrially significant physical parameters for fuels and lubricants.
Semester V	ORGANIC CHEMISTRY-IV	CHE-HC-5016	Students will be able to explain/describe the important feature of nucleic acids, amino acids and enzymes and develop their ability to examine their properties and applications.
	PHYSICAL CHEMISTRY V	CHE-HC-5026	After completion of this course the students are expected to understand the application of quantum mechanics in some simple chemical systems such as hydrogen atom or hydrogen like ions. The students will also learn chemical bonding in some simple molecular systems. They will able to understand the basics of various kinds of spectroscopic techniques and photochemistry.
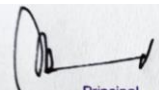
Semester	Paper title	Paper code	Course outcome
Semester V (Discipline Specific Electives)	**APPLICATIONS OF COMPUTERS IN CHEMISTRY**	**CHE-HE-5016**	After the completion of this course i will help the student to interpre laboratory data, curve fitting o experimental work, also perform quantum mechanical calculations fo various molecular models.
	ANALYTICAL METHODS IN CHEMISTRY	**CHE-HE-5026**	On successful completion students wil be have theoretical understanding abou choice of various analytical technique used for qualitative and quantitativ characterization of samples. At th same time through the experiment students will gain hands on experienc of the discussed techniques. This wil enable students to take judiciou decisions while analyzing differen samples.
	MOLECULAR MODELLING & DRUG DESIGN	**CHE-HE-5036**	Students will be able to identify basi components of computer an programming as applied to compute assisted design and modelling o molecules.
	NOVEL INORGANIC SOLIDS	**CHE-HE-5046**	After the completion of this course i will also be possible for the students t opt for studying an interdisciplinar master's programme with an emphasi on the synthesis and applications o various materials or take up a job in th materials production and/or processin industry.
	POLYMER CHEMISTRY	**CHE-HE-5056**	After completion of this course th students will learn the definition an classifications of polymers, kinetics o polymerization, molecular weight o polymers, glass transition temperature and polymer solutions etc. They als learn the brief introduction o preparation, structure and properties o some industrially important an technologically promising polymers.
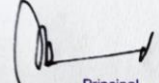
Semester	Paper title	Paper code	Course outcome
	INSTRUMENTAL METHODS OF CHEMICAL ANALYSIS	**CHE-HE-5066**	Students shall be able to explain the theoretical basis of different analytical techniques, identify the experimental requirements and compare/analyze the data/results thereof.
Semester VI	**INORGANIC CHEMISTRY-IV**	**CHE-HC-6016**	By studying this course the student will be expected to learn about how ligand substitution and redox reactions take place in coordination complexes. Students will also learn about organometallic compounds, comprehend their bonding, stability, reactivity and uses. They will be familiar with the variety of catalysts based on transition metals and their application in industry. On successful completion, students in general will be able to appreciate the use of concepts like solubility product, common ion effect, pH etc. in analysis of ions and how a clever design of reactions, it is possible to identify the components in a mixture. With the experiments related to coordination compound synthesis, calculation of 10Dq, controlling factors etc. will make the students appreciate the concepts of theory in experiments.
	ORGANIC CHEMISTRY-V	**CHE-HC-6026**	Students will be able to explain/describe basic principles of different spectroscopic techniques and their importance in chemical/organic analysis. Students shall be able to classify/identify/critically examine carbohydrates, polymers and dye materials.

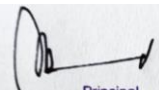| Semester	Paper title	Paper code	Course outcome
Semester VI (Discipline specific course)	**GREEN CHEMISTRY**	**CHE-HE-6016**	Apart from introducing learners to the principles of green chemistry, this course will make them conversant with applications of green chemistry to organic synthesis. Students will be prepared for taking up entry level job in the chemical industry. They also will have the option of studying further in the area.
	INDUSTRIAL CHEMICALS AND ENVIRONMENT	**CHE-HE-6026**	After successful completion of the course, students would have learnt about the manufacture, applications and safe ways of storage and handling gaseous and inorganic industrial chemicals. Students will get to know about industrial metallurgy and the energy generation industry. Students will also learn about environmental pollution by various gaseous, liquid wastes and nuclear wastes and their effects on living beings. Finally, the students will learn about industrial waste management, their safe disposal and the importance of environment friendly "green chemistry" in chemical industry.
	INORGANIC MATERIALS OF INDUSTRIAL IMPORTANCE	**CHE-HE-6036**	This course will establish the basic foundation of industrial inorganic chemistry among the students. This will be helpful for pursuing further studies of industrial chemistry in future. Experiments will help the Students to gather the experience of qualitative and quantitative chemical analysis. Students will be capable of doing analysis of the inorganic material which are used in our daily life. They will have insight of the industrial processes.
	RESEARCH METHODOLOGY FOR CHEMISTRY	**CHE-HE-6046**	After completing this course, student should be able to construct a rational research proposal to generate fruitful output in terms of publications and patents in the field of chemical sciences.
	DISSERTATION	**CHE-HE-6056**	After doing this project student will get an idea about how to design a research

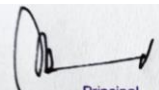| Semester	Paper title	Paper Code	Course Outcome
			methodology and to write scientific articles.
Semester I	**CHEMISTRY1: ATOMIC STRUCTURE, BONDING, GENERAL ORGANIC CHEMISTRY & ALIPHATIC HYDROCARBONS**	**CHE-RC-1016** **CHE-HG-1016**	After completion of this course the students will learn the atomic structure through the basic concepts of quantum mechanics. They will understand the chemical bonding through VB and MO approaches. In organic part, the students are expected to learn basic ideas used in organic chemistry, stereochemistry, functional groups, alkanes, alkenes, alkynes etc.
Semester II	**CHEMISTRY2: s- AND p-BLOCK ELEMENTS, TRANSITION ELEMENTS, COORDINATIONCHE MISTRY, STATES OF MATTER & CHEMICAL KINETICS**	**CHE-RC-2016** **CHE-HG-2016**	After completion of this course the students will learn periodic properties in main group elements, transition metals (3d series). They will also learn the crystal field theory in coordination chemistry unit. In physical chemistry part, the students are expected to learn kinetic theory of gases, ideal gas and real gases, surface tension, viscosity, basic solid-state chemistry and chemical kinetics.
Semester III	**CHEMISTRY 3: CHEMICAL ENERGETICS, EQUILIBRIA & FUNCTIONAL ORGANIC CHEMISTRY-I**	**CHE-RC-3016** **CHE-HG-3016**	After completion of this course the students will able to understand the chemical system from thermodynamic points of view. They will also learn two very important topics in chemistry- chemical equilibrium and ionic equilibrium. In organic chemistry part, the students are expected to learn various classes of organic molecules-alkyl halides, arylhalides, alcohols, phenols, ethers, aldehydes and ketones.

B.Sc. Generic Elective/Regular Core Courses in Chemistry

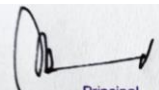| Semester	Paper Title	Paper Code	Course Outcome
Semester IV	**CHEMISTRY4 SOLUTIONS, PHASE EQUILIBRIUM, CONDUCTANCE, ELECTROCH EMISTRY & FUNCTIONAL GROUP ORGANIC CHEMISTRY**	**CHE-RC-4016** **CHE-HG-4016**	After completion of this course the students learn solutions, phase rule and its application in specific cases, basics of conductance and electrochemistry. Students will also learn some important topics of organic and ochemistry- carboxylic acids, amines, amino acids, peptides, proteins and carbohydrates.
Semester V	**ANALYTICAL METHODS IN CHEMISTRY**	**CHE-RE-5026**	On successful completion students will be have theoretical understanding about choice of various analytical techniques used for qualitative and quantitative characterization of samples. At the same time through the experiment students will gain hands on experience of the discussed techniques. This will enable students to take judicious decisions while analyzing different samples.
Semester VI	**GREEN CHEMISTRY**	**CHE-RE-6016**	Apart from introducing learners to the principles of green chemistry, this course will make them conversant with applications of green chemistry to organic synthesis. Students will be prepared for taking up entry level jobs in the chemical industry. They also will have the option of studying further in the area.

1. B.Sc. in Computer science

Program Specific outcomes

PDUAM, Amjonga, follows the syllabus of its affiliating university i.e. Gauhati University. Therefore, Department of Computer Science of this college adopts the course curriculum and gives effort to make the students aware of programme specific outcome prescribed by Gauhati University.

Course structure:

CBCS Course Structure for B.Sc. (Honours) Computer Science Program

SEMESTER WISE PLACEMENT OF THE COURSES

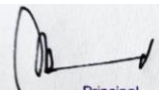| Semester	CORE COURSE (14)	Ability Enhancement Compulsory Course(AECC) (2)	Skill Enhancement Course (SEC) (2)	Elective: Discipline Specific DSE (4)	Elective: Generic(GE) (4)
I	CSC-HC-1016 Programming Fundamentals using C/C++	ENG-AE-1014			GE-1
	CSC-HC-1026 Computer System Architecture				
II	CSC-HC-2016 Programming in JAVA	ENV-AE-2014			GE-2
	CSC-HC-2026 Discrete Structures				
III	CSC-HC-3016 Data Structures		SEC -1		GE-3
	CSC-HC-3026 Operating System				
	CSC-HC-3036 Computer Networks				
IV	CSC-HC-4016 Design and Analysis of Algorithms		SEC -2		GE-4
	CSC-HC-4026 Software Engineering				
	CSC-HC-4036 Database Management System				
V	CSC-HC-5016 Internet Technologies			DSE-1	
	CSC-HC-5026 Theory of Computation			DSE -2	
VI	CSC-HC-6016 Artificial Intelligence			DSE -3	
	CSC-HC-6026 Computer Graphics			DSE -4	

Program Learning Outcomes

Completion of B.Sc. (Honours) Computer Science Program shall enable a student

i) To communicate technical information both orally and in writing

ii) Apply the knowledge gained in core courses to a broad range of advanced topics in

Computer Science, to learn and develop sophisticated technical products independently.
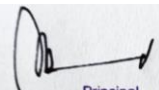
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Goalpara- 783124

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Adarsha Mahavidyalaya, Amjonga

iii) To design, implement and evaluate computer based system, process, component, or program to meet desired needs by critical understanding, analysis and synthesis.

iv)Identify applications of Computer Science in other fields in the real world to enhance the career prospects

v) Realize the requirement of lifelong learning through continued education and research.

vi) Use the concepts of best practices and standards to develop user interactive and abstract application

vii) Understand the professional, ethical, legal, security, social issues and responsibilities

General/Regular course in Computer Science

Course Structure

Details of courses under (B.Sc. with Computer Science Regular):

Course	*Credits	
	Theory + Practical	Theory + Tutorial
I. Core Course (6 Credits)		
(12 Papers)	12X4= 48	12X5=60
04 Courses from each of the 03 disciplines of choice		
Core Course Practical / Tutorial*		
(12 Practical/Tutorials*)	12X2=24	12X1=12
04 Courses from each of the 03 disciplines of choice		
II. Elective Course (6 Credits)		
(6 Papers)	6X4=24	6X5=30
Two papers from each discipline of choice including paper of interdisciplinary nature		
Elective Course Practical / Tutorial*	6 X 2=12	6X1=6
Two papers from each discipline of choice including paper of interdisciplinary nature		
Optional Dissertation or project work in place of one Discipline Specific Elective paper (6 credits) in 6th Semester		
III. Ability Enhancement Courses		
1. Ability Enhancement Compulsory Courses (AECC) (2 Papers of 4 credit each)	2 X 4=8	2 X 4=8
Environmental Science		
English Communication		
2. Skill Enhancement Courses (SEC) (4 Papers of 4 credit each)	4 X 4=16	4 X 4=16
Total credit	132	132

* wherever there is a practical there will be no tutorial and vice-versa

Program Learning Outcomes: 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.
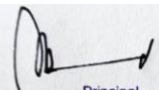
2. B.Sc. in Mathematics (CBCS)

Program Specific Outcomes

The completion of the BMATH(H) Program shall enable a student to:

i) Communicate mathematics effectively by oral, written, computational and graphic means.

ii) Create mathematical ideas from basic axioms.

iii) Gauge the hypothesis, theories, techniques and proofs provisionally.

iv)Utilize mathematics to solve theoretical and applied problems by critical understanding, analysis and synthesis.

v) Identify applications of mathematics in other disciplines and in the real world, leading to enhancement of career prospects in a plethora of fields.
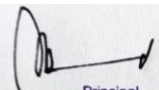
vi) Appreciate the requirement of lifelong learning through continued education and research.

CBCS Course Structure for B.Sc. (Hons.) Mathematics Program SEMESTER WISE PLACEMENT OF THE COURSES

Sem	Core Course (14)	Ability Enhancement Compulsory Course (AECC) (2)	Skill Enhancement Course (SEC) (2)	Discipline Specific Elective (DSE) (4)	Generic Elective (GE) (4) (Other than Mathematics Honours)
I	MAT-HC-1016: Calculus (including practical) MAT-HC-1026:Algebra	ENG-AE-1014			MAT-HG-1016 / MAT-RC- 1016MAT-HG- 1026
II	MAT-HC-2016: Real Analysis MAT-HC-2026: Differential Equations (including practical)	ENV-AE-2014			MAT-HG-2016 /MAT-RC-2016 MAT-HG-2026
III	MAT-HC-3016: Theory of Real Functions MAT-HC-3026: Group Theory-I MAT-HC-3036: Analytical Geometry		MAT-SE-3014 MAT-SE-3024		MAT-HG-3016 /MAT-RC- 3016MAT-HG- 3026
IV	MAT-HC-4016: Multivariate Calculus MAT-HC-4026: Numerical Methods (including practical) MAT-HC-4036: Ring Theory		MAT-SE-4014 MAT-SE-4024 MAT-SE-4034		MAT-HG-4016 / MAT-RC- 4016MAT-HG- 4026
V	MAT-HC-5016: Complex Analysis MAT-HC-5026: Linear Algebra			DSE-1 MAT-HE-5016 MAT-HE-5026 MAT-HE-5036 DSE-2 MAT-HE-5046 MAT-HE-5056 MAT-HE-5066	
VI	MAT-HC-6016: Riemann Integration and Metric spaces MAT-HC-6026: Partial Differential Equations (including practical)			DSE-3 MAT-HE-6016 MAT-HE-6026 MAT-HE-6036 MAT-HE-6046 DSE-4 MAT-HE-6056 MAT-HE-6066 MAT-HE-6076 Project In lieu of DSE-3 or DSE-4	

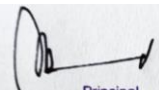Legends: HC: Core Papers HE: Discipline Specific Elective Papers SE: Skill

Honors papers in Mathematics:

Semester	Paper Title	Paper Code	Course Outcome
Semester I	**Calculus**	**MAT-HC-1016**	This course will enable the students to: i) Learn first and second derivative tests for relative extrema and apply the knowledge in problems in business, economics and life sciences. ii) Sketch curves in a plane using its mathematical properties in the different coordinate systems of reference. iii) Compute area of surfaces of revolution and the volume of solids by integrating over cross-sectional areas. iv) Understand the calculus of vector functions and its use to develop the basic principles of planetary motion.
	Algebra	**MAT-HC-1026**	This course will enable the students to: i) Employ DeMoivre's theorem in a number of applications to solve numerical problems. ii) Learn about equivalent classes and cardinality of a set. iii) Use modular arithmetic and basic properties of congruences. iv) Recognize consistent and inconsistent systems of linear equations by the row echelon form of the augmented matrix. v) Learn about the solution sets of linear systems using matrix method and Cramer's rule

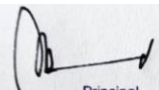| Semester	Paper Title	Paper Code	Course Outcome
Semester II	**Real Analysis**	**MAT-HC-2016**	This course will enable the students to i) Understand many properties of the real line R, including completeness and Archimedean properties. ii) Learn to define sequences in terms of functions from N to a subset of R. iii) Recognize bounded, convergent, divergent, Cauchy and monotonic sequences and to calculate their limit superior, limit inferior, and the limit of a bounded sequence. Apply the ratio, root, alternating series and limit comparison tests for convergence and absolute convergence of an infinite series of real numbers.
	Differential Equations (including practical)	**MAT-HC-2026**	The course will enable the students to i Learn basics of differential equations and mathematical modeling. ii Formulate differential equations for various mathematical models. iii Solve first order non-linear differential equations and linear differential equations of higher order using various techniques. iv Apply these techniques to solve and analyze various mathematical models. v) Learn about the solution sets of linear systems using matrix method and Cramer's rule
Semester-III	**Theory of Real Functions**	**MAT-HC-3016**	This course will enable the student to: i) Have a rigorous understanding of the concept of limit of a function. ii) Learn about continuity and uniform continuity of functions defined on intervals.

			iii) Understand geometrical properties of continuous functions on closed and bounded intervals.

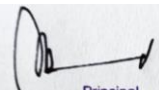| Semester	Paper Title	Paper Code	Course Outcome
Semester-III			iv) Learn extensively about the concept of differentiability using limits, leading to a better understanding for applications.
			v) Know about applications of mean value theorems and Taylor's theorem
	Group Theory-I	**MAT-HC-3026**	The course will enable the students to
			i) Recognize the mathematical object that are groups, and classify them as abelian, cyclic and permutation groups, etc.
			ii) Link the fundamental concepts of groups and symmetrical figures.
			iii) Analyze the subgroups of cyclic groups and classify subgroups of cyclic groups.
			iv) Explain the significance of the notion of cosets, normal subgroup and factor groups.
			v) Learn about Lagrange's theorem and Fermat's Little theorem.
			vi) Know about group homomorphisms and group isomorphisms.
	Analytical Geometry	**MAT-HC-3036**	This course will enable the student to:
			i) Learn conic sections and transform co-ordinate systems
			ii) Learn polar equation of a conic, tangent, normal and properties

			iii) Have a rigorous understanding of the concept of three-dimensional coordinates systems

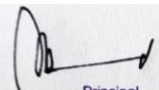| Semester	Paper Title	Paper Code	Course Outcome
Semester-III **(Skill enhancement courses EC-1)**	**Computer Algebra Systems and Related Software**	**MAT-SE-3014**	This course will enable the students to: i) Use of software Mathematica/MATLAB/Maxima/Maple, etc. as a calculator, for plotting functions and animations. ii) Use of CAS for various applications of matrices such as solving system of equations and finding eigenvalues and eigen vectors. iii) Understand the use of the statistical software R as calculator and learn to read and get data into R. iv) Learn the use of R in summary calculation, pictorial representation of data and exploring relationship between data. v) Analyze, test, and interpret technical arguments on the basis of geometry
	Combinatorics and Graph Theory	**MAT-SE-3024**	This course will enable the students to: i) Learn about the counting principles, permutations and combinations, Pigeon hole principle ii) Understand the basics of graph theory and learn about social networks, Eulerian and Hamiltonian graphs, diagram tracing puzzles and Knight's tour problem.
Semester-IV	**Multivariate Calculus**	**MAT-HC-4016**	This course will enable the students to: i) Learn the conceptual variations when advancing in calculus from one variable to multivariable discussion.

			ii) Understand the maximization and minimization of multivariable functions subject to the given constraints on variables.
			iii) Learn about inter-relationship amongst the line integral, double and triple integral formulations.
			iv) Familiarize with Green's, Stokes and Gauss divergence theorems

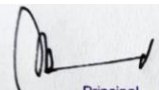| Semester	Paper Title	Paper Code	Course Outcome
Semester-IV	**Numerical Methods (including practical)**	**MAT-HC-4026**	The course will enable the students to: i) Learn some numerical methods to find the zeroes of nonlinear functions of a single variable and solution of a system of linear equations, up to a certain given level of precision. ii) Know about methods to solve system of linear equations, such as False position method, Fixed point iteration method, Newton's method, Secant method, LU decomposition. iii) Interpolation techniques to compute the values for a tabulated function at points not in the table. iv) Applications of numerical differentiation and integration to convert differential equations into difference equations for numerical solutions.
	Ring Theory	**MAT-HC-4036**	On completion of this course, the student will be able to: i) Appreciate the significance of unique factorization in rings and integral domains. ii) Learn about the fundamental concept of rings, integral domains and fields.

Semester	Paper Title	Paper Code	Course Outcome
			iii) Know about ring homomorphisms and isomorphisms theorems of rings.
			iv) learn about the polynomial rings over commutative rings, integral domains, Euclidean domains, and UFD
Semester-IV **(Skill enhancement courses EC-2)**	**R Programming**	**MAT-SE-4014**	This course will enable the students to: i) Be familiar with **R** syntax and use **R** as a calculator. ii) Understand the concepts of objects, vectors and data types.

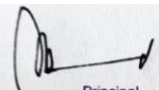| Semester	Paper Title	Paper Code	Course Outcome
Semester-IV **(Skill enhancement courses EC-2)**			iii) Know about summary commands and summary table in **R**.
			iv) Visualize distribution of data in R and learn about normality test.
			v) Plot various graphs and charts using R.
	LaTeX and HTML (practical)	**MAT-SE-4024**	After studying this course the student will be able to: i) Create and typeset a LaTeX document.
			ii) Typeset a mathematical document using LaTex.
			iii) Learn about pictures and graphics in LaTex.
			iv) Create beamer presentations.
			v) Create web page using HTML
Semester-V	**Complex Analysis (including practical)**	**MAT-HC-5016**	The completion of the course will enable the students to: i) Learn the significance of differentiability of complex functions leading to the understanding of Cauchy−Riemann equations. ii) Learn some elementary functions and valuate the contour integrals.

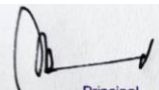|			iii) Understand the role of Cauchy−Goursat theorem and the Cauchy integral formula. iv) Expand some simple functions as their Taylor and Laurent series, classify the nature of singularities, find residues and apply Cauchy Residue theorem to evaluate integrals.

Semester	Paper Title	Paper Code	Course Outcome
Semester-V	**Linear Algebra**	**MAT-HC-5026**	The course will enable the students to: i) Learn about the concept of linear independence of vectors over a field, and the dimension of a vector space. ii) Basic concepts of linear transformations, dimension theorem, matrix representation of a linear transformation, and the change of coordinate matrix. iii) Compute the characteristic polynomial, eigenvalues, eigenvectors, and eigenspaces, as well as the geometric and the algebraic multiplicities of an eigenvalue and apply the basic diagonalization result. iv) Compute inner products and determine orthogonality on vector spaces, including Gram−Schmidt orthogonalization to obtain orthonormal basis. v) Find the adjoint, normal, unitary and orthogonal operators.
Semester-V **(Discipline specific elective papers DSE-1)**	**Number Theory**	**MAT-HE-5016**	This course will enable the students to: i) Learn about some fascinating discoveries related to the properties of prime numbers, and some of the open problems in number theory, viz., Goldbach conjecture etc. ii) Know about number theoretic functions and modular arithmetic.

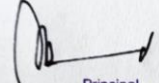| Semester	Paper Title	Paper Code	Course Outcome
			Solve linear, quadratic and system of linear congruence equations.
	Mechanics	**MAT-HE-5026**	The course will enable the students to: i) Know about the concepts in statics such as moments, couples, equilibrium in both two and three dimensions. ii) Understand the theory behind friction and center of gravity. iii) Know about conservation of mechanical energy and work-energy equations. iv) Learn about translational and rotational motion of rigid bodies.
	Probability and Statistics	**MAT-HE-5036**	This course will enable the students to: i) Learn about probability density and moment generating functions. ii) Know about various univariate distributions such as Bernoulli, Binomial, Poisson, gamma and exponential distributions. iii) Learn about distributions to study the joint behavior of two random variables.
Semester	**Paper Title**	**Paper Code**	**Course Outcome**
			iv) Measure the scale of association between two variables, and to establish a formulation helping to predict one variable in terms of the other, i.e., correlation and linear regression. v) Understand central limit theorem, which helps to understand the remarkable fact that the empirical frequencies of so many natural populations, exhibit a bell-shaped curve, i.e., a normal distribution
Semester-V **(Discipline specific elective papers DSE-2)**	**Linear Programming**	**MAT-HE-5046**	This course will enable the students to: i) Learn about the graphical solution of linear programming problem with two variables. ii) Learn about the relation between basic feasible solutions and extreme points. iii) Understand the theory of the simplex method used to solve linear programming problems. iv) Learn about two-phase and big-M methods to deal with problems involving artificial variables. v) Learn about the relationships between the primal and dual problems.

Semester	Paper Title	Paper Code	Course Outcome
			vi) Solve transportation and assignment problems. vii) Apply linear programming method to solve two-person zero-sum game problems.
	Spherical Trigonometry and Astronomy	**MAT-HE-5056**	This course will enable the students to: i) Learn about the properties of spherical and polar triangles ii) Know about fundamental formulae of spherical triangles iii) Learn about the celestial sphere, circumpolar star, rate of change of zenith distance and azimuth iv) Learn about Kepler's law of planetary motion, Cassini's hypothesis, differential equations or fraction
	Programming in C (including practical)	**MAT-HE-5066**	After completion of this paper, student will be able to: i) Understand and apply the programming concepts of C which is important to mathematical investigation and problem solving.

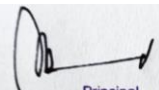| Semester	Paper Title	Paper Code	Course Outcome
			ii) Learn about structured data-types in C and learn about applications in factorization of an integer and understanding Cartesian geometry and Pythagorean triples. iii) Use of containers and templates in various applications in algebra. iv) Use mathematical libraries for computational objectives. v) Represent the outputs of programs visually in terms of well formatted text and plots. vi) In practical students learn about the roots of a quadratic equation, solution of an equation using N-R algorithm, $\sin(x)$, $\cos(x)$ with the help of functions
Semester-VI	**Riemann Integration and Metric spaces**	**MAT-HC-6016**	The course will enable the students to: i) Learn about some of the classes and properties of Riemann integrable functions, and the applications of the Fundamental theorems of integration. ii) Know about improper integrals including, beta and gamma functions.

			iii) Learn various natural and abstract formulations of distance on the sets of usual or unusual entities. Become aware one such formulations leading to metric spaces. iv) Analyse how a theory advances from a particular frame to a general frame. v) Appreciate the mathematical understanding of various geometrical concepts, viz. Balls or connected sets etc. in an abstract setting. vi) Know about Banach fixed point theorem, whose far-reaching consequences have resulted into an independent branch of study in analysis, known as fixed point theory. vii) Learn about the two important topological properties, namely connectedness and compactness of metric spaces.
	Partial Differential Equations (including practical)	**MAT-HC-6026**	The course will enable the students to: i) Formulate, classify and transform first order PDEs into canonical form. ii) Learn about method of characteristics and separation of variables to solve first order PDE's. iii) Classify and solve second order linear PDEs.

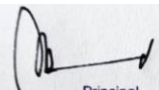| Semester	Paper Title	Paper Code	Course Outcome
			iv) Learn about Cauchy problem for second order PDE and homogeneous and non-homogeneous wave equations. v) Apply the method of separation of variables for solving many well-known second order PDEs.
Semester-VI **Discipline specific papers (DSE-3)**	**Boolean Algebra and Automata Theory**	**MAT-HE-6016**	The course will enable the students to: i) learn about the order isomorphism, Hasse diagrams, building new ordered set. ii) learn about the algebraic structure lattice, properties of modular and distributive lattices iii) get ideas about the Boolean algebra, Switching circuits and applications of switching circuits. iv) Appreciate the theory of automata and its applications
	Bio-Mathematics	**MAT-HE-6026**	Towards the end of the course the student would be able to

			i) Learn the development, analysis and interpretation of bio-mathematical models. ii) Learn about the mathematics behind different bio-mathematical models iii) Solve basic application-oriented mathematical problems in real life situation. Students also would be able to develop problem solving skills useful in future study.
	Mathematical Modelling (including practical)	**MAT-HE-6036**	The course will enable the students to: i) Know about power series solution of a differential equation and learn about Legendre's and Bessel's equations. ii) Use of Laplace transform and inverse transform for solving initial value problems. iii) Learn about various models such as Monte Carlo simulation models, queuing models, and linear programming models.
	Hydromechanics	**MAT-HE-6046**	The course will enable the students to: i) Know about Pressure equation, rotating fluids. ii) learn about Fluid pressure on plane surface, resultant pressure on curved surfaces, Gas law, mixture of gases iii) learn about the Eulerian and Lagrangian method. iv) learn about equation of continuity, examples, acceleration of a fluid at a point

Semester	Paper Title	Paper Code	Course Outcome
Semester-VI (Discipline specific papers DSE-4)	**Rigid Dynamics**	**MAT-HE-6056**	The course will enable the students to: i) Know about find the moments and products of inertia. ii) learn about the motion of the center of inertia. iii) learn about the D'Alembert's principle and Lagrange's equations. iv) learn about motion of a body in 2-dimension.
	Group Theory II	**MAT-HE-6066**	The course shall enable students to: i) Learn about automorphisms for constructing new groups from the given group. ii) Learn about the fact that external direct product applies to data security and electric circuits. iii) Understand fundamental theorem of finite abelian groups.

	Mathematical Finance	MAT-HE-6076	iv) Be familiar with group actions and conjugacy in Sn. v) Understand Sylow's theorems and their applications.
	Mathematical Finance	**MAT-HE-6076**	On completion of this course, the student will be able to: i) Know the basics of financial markets and derivatives including options and futures. ii) Learn about pricing and hedging of options, as well as interest rate swaps. iii) Learn about no-arbitrage pricing concept and types of options. iv) Learn stochastic analysis (Ito formula, Ito integration) and the Black−Scholes model. v) Understand the concepts of trading strategies and valuation of currency swaps.

Generic elective course in Mathematics:

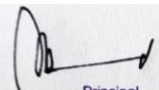| Semester	Paper Title	Paper Code	Course Outcome
Semester I	**Calculus**	**MAT-HG-1016/ MAT-RC-1016**	The students who take this course will be able to: i) Understand continuity and differentiability in terms of limits. ii) Describe asymptotic behavior in terms of limits involving infinity. iii) Use derivatives to explore the behavior of a given function, locating and classifying its extrema, and graphing the function.

Semester	Paper Title	Paper Code	Course Outcome
			iv) Understand the importance of mean value theorems.
	Analytical Geometry	**MAT-HG-1026**	This course will enable the students to: i) Transform coordinate systems, conic sections ii) Learn polar equation of a conic, tangent, normal and related properties iii) Have a rigorous understanding of the concept of three-dimensional coordinate systems iv) Understand geometrical properties of dot product, cross product of vectors
Semester II	**Algebra**	**MAT-HG-2016/ MAT-RC-2016**	This course will enable the students to: i) Learn how to solve the cubic and biquadratic equations, also learn about symmetric functions of the roots for cubic and biquadratic ii) Employ De Moivre's theorem in a number of applications to solve numerical problems. iii) Recognize consistent and inconsistent systems of linear equations by the row echelon form of the augmented matrix. Finding inverse of a matrix. iv) Recognize the mathematical objects that are groups, and classify them as abelian, cyclic and permutation groups, ring etc.

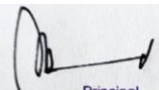| Semester	Paper Title	Paper Code	Course Outcome
Semester II	**Discrete Mathematics**	**MAT-HG-2026**	After the course, the student will be able to: i) Understand the notion of ordered sets and maps between ordered sets. ii) Learn about lattices, modular and distributive lattices, sub lattices and homomorphisms between lattices. iii) Become familiar with Boolean algebra, Boolean homomorphism, Karnaugh diagrams, switching circuits and their applications.

Semester	Paper Title	Paper Code	Course Outcome
	Differential Equations	**MAT-HG-3016/MAT-RC-3016**	The course will enable the students to: i) Learn basics of differential equations and mathematical modelling. ii) Solve first order non-linear differential equations and linear differential equations of higher order using various techniques.
Semester III	**Linear Programming**	**MAT-HG-3026**	This course will enable the students to: i) Learn about the graphical solution of linear programming problem with two variables. ii) Learn about the relation between basic feasible solutions and extreme points. iii) Understand the theory of the simplex method used to solve linear programming problems. iv) Learn about two-phase and big-M method to deal with problems involving artificial variables. v) Learn about the relationships between the primal and dual problems. vi) Solve transportation and assignment problems. vii) Apply linear programming method to solve two-person zero-sum game problems.

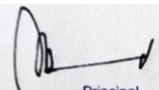| Semester	Paper Title	Paper Code	Course Outcome
Semester IV	**Real Analysis**	**MAT-HG-4016/ MAT-RC-4016**	This course will enable the students to: i) Understand many properties of the real line R, including completeness and Archimedean properties. ii) Learn to define sequences in terms of functions from R to a subset of R. iii) Recognize bounded, convergent, divergent, Cauchy and monotonic sequences and to calculate their limit superior, limit inferior, and the limit of a bounded sequence.

Coordinator
IQAC, PDUAM, Amjonga
Goalpara-783124

Principal
Pandit Deendayal Upadhyaya
Adarsha Mahavidyalaya, Amjonga

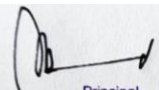|			iv) Apply the ratio, root and limit comparison tests for convergence and absolute convergence of 31 infinite series of real numbers.
	Numerical Analysis	**MAT-HG-4026**	The course will enable the students to: i) Learn some numerical methods to find the zeroes of nonlinear functions of a single variable and solution of a system of linear equations, up to a certain given level of precision. ii) Know about methods to solve system of linear equations, such as Gauss−Jacobi, Gauss−Seidel and SOR methods. iii) Interpolation techniques to compute the values for a tabulated function at points not in the table. iv) Applications of numerical differentiation and integration to convert differential equations into difference equations for numerical solutions.

3. B.Sc. in Physics (CBCS)

Progrmamme specific outcome

•Knowledge of mathematical methods for vector analysis, vector differentiation, integration of vectors, curvilinear co- ordinate system, Matrix, differential equations, Algebric operation etc.

• Ability to understood mechanics.

• Ability to understood waves & oscillation.

• Knowledge of ray optics wave optics and modern optics.

• Ability to understand the properties of matter: elasticity, surface tension & viscosity.

• Ability to understand electrostatic and magneto statics.

• Knowledge of classical, quantum and statistical mechanics.

• Knowledge of computer and ability to apply computer language.

• Know Understanding the edge of astrophysics and nuclear physics.

• Understanding the theory of relativity.

• Ability to understand thermodynamics and the laws of thermodynamics and their applications.

• Understand the Solid-state Physics, Crystal and its internal composition and external behaviour

• Understand electronics, Circuit construction and critical circuit analysis.

• Understand the basic instrumental skills and their usages through hand on mood.

• Ability to undertake project work.

Courses structure:

Course Structure for B.Sc. in Physics (Honours) under CBCS

Type→	Core	AECC	SEC	DSE	GE
Credits→	14 × 6 = 84	2 × 4 = 8	2 × 4 = 8	4 × 6 = 24	4 × 6 = 24
Semester I	PHY-HC-1016	ENG-AE-1014			AAA-HG-1016
	PHY-HC-1026				
Semester II	PHY-HC-2016	ENV-AE-2014			BBB-HG-2016
	PHY-HC-2026				
Semester III	PHY-HC-3016		PHY-SE-3XX4		CCC-HG-3016
	PHY-HC-3026				
	PHY-HC-3036				
Semester IV	PHY-HC-4016		PHY-SE-4XX4		DDD-HG-4016
	PHY-HC-4026				
	PHY-HC-4036				
Semester V	PHY-HC-5016			PHY-HE-5XX6	
	PHY-HC-5026			PHY-HE-5YY6	
Semester VI	PHY-HC-6016			PHY-HE-6XX6	
	PHY-HC-6026			PHY-HE-6YY6	

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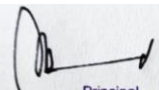
HC : Core Papers   SE : Skill Enhancement Papers

HE : Discipline Specific Elective Papers   HG : Generic Elective Papers

Honors papers in B.Sc. Physics

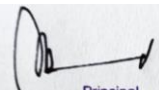| Semester	Paper Title	Paper Code	Course Outcome
Semester I	**Mathematical Physics I**	**PHY-HC-1016**	Successful students should be able to understand vector and its applications in various fields, differential equations and its applications, different coordinate systems, concept of probability and error.
	Mechanics	**PHY-HC-1026**	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.
Semester II	**Electricity & Magnetism**	**PHY-HC-2016**	After successful completion of this course students will be able to Understand electric and magnetic fields in matter, Dilectric properties of matter magnetic properties of matter, electromagnetic induction, applications of Kirchhofff's law in different circuits, applications of network theorem in circuits.
	Waves & Optics	**PHY-HC-2026**	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.
	Mathematical Physics II	**PHY-HC-3016**	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.
	Thermal Physics	**PHY-HC-3026**	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, Thermodynamic potentials, Free energies, Maxwell's relation in thermodynamics, behaviour of real gases.

Coordinator
IQAC, PDUAM, Amjonga
Goalpara-783124

Principal
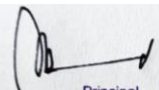Pandit Deendayal Upadhyaya
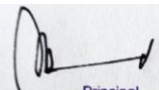Adarsha Mahavidyalaya, Amjonga

Semester	Paper Title	Paper Code	Course Outcome
Semester-III	**Digital Systems & Applications**	**PHY-HC-3036**	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.
Semester III (Skill Enhancement Papers)	**Physics Workshop Skills**	**PHY-SE-3014**	The aim of this course is to enable the students to familiar and experience with various mechanical and electrical tools through hands on mode.
	COMPUTATIONAL PHYSICS SKILLS	**PHY-SE-3024**	The aim of this course is not just to teach computer programming and numerical analysis but to emphasize its role in solving problems in Physics. Highlights the use of computational methods to solve physical problems. Use of computer language as a tool in solving physics problems (applications). Course will consist of hands on training on the Problem solving on Computers.
	Computer Assembling and Networking	**PHY-SE-3034**	After successfully completing the course, students will be able to Identify Computer Hardware Components, Network Components and Peripherals, assemble and dissemble a computer, Identify the different types of network topologies and protocols. Enumerate the layers of the OSI model and TCP/IP, Explain the function(s) of each layer, Identify the different types of network devices and their functions within a network, Understand and building the skills of subnetting and routing mechanisms., Familiarity with the basic protocols of computer networks, and how they can be used to assist in network design and implementation.
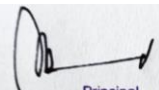
Semester	Paper Title	Paper Code	Course Outcome
Semester-(Skill Enhancement Papers)III	Digital Photography & Editing	PHY-SE-3044	On successful completion of the course students will be able to indentify camera according to formats and view finder systems, identify types of lenses and state what type of lenses to be used for different purposes, apply settings of shutter speed, control depth of field via aperture settings, apply suitable focal length, Use the light metering mechanism of the camera to take photographs.
	VIDEO EDITING FOR SOCIAL MEDIA	PHY-SE-3054	On successful completion of the course students will be able to learn to Edit impactful video content which appeals to target audience, Add or Edit Music, Soundtrack or Audio to your videos, Learn to customize your video by using Text (fonts), Learn to use transition and effects to create impactful videos.
	WEATHER FORECASTING	PHY-SE-3064	The aim of this course is not just to impart theoretical knowledge to the students but to enable them to develop an awareness and understanding regarding the causes and effect of different weather phenomenon and basic forecasting techniques.
	APPLIED OPTICS	PHY-SE-3074	Theory includes only qualitative explanation. Minimum five experiments should be performed covering minimum three sections.
	TECHNICAL DRAWING	PHY-SE-3084	After successfully completing the course students will be able to draw free hand sketches of various kinds of objects, apply different dimensioning methods on drawing of objects, different types of scales and their utilization in reading and reproducing drawings of objects and maps, Draw 2 dimensional view of different objects viewed from different angles, Generate isometric (3D) drawing from different 2D (orthographic) views/sketches, use basic commands of Auto CAD.
	PAGEMAKER	PHY-SE-3094	On successful completion of the course students will be able to Create Documents and Templates, add text into documents using various methods, and apply different formatting styles to characters and paragraphs.

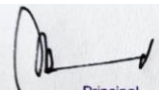| Semester	Paper Title	Paper Code	Course Outcome
			Import graphics, create objects using variou tools, add effects to objects, Create a book an export it into PDF, Multipage Layout Design.
Semester IV	**Digital Photography & Editing**	**PHY-HC-4016**	On successful completion of the cours students will able to solve complex integral using residue theorem, apply Fourier an Laplace transforms in solving differentia equations, understand properties of Tensor lik Transformation of coordinates, contravarian and co-variant tensors, indices rules fo combining tensors.
	Elements of Modern Physics	**PHY-HC-4026**	On completion of the course students will b able to understand modern development i Physics, Starting from Planck's law, i development of the idea of probability interpretation and the formulation o Schrodinger equation. Students will also ge preliminary idea of structure of nucleus radioactivity Fission and Fusion and Laser
	Analog Systems & Applications	**PHY-HC-4036**	On successful completion of the cours students will be able to understand about th physics of semiconductor p-n junction an devices such as rectifier diodes, zener diode photodiode etc. and bipolar junctio transistors, transistor biasing and stabilizatio circuits, the concept of feedback in amplifier and the oscillator circuits, students will als have an understanding of operationa amplifiers and their applications.
Semester IV **(Skill Enhancement Papers)**	**BASIC INSTRUMENT ATION SKILLS**	**PHY-SE-4014**	This course is to get exposure with variou aspects of instruments and their usage throug hands-on mode. Experiments listed below ar to be done in continuation of the topics.
	Research & Technical Writing	**PHY-SE-4024**	On successful completion of the cours students will be able to identify and writ different parts of technical reports, writ article, thesis, and presentation in latex, creat chart in Microsoft excel, use different forma of chart based on need, plot data from differen sources using Origin plot.

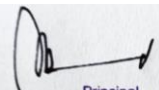| Semester	Paper Title	Paper Code	Course Outcome
Semester IV **(Skill Enhancement Papers)**	**Domestic and Industrial Electrical Wiring**	**PHY-SE-4034**	After successfully completion of the course students will be able to recognize various electrical devices and their symbols, Recognize various electrical devices placed on the panels/distribution boards and to design the panels, Read schematic and wiring diagrams of electrical devices, Read and interpret electrical installation plan, Practice and execute any type of wiring, Estimate and determine the cost of wiring installation
	Photoshop	**PHY-SE-4044**	On successful completion of the course students will be able to work with the tools in Adobe Photoshop CC, crop image in Adobe Photoshop CC, to resize an image for print and digital media in Adobe Photoshop CC, apply Photoshop filters in print and digital media, apply filters to sharpen the images, different types of brushes used for digital painting.
	MOTION GRAPHICS FOR ADVERTISING & FILMS	**PHY-SE-4054**	On successful completion of the course students will be able to create Motion Graphics Design for Ads, Commercials, Promos & Film / Show Titles, use After Effects templates to create your own customized 2D or 3D Motion Graphics, Understand Working with Layers, create Shape morphing animation and build transitions, utilize After Effects' Motion Graphics Techniques.
	Radiation Safety	**PHY-SE-4064**	The students will acquire a basic knowledge of types and sources of radiations, interactions of radiations with matter, risks involved and safety measures to be taken.
	RENEWABLE ENERGY AND ENERGY HARVESTING	**PHY-SE-4074**	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
	Introduction to CorelDraw	**PHY-SE-4084**	On successful completion of the course students will be able to work with layers and symbols in CorelDRAW, Apply fills and

| | | | outlines to illustrations in CorelDRAW, Use edit, and create artistic and paragraph text i CorelDRAW, Create boundaries to objects and copy and clone the effect of one object t another in Core lDRAW. |

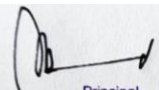| Semester	Paper Title	Paper Code	Course Outcome
Semester IV (Skill Enhancement Papers	**GRAPHIC DESIGN FOR DIGITAL ADVERTISING**	**PHY-SE-4094**	On successful completion of the cours students will be able to Understand aesthetic & visual appeal in design, Using impactfu visual content which appeals to targe audience, Conceptualize, Visualize and Creat Graphic Designs for:Digital Ads, Posters Banners and Flyers, Social Media Ads & Banners, Websites and Blogs
Semester V	**Quantum Mechanics & Applications**	**PHY-HC-5016**	On successful completion of the cours students will be able to understand th principles in quantum mechanics, such as th Schrödinger equation, the wave function, th uncertainty principle, stationary and non stationary states, time evolution of solutions as well as the relation between quantun mechanics and linear algebra. Students will b able to solve the Schrödinger equation fo hydrogen atom. Students will have th concepts of angular momentum and spin, a well as the rules for quantization and additio of these, spin-orbit coupling and Zeema Effect.
	Solid State Physics	**PHY-HC-5026**	On successful completion of the cours students should be able to explain the mai features of crystal lattices and phonons understand the elementary lattice dynamic and its influence on the properties of materials describe the main features of the physics o electrons in solids; explain the dielectri ferroelectric and magnetic properties of solid and understand the basic concept i superconductivity.
Semester V **Discipline Specific Elective Papers**	**Experimental Techniques**	**PHY-HE-5016**	Upon completion of this course, students wil be able to describe the errors in measuremen and statistical analysis of data required whil performing an experiment. Also, students wil learn the working principle, efficiency an

Semester	Paper Title	Paper Code	Course Outcome
			applications of transducers & industrial instruments like digital multimeter, RTD, Thermistor, Thermocouples and Semiconductor type temperature sensors.

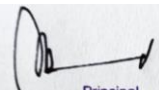| Semester	Paper Title	Paper Code	Course Outcome
Semester V **Discipline Specific Elective Papers**	**Embedded System: Introduction to microcontroller**	**PHY-HE-5026**	Upon completion of this course, students will be able to understand microprocessor and microcontroller 8051. Students will also learn about the 8051 I/O port programming, various addressing modes, Timer and counter programming, Serial port programming with and without interrupt and interfacing 8051 microcontroller to peripherals.
	Advanced Mathematical Physics I	**PHY-HE-5036**	Upon completion of this course, students will be able to solve problems in Physics related to Linear Vector space, Matrix algebra, Tensor.
	Physics of Devices and Instruments	**PHY-HE-5046**	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.
	Nuclear and Particle Physics	**PHY-HE-5056**	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 applications. The course will develop problem based skills and the acquire knowledge can be applied in the areas of nuclear, medical, archeology, geology and other interdisciplinaryfields of Physics and Chemistry.
Semester VI	**Electromagnetic Theory**	**PHY-HC-6016**	On successful completion of the course students will acquire the concepts of Maxwell's equations, propagation of

| | | | electromagnetic (EM) waves in differen homogeneous-isotropic as well as anisotropic unbounded and bounded media, production and detection of different types of polarized EM waves, general information as waveguide and fibre optics. |

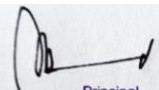| Semester	Paper Title	Paper Code	Course Outcome
Semester VI	**Statistical Mechanics**	**PHY-HC-6026**	On successful completion of the cours students will be learn the techniques o Statistical Mechanics to apply in various field including Astrophysics, Semiconductors Plasma Physics, Bio-Physics, Chemistry and in many other directions.
Semester VI Discipline Specific Elective Papers	**Communication Electronics**	**PHY-HE-6016**	Upon completion of this course, students wil have the concepts of electronics i communication, details of communication techniques based on Analog Modulation Analog and digital Pulse Modulation including PAM, PWM, PPM, ASK, PSK, FSK, overview of communication and Navigation system such as GPS and mobile telephony system.
	Digital Signal Processing	**PHY-HE-6026**	Upon completion of this course, students wil be able This paper describes the discrete-time signals and systems, Fourier Transform Representation of Aperiodic Discrete-Time Signals. This paper also highlights the concep of filters and realization of Digital Filters. A the end of the syllabus, students will develop the understanding of Discrete and fast Fourie Transform.
	Advanced Mathematical Physics II	**PHY-HE-6036**	Upon completion of this course, students wil be able to apply the concepts of Calculus o Variations, Group Theory and Probability Theory to solve numerical problems i Physics.
	Astronomy and Astrophysics	**PHY-HE-6046**	Upon completion of this course, students wil be able to understanding the origin and evolution of the Universe. The course will giv a comprehensive introduction on the measurement of basic astronomical parameter

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, th 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.

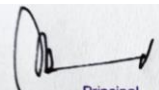| Semester	Paper Title	Paper Code	Course Outcome
Semester VI **Discipline Specific Elective Papers**	**PHYSICS-DSE: CLASSICAL DYNAMICS**	**PHY-HE-6056**	Upon completion of this course, students will have the overview of Newton's Laws of Motion, Special Theory of Relativity by 4 vectoer approach and fluids. Students will also have the understanding of the Lagrangian and Hamiltonian of a system. By the end of this course, students will be able to solve the seen or unseen problems/numerics in classical mechanics.

Generic papers in B.Sc. Physics

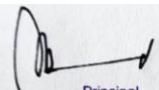| Semester	Paper Title	Paper Code	Course Outcome
Semester-I	Mechanics	**PHY-HG-1016** **PHY-RC-1016**	Upon completion of this course, students are expected to understand the role of vectors and coordinate systems in Physics, solve Ordinary Differential Equations, laws of motion and their application 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) studen

			shall embark on verifying various principles and associated measurable parameters.
	Electricity & Magnetism	**PHY-HG-2016** **PHY-RC-2016**	Upon completion of this course, students are expected to apply Gauss's law of electrostatic 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, student 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.

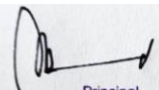| Semester	Paper Title	Paper Code	Course Outcome
Semester III	**Thermal Physics & Statistical Mechanics**	**PHY-HG-3016** **(PHY-RC-3016)**	Upon completion of this course, students are expected learn the basic concepts of thermodynamics, the first and the second law of thermodynamics, the concept of 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.
Semester IV	**Waves & Optics**	**PHY-HG-4016** **(PHY-RC-4016)**	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.

4. B. Sc. In Zoology (CBCS)

Programme specific outcome

- Broad understanding of animal diversity, including knowledge of the scientific classification; evolutionary relationships among the animals and the adaptations they show.

- Understanding of ecology and relationship between biological, chemical and physical factors of the environment; the need of wildlife conservation and management.

- Understanding of how organisms function at the level of the gene, genome, cell, tissue, organ and organ-system. Drawing upon this knowledge, they are able to study the histology and comprehend the comparative anatomy of the organisms.

- Understanding of the development, growth, reproduction, various structural and physiological adaptations as well as behaviour of different forms of animal life.

- Understanding the relationships between structure and functions at different levels of biological organization (e.g., molecules, cells, organs, organisms, populations, and species) in animals and their coordinated function (Physiological, Biochemical, Endocrine and Immune system).

- Understanding the Biological Techniques, Bioinformatics and the application of statistics in Biological science.

- Understanding of the applied biological sciences or economic Zoology such as sericulture, apiculture, aquaculture, lac culture, pest and its management for their career opportunities.

- Make able to think logically from the knowledge gathered undertaking research project, assimilate and analysis of the data and ideas and concluding in the form of project report.

Course structure:
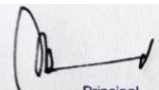
Course Structure	
Course	***Credits**
	Theory+ Practical
I. Core Course **(14 Papers)** **Core Course Practical / Tutorial*** **(14 Papers)**	14×4= 56 14×2= 28

II. Elective
 Course (8 Papers)
   A.1. Discipline Specific Elective (4Papers)
   A.2. Discipline Specific
 Elective
 Practical/Tutorial*(4Papers)
	4×4=16
	
	 4×2=8

B.1. Generic Elective/ Interdisciplinary (4 Papers) B.2. Generic Elective Practical/ Tutorial* (4 Papers)	4×4=16 4×2=8

III. Ability Enhancement Courses
   1. **Ability Enhancement**
 Compulsory (2 Papers of 2 credit
 each) Environmental Studies
 English/MIL Communication
   2. **Ability Enhancement**
 Elective(SkillBased) (Minimum2)
 (2 Papers of 2 credit each)
	2×4=8
	
	 2×4=8

Total	**148**

*Core and DSE courses without practicals will have tutorial and have credit distribution of: 5credits for theory and 1credit for tutorial, total6credits,sameasthe papers with practical
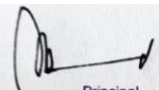
Core papers of B.Sc. in Zoology

Semester	Paper Title	Paper Code	Course Outcome
Semester I	**Non-Cordates -1: Protists to Pseudocoelomates**	**ZOO-HC-1016**	Students are able to understand about the characters and classify-cation and life cycle of various Protista, Porifera, Cnideria, Ctinophora, Platyhel-minthes and Nemathhelminthes
	Principle of Ecology	**ZOO-HC-1026**	Students are able to understand about the basic principle with special reference to population community and ecosystem. At the same time in applied ecological part student will aware with the process of wild life conservation and management
Semester II	**Non Chordates II: Coelomates**	**ZOO-HC-2016**	Students are able to understand about the characters and classification, social life and evolutionary significance Coelomates.
	Cell Biology	**ZOO-HC-2026**	Students are able to understand about the structure and function of cell and cellular organelles, process of cell division and cell communication. Students are able to understand about the preparation of various stains and fixatives, determination of protein, mucopolysaccharides and chromosome in practicals.
Semester III	**Diversity of Chordata**	**ZOO-HC-3016**	Students are able to understand about the general characteristics, classification, metamorphosis and animal distribution.
	Animal Physiology: Controlling and Coordinating Systems	**ZOO-HC-3026**	Students are able to understand the entire animal's functions of the body which includes nutrition., Respiration, heart, excretion, nerve physiology etc
	Fundamentals of Biochemistry	**ZOO-HC-3036**	Students are able to understand all the biochemical components of the body system are studied. It helps the student to get a view about the chemical compositions of different chemical compounds such as enzymes, hormones and other secretions. It also includes the pathway and chemical
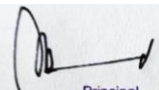
Semester	Paper Title	Paper Code	Course Outcome
			which are responsible for the energy production in our body
Semester IV	**Comparative Anatomy of Vertebrate**s	**ZOO-HC-4016**	Students are able to understand about the comparative structures of heart, aoticarches, kidney, balancing organ, hearing organ, thyroid, respiratory organs, brain of different animals which give them a definite idea not only the structure but also the structural development of that organ and how they become modified according to the need and environment.

Semester	Paper Title	Paper Code	Course Outcome
Semester IV	**Animal Physiology: Life Sustaining Systems**	**ZOO-HC-4026**	The entire animal's functions of the body are studied in this part. It includes nutrition, Respiration, heart, excretion, nerve physiology etc in which all structure, function, process and control.
	Animal Physiology: Biochemistry of Metabolic Processes	**ZOO-HC-4036**	Students are able to under-stand metabolic process including carbo-hydrates, lipid and protein and also ATP production.
Semester V	**Molecular Biology**	**ZOO-HC-5016**	Students are able to under-stand in details about the nucleic acid, DNA replication, Protein synthesis and its modification and gene regulation.
	Principles of Genetics	**ZOO-HC-5026**	Students are able to understand about the Mandelianinheritance, inter action of genes, mutation andi ts effects.
Semester VI	**Developmental Biology**	**ZOO-HC-6016**	Students are able to acquire a thorough knowledge of embryonic development along with the factors affecting it.
	Evolutionary Biology	**ZOO-HC-6026**	Students will be able to learn the process of Evolution, Lamarckism, Darwinism and Hardy Weinberg Law. They will learn the concept of Phylogenetic tree, micro evolutionary process and fossil record.

Discipline specific elective (DSE) course of B.Sc. in Zoology
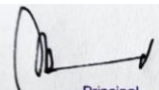
Coordinator
IQAC, PDUAM, Amjonga
Goalpara- 783124

Principal
Pandit Deendayal Upadhyaya
Adarsha Mahavidyalaya, Amjonga

Semester	Paper Title	Paper Code	Course Outcome
Semester V	**Computational Biology and biostatistics**	**ZOO-HE-5016**	Biological techniques deal with different techniques used for studying biology and biostatistical tools used for analyzing biological data.
	Animal biotechnology	**ZOO-HE-5026**	Endrocrinology teaches about hormone and the processes they control
	Endocrinology	**ZOO-HE-5036**	Different sophisticated biological techniques for modern techniques, use of computer for studying animal diversity.
	Parasitology	**ZOO-HE-5046**	Disease related parasites, their life cycle , causative organisms are studied in parasitology and hence can be explored to find means of combating it
Semester VI	**Biology of Insecta**	**ZOO-HE-6014**	Insecta includes a huge group of insects that can be used as biopesticides, for food, for medicines, for maintaining food chain etc. knowledge about them can illicit research in this field.
	Fish and fisheries	**ZOO-HE-6026**	Fish and fisheries gives knowledge about the wide scope in fish rearing, cultivation and marketing.
	Reproductive Biology	**ZOO-HE-6036**	Concepts of reproductive biology can help students to pursue their career as embryologist and in conservation prospects.
	Wildlife conservation and management	**ZOO-HE-6046**	Adequate knowledge of wildlife management will help in controlling man animal conflicts and poaching and other activities that disrupt the ecology.
	Dissertation	**ZOO-HE-6056**	This paper will enable the students to get an idea about the research methodology and scientific writing in the field of Zoology.

Skill enhancement courses of B.Sc. in Zoology

Semester	Paper Title	Paper Code	Course Outcome
Semester III	**Ornamental fish and fisheries**	**ZOO-SE-3014**	Make students familiar with the ornamental fish diversity of NE India. Detail knowledge on construction and management of Home Aquarium. Brief

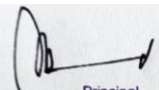| Semester	Paper Title	Paper Code	Course Outcome
Semester III	**Apiculture**	**ZOO-SE-3024**	idea on feed formulation of Ornamental fishes. Practical knowledge on Aquarium maintenance. Comprehensive knowledge planktons and their culture.
			Make students familiar with the economic benefits of Apiculture. Understand the biology of bees. To develop ideas on bee rearing. Practical knowledge on modern methods of Apiculture. Identification of bee diseases and enemies and their control methods.
Semester IV	**Non Mulberry sericulture.**	**ZOO-SE-4014**	Students will be able to gain knowledge on the life history and rearing of non-mulberry silk worms. To develop basic ideas on food of silk

Semester	Paper Title	Paper Code	Course Outcome
			worms, diseases and their control. To become acquainted with the food plants of non-mulberry silk worms. Knowledge on employment generation and potential of sericulture.
Semester IV	**Wild life photography and ecotourism**	**ZOO-SE-4024**	To develop expertise in Wildlife photography. Learn about about methods of documentation. To develop ideas of Eco tourism. Knowledge on scope of Eco tourism in NE region of India

B.Sc. Generic/Regular course in Zoology

Semester	Paper Title	Paper Code	Course Outcome
Semester I	**Animal diversity**	**ZOO-RC-1016**	The students will have a knowledge on various classes of animals ranging from Protista to Mammalia. Basis of classification of Animals. Rules for identification of animals of various classes. Specific characters of various classes of animals. Functional and physiological aspects of specific animal groups. Evolutionary relationship among successive groups of animals.
Semester II	**Comparative anatomy and**	**ZOO-RC-2016**	Successive stages of modification of specific organs and organ systems in

	developmental biology of vertebrates		groups of vertebrates i.e. Succession of organs in various groups of vertebrates. Idea about early embryonic development in frog, bird and mammals. A brief idea on implantation in mammals. Generate idea on metamorphosis. Develop idea about genetic control of development.
Semester III	**Physiology and biochemistry**	**ZOO-RC-3016**	Develop idea about the functioning of various systems of animals like nervous system, muscles, digestive, respiratory, excretory, cardiovalsular, reproductive and endorcrine system. Learn about metabolism of Carbohydrate, Lipid and Protein. Understanding the mechanism of enzyme action, enzyme kinetics and regulation. To gain a practical idea about the structures of various tissues and endocrine glands and be able to identify them.

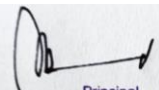| Semester	Paper Title	Paper Code	Course Outcome
Semester IV	**Genetics and evolutionary biology**	**ZOO-RC-4016**	To develop ideas about genetics and its different aspects. To develop basic ideas about the causes of evolution. To develop knowledge on genetic mechanism related to evolutionary changes. To develop the concept of species and role of extinction in evolution. To undetstand the various evidences of evolution with the help of models/ pictures and diagrams.

5. Ability Enhancement Compulsory Course

(All Undergraduate Degree Programmes under Gauhati University)

I. ENG-AE-1014 English Communication (English Language Proficiency)

Course Description

This course on English for undergraduate students aims to develop the language

skills of students who need to use English for academic and other purposes. The

sustained content in this course is based on Reading and Writing pedagogy, and

uses authentic materials to teach students. The accessible short texts used will

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help the students develop their speaking, reading, writing, vocabulary and grammar skills.
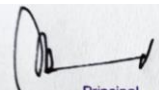
Course Outcomes

After studying / completing the course the students will be able to comprehend a text meaningfully by:

• making predictions about a text

• relating to their life experiences to the topic of the text

• identifying the key terms in a text

• guessing meaning of the text in particular contexts

• reading for overall idea of the text and for specific information

• knowing the context of the text

• comprehending a text meaningfully

II. ENV-AE -2014: Environmental Studies

- After studying this course students will get an introduction about the environment and its components.

- They will get a detailed idea about different types of ecosystems and its interaction.

- They will know about the importance of natural resources, biodiversity and their conservation.

- Students will be aware of the impact of human on environment, different acts and policies related to environment protection.

- They will be able to practically know about the importance of flora and fauna of land, wetlands etc. by visiting and studying any nearby places**.**

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