

PO-PSO-CO

## ***1. Course Outcome***

A bachelor degree in Commerce develops business knowledge, financial, literacy, communication and analytical skills. The degree provides strong foundation in Chartered Accountancy, Company Secretary and Management Accountant. A student can find employment in banks, non - banking financial institutions, insurance, accounting firms and audit services etc. Students can become a finance advisor, tax consultant and teacher. They can also prepare themselves for several competitive exams like, IAS, IPS, WBCS, UPSC, Indian Defence Service etc.

## ***2. Programme Outcome***

- P01. Enables students to get theoretical exposure to various sectors which includes Accounts, Marketing, Economics, Environment, Management etc.
- P02. Develop communication skills and confidence to face the challenges of the corporate world.
- P03. Enhances the capability of decision making at personal and professional levels.
- P04. Makes students Industry ready and develop various managerial and accounting skills for better professional opportunities.
- P05. Develops entrepreneur skills amongst learners.
- P06. Strengthens their capacities in various areas of Commerce and Industry aiming towards holistic development of learners.
- P07. Thus, after completing their graduation learners develop a thorough understanding the fundamentals in Commerce and Finance.

### ***3. Programme Specific Outcome***

- PS01. The course helps the students to acquire knowledge in the field of Accounting, Taxation, Auditing, Business Law and Business Communication.
- PS02. Develops communication skills and build confidence to face the challenges of corporate world.
- PS03. Students get opportunities to explore many career paths like investments, portfolio management, stock market, mutual funds, accounting fields etc.
- PS04. The programme aims to develop professional skills among students and build a strong foundation in accounts, finance and ethics which will benefit themselves as well as society.

# CURRICULUM FRAMEWORK: TWO-YEAR B.P.ED. PROGRAMME

## COURSE OUTCOMES

B.P. Ed.

- Bachelor of Physical Education (B. P. Ed.) two years (Four Semesters Choice Based Credit System) programme is a professional programme meant for preparing teachers of Physical Education in classes VI to X and for conducting Physical Education and sports activities in classes XI and XII.
- The course prepares the leaders in Physical Education who act as Mentors and Motivators for School children in inculcating healthy and hygienic habits.
- To prepare recreational leaders who will motivate and guide the students in adopting healthy recreational habits.
- To identify hidden sports talent in the school going children and guiding them future sports carrier.
- To make them leaders who infuses National Integration and Patriotism in Students.

### **B.P.Ed. 1. Eligibility**

Intake, Eligibility and Admission Procedure as per the NCTE norms and standards.

### **B.P.Ed. 2. Duration:**

The B.P.Ed. programme shall be of duration of two academic years, that is, four semesters. However, the students shall be permitted to complete the programme requirements within a maximum of three years from the date of admission to the programme.

### **B.P.Ed. 3. The CBCS System:**

All Programmes shall run on Choice Based Credit System (CBCS). It is an instructional package developed to suit the needs of students, to keep pace with the developments in higher education and the quality assurance expected of it in the light of liberalization and globalization in higher education.

### **B.P.Ed. 4. Course:**

The term course usually referred to, as 'papers' is a component of a programme. All courses need not carry the same weight. The courses should define learning objectives and learning outcomes. A course may be designed to comprise Lectures/ tutorials/ laboratory work/ field work/ outreach activities/ project work/

vocational training/ viva/ seminars/ term papers/ assignments/ presentations/ self-study etc. or a combination of some of these.

### **B.P.Ed. 5. Courses of Programme:**

The B.P.Ed. Programme consists of a number of courses, the term 'Course' applied to indicate a logical part of subject matter of the programme and is invariably equivalent to the subject matter of a "paper" in the conventional sense. The following are the various categories of courses suggested for the B.P.Ed. Programme.

**Theory : Core Course,  
Elective Course,**

**Practicum: Teaching,  
Practices.**

### **B.P.Ed. 6. Semesters:**

An academic year is divided into two semesters. Each semester will consist of 17-20 weeks of academic work equivalent to 100 actual teaching days. The odd semester maybe scheduled from May/June to November/December and even semester from November/December to May/June. The institution shall work for a minimum of 36 working hours in a week (five or six days a week).

### **B.P.Ed. 7. Working days:**

There shall be at least 200 working days per year exclusive of admission and examination processes etc.

### **B.P.Ed. 8. Credits:**

The term 'Credit' refers to a unit by which the programme is measured. It determines the number of hours of instructions required per week. One credit is equivalent to one hour of teaching (lecture or tutorial) or one and half/ two hours of practical work/field work per week. The term 'Credit' refers to the weight given to a course, usually in relation to the instructional hours assigned to it. The total minimum credits, required for completing a B.P.Ed. Programme is 90 credit sand for each semester 20 credits.

### **B.P.Ed. 9. Examinations:**

- i. There shall be examinations attend of each semester, for first semester in the month of November/December: for second semester in the month of May/June. A candidate who does not pass the examination in any course(s) shall be permitted to appearing such failed course(s) in the subsequent examinations to be held in November/December or May/June.
- ii. A candidate should get enrolled/ registered for the first semester examination. If enrollment/ registration is not possible owing to shortage of attendance beyond condo nation limit/rules prescribed OR belated joining OR on medical grounds, such candidates are not permitted to proceed to the next semester. Such candidates shall redo the semester in the subsequent term of that semester as a regular student; however, a students of first semester shall be admitted in the second semester, if he/she has successfully kept the term in first semester.

### **B.P.Ed. 10. Condonation:**

Student must have 75% of attendance in each course for appearing the examination. Students who have 74% to 65% of attendance shall apply for condo nation in the prescribed form with the

prescribed fee. Students who have 64% to 50 % of attendance shall apply for

**HISTORY, PRINCIPLES AND FOUNDATION OF PHYSICAL EDUCATION & OLYMPIC MOVEMENT (CORE COURSE) COURSE CODE : CC-101**

<p><b>UNIT-1: Introduction to the Concept of Physical Education</b></p> <p>1.1 Meaning, Definition, Misconceptions and Scope of Physical Education.</p> <p>1.2 Aims and Objective of Physical Education.</p> <p>1.3 Relationship of Physical Education with General Education, Need for Physical Education in Modern society.</p> <p>1.4 Physical Education as an Art and Science.</p> <p><b>UNIT-2: History of Development of Physical Education</b></p> <p>2.1 History of the development of Physical Education during pre-independence period.</p> <p>2.2 Post-Independence Period - Physical Education in India with reference to development of Physical education in West Bengal.</p> <p>2.3 Contribution of Akhras, Vyayamshalas &amp; YMCA.</p> <p>2.4 Contribution of Eminent Physical Educationists: J.B. Basedow, J.F. Gustmuth, F.L.Jahn, Franz Natchtegall, Niles Bukh, P.H.Ling. H.C.Buck, James Buchanan, P.M. Joshep, Rabindranath Tagore, Swami Vivekananda, Rishi Aurobindo.</p> <p><b>UNIT-3: Foundation &amp; Principles of Physical Education</b></p> <p><b>3.1 Philosophical foundation:</b> Idealism, Realism, Pragmatism and Naturalism in Physical Education.</p> <p><b>3.2 Biological Principles:</b> Change of locomotion from Biped to Quadruped position – Advantages and Disadvantages. - Age &amp; Gender Characteristics, Body type, Fitness and wellness movement in the contemporary perspectives.</p> <p><b>3.3 Psychological principles:</b> Psychological factors affecting sports performance, Growth and Development – meaning, difference and principles.</p> <p><b>3.4 Sociological principles:</b> Socialization through Physical Education, social integration and cohesiveness, National &amp; International integration through sports.</p> <p><b>UNIT-4: Olympic Movement</b></p> <p>4.1 The history of ancient Olympic movement.</p> <p>4.2 The significant stages in the development of the modern Olympic movement, Philosophy of Olympic movement</p> <p>4.3 Significance of Olympic Ideals, Olympic Rings, Olympic Flag, Olympic Oath.</p> <p>4.4 International Olympic Committee - Structure and Functions, National Olympic committees and their role in Olympic movement, Types of Olympic Games.</p>	<ul style="list-style-type: none"> <li>➤ Students will understand the concept of Education.</li> <li>➤ The Students will be able to know about the scope of Physical Education.</li> <li>➤ The students will be equipped with the knowledge regarding History &amp; Development of Physical Education in the India &amp; World.</li> <li>➤ Students will understand the concept of Philosophy and philosophy of physical education to acquaint student with the different Philosophies along with their implications in Physical education.</li> <li>➤ Students will understand the concept of Sociology and to acquaint student the implications of Physical education and sports in society.</li> <li>➤ Students will get acquainted with historical perspective as influence on physical education, Abroad and in India.</li> <li>➤ To understand the International Sports Movement.</li> <li>➤ Students will get acquainted with different Issues, challenges and opportunities in Physical education &amp; sports</li> </ul>
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**UNIT-1: Introduction of the Human Body**

- 1.1 Organization of the human body and Brief introduction of Anatomy Physiology in the field of Physical Education and Sports
- 1.2 Cell-structure and functions of cells
- 1.3 Tissue- Types of tissue and their functions
- 1.4 Skeletal System- Bones of the human body-axial and appendicular skeleton. Classification and functions of bone Anatomical sex difference. Brief description of Joints.

➤ The Students will be able to know about the Brief Introduction to Anatomy, Physiology and Exercise Physiology.

➤ Students will understand the basic structure and function of the human body.

**UNIT-2: System I**

- 2.1 Muscular system- Types of muscle and functions-Structure of skeletal muscle, Major muscles of shoulder, hip and knee joint
- 2.2 Digestive system: The alimentary canal /G.I. tract, Accessory glands and digestive juices – Brief outline of process of carbohydrate, fat and protein digestion
- 2.3 Energy metabolism: Brief discussion on energy metabolism, Fuel for muscular work
- 2.4 Circulatory System: Function of circulatory system. Composition and function of blood, Heart- location and structure, pulmonary circulation, Systemic circulation. Cardiac cycle, Blood pressure, Blood group, Blood coagulation. Blood and immunity.

➤ The students will be equipped with the knowledge regarding Muscular and Skeletal systems.

➤ Students will understand the normal movements of the body.

➤ To understand the Cardiovascular and Respiratory Systems.

➤ To acquire the knowledge about the Nervous and Digestive systems.

**UNIT-3: System II**

- 3.1 Respiratory system: Organs of respiration, meaning internal and external respiration. mechanism of respiration,
- 3.2 Excretory system: Structure and function of kidney, urine formation
- 3.3 Endocrine system: Location, secretion and functions of different endocrine glands
- 3.4 Nervous system: organization, central nervous system- Brain, spinal cord, autonomic nervous system. Concept of nerve-muscle physiology: Neuromuscular junction and transmission.

➤ Students will understand how body gets fuel for its working.

➤ Students will understand the effect of exercise on the different systems.

**UNIT-4: Effect of Exercise on Different System**

- 4.1 Exercise-Concept and type
- 4.2 Types of muscular contraction. Effect of exercise on muscular system
- 4.3 Effect of exercise on circulatory system- Heart rate, stroke volume, cardiac output, athletic heart
- 4.4 Effect of exercise on respiratory system- Tidal volume, respiratory rate, pulmonary ventilation, oxygen uptake, oxygen debt or EPOC (Excess Post exercise oxygen consumption.)

## Health Education and Environmental Studies COURSE CODE : CC-103

### UNIT-1: Health Education

- 1.1 Concept, Dimensions, Spectrum and Determinants of Health.
- 1.2 Definition of Health, Health Education, Aims, objectives and principles of Health Education
- 1.3 Personal Hygiene: Care of eye, ear, skin and hair.
- 1.4 School Health Program: Health service, Health instruction, Health supervision, health appraisal and Health record.

### UNIT-2: Health Problems in India- Prevention and Control

- 2.1 Communicable diseases: Malaria, Dengue, Dysentery, Cough and cold, chicken pox.
- 2.2 Non-Communicable diseases: Obesity, Diabetes, Hyper Tension, Cancer.
- 2.3 Nutritional Disorder: Mother-child Health Care, Explosive Population, Food Adulteration, First-Aid and emergency care.
- 2.4 Postural Deformities

### UNIT- 3: Environmental Studies

- 3.1 Historical Background and concept of Environmental Studies
- 3.2 Definition, scope, need and importance of Environmental Studies
- 3.3 Recycling of wastes, plastic recycling and probation of plastic bag/cover
- 3.4 Role of School in Environmental conservation and sustainable development.

### UNIT- 4: Natural Resources and Related Environmental Issues

- 4.1 Water resources, food resources and Land resources.
- 4.2 Definition, effects and control measures of air pollution, water pollution, soil pollution, Noise pollution and thermal pollution.
- 4.3 Management of environment and Govt. Policies- role of Pollution Control Board
- 4.4 Celebration of various days in relation with environment.

- Students will know about health and health education
- Students will know their health status, identify health problems and be informed for taking appropriate remedial measures.
- Students will be aware about objectives of health education & School health program
- Students will know the concept, importance & determinants of health
- Students will understand need of a comprehensive health education program and approaches to health education.
- Students will help children to know and accept individual and collective responsibility for healthy living at home, school and in the community.
- Students will be aware about healthy habits and hygiene (food, personal and group).
- Students will know correct postural habits of basic movements so as to avoid postural defects and physical deformities.
- Students will know about communicable and non-communicable diseases
- Students will understand reasons, effects & preventive ways of substance use & abuse.
- Students will know about nutrition and its importance to human body.
- Students will know about nutrition for selective diseases and illness
- Students will know about supplements and Ergogenic aids and its effects on human body
- Students will know different energy loading procedures and competition related diet



**UNIT-1: Introduction to Movement Education and Physical Literacy**

- 1.1 Definition, Meaning & Importance of Movement Education.
- 1.2 Definition, Meaning & Importance of Physical Literacy.
- 1.3 Concept of developmentally Appropriate Physical Activities.
- 1.4 Standards based Physical Education Curriculum (NASPE Standards).

**UNIT-2: Motor Skill & Movement Pattern**

- 2.1 Classification of Motor Skills: Fundamental (Locomotor, Non locomotor, Body Management Skill), Specialized (Manipulative, Rhythmic Movement, Game & Sport Skills).
- 2.2 Skill Themes Approach and Development of Skill Themes: Traveling, Chasing, fleeing, dodging, jumping, landing, transferring body weight, striking, kicking, throwing and catching.
- 2.3 Introduction to Movement Concepts, Development of Movement Concepts: Space Awareness, Effort Concepts, Relationships.
- 2.4 Long Term Athlete Development (LTAD)

**UNIT- 3: Participation in Physical Activity and Personal & Social Development**

- 3.1 Personal Development: Self-concept, Cognitive Functioning and Motivational outcomes
- 3.2 Social Development: Altruism, Controlling Aggression,
- 3.3 Cooperation, Group development.
- 3.4 United Nations and other organizations using Sport and Traditional Sports for Social Development
- 3.5 Sport for Development: Sport for Education, Economic, Gender, Health and Peace.

**UNIT- 4: Pedagogical Models for Physical Literacy & Movement Education**

- 4.1 Need for child centered teaching models.
- 4.2 Teaching Games for Understanding (TGFU) model: Invasion Games, Net/Wall Games, Striking/ Fielding Games, Target Games
- 4.3 Education through Movement (ETM) program
- 4.4 Coaching life skills through sport

- Students will understand the concept and importance of movement education and physical literacy, to acquaint students with the concept of developmentally appropriate physical activities along with the standard based physical education curriculum.
- Students will understand the classification of fundamental motor skill and to acquaint students with the implications of Physical education and sports in society.
- Students will understand the concept of participation in physical activity and personal & social development of sports. Like self-concept, cognitive functioning and motivational outcomes etc.
- Students will get acquainted with pedagogical models for physical literacy & movement education, students will understand the need for child centered teaching models.
- Students will get acquainted with education through movement programs and coaching life skills through sports.

**UNIT – 1: Introduction of Officiating and Coaching**

- 1.1 Concept of Officiating and Coaching
- 1.2 Importance and principles of Officiating
- 1.3 Relation of official and coach with management, players and spectators
- 1.4 Measures of improving the standards of Officiating and Coaching

**UNIT – 2: Coach as a Mentor**

- 2.1 Duties of coach in general, pre, during and post-game.
- 2.2 Philosophy of coaching.
- 2.3 Responsibilities of a coach on and off the field
- 2.4 Psychology of competition and coaching

**UNIT – 3: Duties of Official**

- 3.1 Duties of official in general, pre, during and post-game.
- 3.2 Philosophy of Officiating
- 3.3 Mechanics of officiating – Position, singles and movement etc.
- 3.4 Ethics of officiating

**UNIT – 4: Qualities and Qualification of Coach and Official**

- 4.1 Qualities and Qualification of coach and official
- 4.2 General rules of game and sports
- 4.3 Eligibility rules of inter-collegiate and inter-university tournaments, preparation of TA, DA bills  
Integrity and values of sports

- Students will know the concept of officiating and coaching.
- Students will know their importance.
- Students will be aware about the relation of officials and coaches with management, players and spectators.
- Students will understand the measures of improving the standards of officiating and coaching.
- Students will be aware of the coach as a mentor, like duties of coach, philosophy of coaching, responsibilities of coach off and on field and psychological factor of coaching in competition.
- Students will know the duties of official pre game, postgame and during the game.
- Students will know about the philosophy of officiating, mechanics of officiating and ethics of officiating.
- Students will understand the qualities and qualifications of coach and official.
- Students will know about general rules of game and sports.
- Students will know about the eligibility rules of inter-collegiate and inter-university tournaments, and preparation of TA, DA bills.
- Students will know about the integrity and values of sports.

**UNIT -1: Introduction of Yoga**

- 1.1 Meaning and Definition of Yoga
- 1.2 Aim and Objectives of Yoga
- 1.3 History and Philosophical aspects of Yoga
- 1.4 Need and Importance of Yoga in Physical Education and Sports

**UNIT -2: Methods of Yoga**

- 2.1 Karma Yoga, Jnana Yoga, Bhakti Yoga and Raja Yoga
- 2.2 Steps of Hatha Yoga, Astanga Yoga and Yogic Teaching Method
- 2.3 Effect of asana and pranayama on human body and mind
- 2.4 Yoga as therapy

**UNIT -3: Introduction to Inclusive Education**

- 3.1 Concept and history of special education, integrated education and inclusive education and their relationship
- 3.2 Philosophical, Sociological, Economical and Humanitarian dimensions of inclusive education.
- 3.3 Advantages of inclusive education for the individual and society
- 3.4 Factors affecting inclusion

**UNIT -4: Inclusion in Operation & Teacher preparation for inclusive school**

- 4.1 Class room management and organizations, curricular adaptations, learning designing and development of suitable Teaching Learning Method
- 4.2 Pedagogical strategies to respond to individual needs of students: Cooperative learning strategies in the class room, peer tutoring, social learning, buddy system, reflective teaching, multisensory teaching etc.
- 4.3 Problems in inclusion in the real class room situations; ways for overcoming the problems.
- 4.4 Teacher preparation for inclusive education. Skills and competencies of teachers

- Students will acquire knowledge of classical and theoretical foundations of the field of Yoga
- Students will acquire knowledge of biomedical systems from an integrative and holistic perspective
- Students will acquire knowledge and ability to use professional conduct during the practice of Yoga Therapy
- Students will develop an ability to use relationship-based approaches to catalyze positive change or transformation with students
- Students will develop an ability to apply knowledge learned in this curriculum to assess the needs of students, and to evaluate their performance
- Students will acquire knowledge of models of human development, with the influence of familial, social, religious and cultural conditioning on health and healing
- Students will acquire knowledge of the interconnections between the body, the breath, the mind, and the emotions in the context of maintaining resilience and well-being
- Students will communicate effectively, implement effective teaching methods by adapting to unique styles of learning, providing supportive and effective feedback while evaluating and acknowledging the progress of the student
- Students will teach or deliver the appropriate practices for individuals and/or groups, using multimodal strategies of education such as auditory, visual, and kinesthetic learning tools, and tools that foster student engagement
- Students will develop a knowledge of generally accepted ethical principles of health care and yoga codes of conduct

## EDUCATIONAL TECHNOLOGY AND METHODS OF TEACHING IN PHYSICAL EDUCATION

COURSE CODE : CC-202

### UNIT – 1: Introduction

- 1.1 Education and education technology- meaning and definitions
- 1.2 Types of education – Formal, Informal and non-formal education
- 1.3 Educative Processes
- 1.4 Importance of device and methods of teaching and class management

### UNIT – 2: Teaching Technique

- 2.1 Teaching Techniques – Lecture Method, Command Method, Demonstration Method, Imitation Method, Project Method etc. ; Teaching procedure – Whole method, Whole – part- whole method, Part- whole method
- 2.2 Presentation technique – personal and technical preparation and presentation
- 2.3 Verbal Non-verbal communication technique
- 2.4 Details of three fundamental methods – meaning, types and its uses in different situation

### UNIT – 3: Teaching Aids and Competition

- 3.1 Teaching Aids – meaning importance and its criteria for selecting teaching aids. Community Aids, Co-curricular Aids
- 3.2 Type of Teaching Aids – Audio aids, Visual Aids, Audio-visual Aids
- 3.3 Meaning, Principles and advantages of team teaching
- 3.4 Group Competition, Intramural and extramural Competition

### UNIT – 4: Learning Designing and Teaching Innovations

- 4.1 Meaning, Types and Principle of Learning designing
- 4.2 General and Specific Learning designing. Simulation Teaching – meaning, types and steps of Simulation Teaching
- 4.3 Meaning, Types and Steps of Micro and Macro Teaching.
- 4.4 Classification of students

- Students will maintain and manage a variety of digital tools and resources for use in a technology-rich learning environment.
- Students will design, develop, and implement technology-rich learning programs that model principles of learning and promote digital age best practices in teaching, learning and assessment.
- Students will demonstrate field experience in a working environment where educational technology services and programs are used or developed
- To understand the place of Physical Education in school curriculum.
- To acquaint the learner with different methods of teaching physical activities.
- To acquaint the students with planning objectives of different types of lessons.
- To acquaint the learner with organizing and conducting various types of tournaments and athletic meet.
- To acquaint the learner with the constructions and marking of track and field events

**UNIT - 1: Introduction to Organization and Administration**

- 1.1 Meaning Definition, and Importance of organization and Administration in Physical Education
- 1.2 Meaning, Definition and Importance of Planning
- 1.3 Basic principles of Planning
- 1.4 Functions of organization and Administration

➤ The student understands how people behave in organisation and the nature of influence and leadership. And how working together towards the accomplishment of the organization goal.

**UNIT – 2: Office and Time-Table Management**

- 2.1 Meaning Definition, and Functions of Office Management
- 2.2 Kinds of office Management
- 2.3 Maintenance of different types of Register
- 2.4 Time-Table Management: Meaning, need and Importance

➤ Students understand and form ideas on how to increase office efficiency, smooth work, maintain public relations, manage change and accept new challenges which help in achieving the goal of the organisation.

➤ The student form of ideas on how to make a well constructed time table.

**UNIT – 3: Management of Sports Facility**

- 3.1 Types of facilities: Infrastructure -Indoor, Outdoor
- 3.2 Facility Management: Equipment Store Room, Gymnasium, Swimming pool, Play ground
- 3.3 Equipment: Need, Importance, Procedure of purchase, Care and Maintenance
- 3.4 Physical efficiency Record, Medical examination Record

➤ The student is familiarised with the facility design and construction of different kinds along with facility maintenance.

➤ The student will acquire knowledge on how to make various types of fixture and how to plan the organisation structure of games and sports.

**UNIT – 4: Tournament**

- 4.1 Importance of Tournament
- 4.2 Types of Tournament and its organizational structure
- 4.3 Organizational structure of athletic meet
- 4.4 Sports Event, Intramural and Extramural Tournament Planning

**CONTEMPORARY ISSUES IN PHYSICAL EDUCATION, FITNESS AND WELLNESS (Elective)**  
**COURSE CODE : EC-201**

**UNIT – 1: Concept of Fitness**

- 1.1 Meaning and Definition of Fitness
- 1.2 Type of fitness
- 1.3 Definition and component of physical fitness
- 1.4 Changing concept of physical fitness

**UNIT – 2: Concept of Wellness and Lifestyle**

- 2.1 Concept and dimensions of wellness
- 2.2 Cyber culture and modern life style
- 2.3 Diseases due to lifestyle – Their prevention and management through physical activities
- 2.4 Construction of Wellness profile

**UNIT – 3: Principle of Exercise Programme**

- 3.1 Means of fitness development – aerobic and anaerobic exercises
- 3.2 Principle of obesity control and weight management
- 3.3 Concept of sets, repetition, volume, intensity, density of exercise
- 3.4 Concept of designing different fitness training programme for different age group

**UNIT – 4: Safety Education and Fitness Promotion**

- 4.1 Definition and need of Safety Education
- 4.2 Determination of desirable body weight
- 4.3 Health drinks and sports drinks- their need and importance
- 4.4 Common injuries and their management

➤ Students will understand the concept of physical activity, exercise, fitness, and wellness and will be able to recognize the long-term benefits of maintaining a high level of wellness for living in today's world.

➤ Students will know the dimensions of wellness and strategies to improve them.

➤ Students will know the physiological benefits of exercise, physical activity, physical fitness and wellness.

➤ Students will understand the concept of overweight, obesity & their management.

**UNIT-1: Introduction to Nutrition**

- 1.1 Meaning and definition of Nutrition and sports nutrition
- 1.2 Guidelines of basic nutrition
- 1.3 Role of nutrition in sports
- 1.4 Factors for developing a nutritional plan

**UNIT- 2: Nutrients**

- 2.1 Macro Nutrients- Carbohydrate, protein, fat - Meaning, Sources and functions
- 2.2 Micro Nutrients- Vitamins, minerals, water – meaning, Sources, classification and functions
- 2.3 Role of carbohydrate, fat and protein during exercise
- 2.4 Role of hydration during exercise and water balance.

**UNIT-3: Nutrition and Weight Management**

- 3.1 Meaning and concept of weight management in modern era. Factors affecting weight management and values of weight management
- 3.2 Concept of B.M.I.(Body Mass Index) and Obesity
- 3.3 Obesity and its hazards, Myth of Spot reduction, dieting versus exercise for weight control, Common Myths about weight loss
- 3.4 Health risks associated with Obesity – Causes and solution for overcoming obesity.

**UNIT-4: Steps of Planning of Weight Management**

- 4.1 Nutrition – Daily calorie intake and expenditure.
- 4.2 Balance diet and athletic diet
- 4.3 Role of diet and exercise in weight management
- 4.4 Weight management programme for sporty child, Design diet and exercise schedule for weight gain and loss.

- Students will acquire knowledge of Meaning and definition of Nutrition and sports nutrition
- Students will acquire knowledge of guidelines of basic nutrition, role of nutrition and factor developing a nutritional plan.
- Students will acquire knowledge about the meaning of macro and micro nutrients, and their sources, classification, functions and role.
- Students will know the meaning and concept of weight management, factor affecting and values of weight management.
- Students will also know the concept of BMI and obesity.
- Students will develop an ability to apply knowledge learned about obesity and its hazards, myth of spot reduction, common myth about weight loss and health risks associated with obesity- causes and solutions.
- Students will develop a knowledge about the steps of planning of weight management such as nutrition, daily calorie intake and expenditure, balance diet and athletic diet, role of diet and exercise in weight management.
- Students will acquire knowledge about weight management program for sporty child and design diet and exercise schedule for weight gain and lose.

## SPORTS TRAINING COURSE CODE : CC-301

### **UNIT – 1: Introduction to Sports Training**

- 1.1 Meaning and Definition of Sports Training and Sports Coaching
- 1.2 Aim and Objectives of Sports Training
- 1.3 Principles of Sports Training and qualification and duties of sports trainer
- 1.4 Components of games and sports training (Motor fitness components Technique, Tactics and Strategical approach, Psychological components facilities and infrastructure)

- Students will understand and form ideas about sports training and sports coaching.
- Students will know the principle of sports training and students also will know the qualification and duties of a sports trainer.

### **UNIT – 1: Process of development of motor fitness component**

- 2.1 Strength- Means and method of Strength development
- 2.2 Speed - Means and method of Speed development
- 2.3 Endurance- Means and method of Endurance development
- 2.4 Power and Balance - Means and method of Power and Balance development

- Students will understand and Ideas about motor fitness components.
- Students will know the process of development of different types of motor fitness components.

### **UNIT – 1: Training load, load dynamics and Training processes**

- 3.1 Concept definition and types of training load
- 3.2 Components of training load
- 3.3 Concept of load dynamics and its principles
- 3.4 Technical and Tactical training- Meaning, Importance and methods.

- Students can learn how to apply training load on an athlete and its principle.

### **UNIT – 1: Programme, planning and system of sports training**

- 4.1 Periodization- Meaning, definition and types. Aims, Objectives and Content of different periods- Preparatory, Competition and Transition.
- 4.2 Planning- Training session for Micro, Meso and Macro cycles.
- 4.3 Systems of Sports Training- Basic Performance, Good Performance and High Performance.
- 4.4 Talent identification. Meaning of Flexibility and coordinative ability and their role in High Performance

- Students will understand and perform ideas about sports training program planning and system also can learn talent identification.



**COMPUTER APPLICATIONS IN PHYSICAL EDUCATION AND SPORTS SCIENCE COURSE  
CODE : CC-302**

**UNIT – 1: Introduction to Computer Application**

- 1.1 Components of computer-input and output unit, storage unit, CPU, ALU, control unit.
- 1.2 Starting & quitting windows, setting display, time & date, managing files and folders.
- 1.3 Meaning, need and importance of information and communication technology (ICT).
- 1.4 Application of computer and computer software in Physical Education and Sports

- Students will gather knowledge about Meaning, need and importance of ICT.
- Students will develop their basic knowledge about computer software and hardware both.
- Students will be aware about applications of computer and computer software use in physical education and Sports.

**UNIT – 2: Word**

- 2.1 Introduction to word
- 2.2 Creating, saving and opening a document
- 2.3 Formatting & editing features, drawing table and graphs, page setup, paragraph alignment, spelling and grammar check, bullets and numbering, page number, header and footer, footnote and endnotes, mail merge, printing option and hyperlink.
- 2.4 Preparation of word document

- Students will acquire knowledge Microsoft word like creating, saving, opening document.
- Students will know formatting & editing features of word and preparation of word document.

**UNIT – 3: Excel**

- 3.1 Introduction to Excel
- 3.2 Creating, saving and opening spreadsheet
- 3.3 Format and editing features, adjusting columns width and row height, Creating formulas, short and filter, inserting graph and pictures, printing option
- 3.4 Preparation of Excel worksheet

- Students will acquire knowledge about Microsoft excel, they known introduction of excel, creating, saving, opening document.
- Students also know formatting & editing features of excel and preparation of excel worksheet.

**UNIT – 4: Power Point**

- 4.1 Introduction to Power Point
- 4.2 Creating, saving and opening a ppt file
- 4.3 Format and editing features, slide show, design, inserting slide number, picture, graph, table, hyperlink and graphics.
- 4.4 Preparation of Power Point Presentation

- Students will acquire knowledge about Microsoft power point, they known introduction power point, creating, saving, opening document.
- Students also know formatting & editing features of power point and preparation of excel preparation of power point presentation.

**SPORTS PSYCHOLOGY AND SOCIOLOGY IN PHYSICAL EDUCATION AND SPORTS COURSE  
CODE : CC- 303**

**UNIT – 1: Introduction to Psychology and Sociology**

- 1.1 Meaning, Importance and scope of Sports Psychology and Sociology.
- 1.2 Biological Basis of Human Behaviour
- 1.3 Individual Differences – Heredity and Environment
- 1.4 Psycho-social aspects of Human behavior in relation to Physical Education and Sports

**UNIT – 2: Learning, Maturity and Growth & Development**

- 2.1 Learning-Definition, Types and Laws of Learning. Theories of Learning. Factors affecting Learning, Transfer of Learning. Learning Curve – Stagnation in learning.
- 2.2 Growth and Development – Stages of Development, need of Physical Activity
- 2.3 Personality - Meaning and definition of personality, characteristics of personality, Dimension of personality, Personality and Sports performance.
- 2.4 Mental Aspects – Attention, Interest, Motivation, Aggression, Emotion, Anxiety.

**UNIT – 3: Social Science and Physical Education**

- 3.1 Orthodoxy, customs, Tradition and Physical Education.
- 3.2 Importance of Festivals in physical Education.
- 3.3 Theories of Play, Socialization through Physical Education.
- 3.4 Social Group life Social conglomeration– Social group, Primary group and Remote group.

**UNIT – 4: Culture and Physical Education**

- 4.1 Features of culture, Importance of culture
- 4.2 Importance of sports in modern society
- 4.3 Effects of culture on people lifestyle.
- 4.4 Different methods of studying (Observation/Inspection method Questionnaire method, Interview method.)

- Students will know about psychology and sports Psychology.
- Students will understand Human behavior and learning patterns of individuals.
- Students will know learning process and different theories based on learning.
- Students will acquire theoretical perspectives and develop understanding of Maturity and Growth & Development
- Stages of human development with special reference to Motor Development for Skill Learning in Sport and PE.
- Students will be aware about different attributes affecting the learning and development process.
- Students will understand the range of cognitive capacities in learners.
- Students will understand the Cognitive and higher mental processes involved in learning in sports and Physical Education.
- Students will understand the differences of personality among various types of sports and its importance for character building.

## SPORTS MEDICINE, PHYSIOTHERAPY AND REHABILITATION (ELECTIVE)

COURSE CODE : EC-301

### UNIT-1: Sports Medicine

- 1.1 Meaning and concept of sports medicine, Aim and objectives of sports medicine.
- 1.2 Development of sports medicine as discipline –aspect of sports medicine
- 1.3 Common regional injuries and their management-shoulder, elbow, wrist knee and ankle – signs, symptoms and diagnosis of injuries
- 1.4 Concept of doping and doping agents banded by WADA

### UNIT-2: Physiotherapy

- 2.1 Brief introduction of Physiotherapy
- 2.2 Need and importance of Physiotherapy
- 2.3 Different types of therapeutic modalities (cryotherapy, superficial thermo therapy, penetrating thermotherapy, Electrical stimulation)
- 2.4 Guiding principles of therapeutic modalities

### UNIT-3: Athletic Care and Massage

- 3.1 Prevention of athletic injuries – steps of prevention –pre-participation evaluation –Warm up and conditioning.
- 3.2 Emergency care in athletics and First aid – Meaning and principles – First aid care for I) Loss of consciousness II) control of building III)Drowning and basic life support.
- 3.3 Protective and supportive equipment: Taping, Bandaging, padding and orthotics.
- 3.4 Massage: Classification – general principles, indication and contraindication.

### UNIT -4: Rehabilitations

- 4.1 Concept and goal of rehabilitation
- 4.2 Principle of therapeutic exercises –Classification, uses of
- 4.3 Passive movement and active movement
- 4.4 Mobility exercise

- Students will understand and form ideas how sports medicine focuses on helping people improve their athletic performance, recovery from injury and prevent future injury.
- Students will know the Common regional injury and their management.
- Students will understand and ideas the Physiotherapy helps in making positive changes to the health and Lifestyle for all ages and Physiotherapy aids in the treatment and rehabilitation of people with an array of health problems ranging right from mental health issues to sports injury.
- Students will understand and can know the immediate an effective first aid is invaluable in an accident or medical incident that occurs during a Sporting activity.
- Students will know the various types of massage technique that focus on treating on sports field and students learn more about its principal.
- Students will know and ideas the process of rehabilitation in the field of physical education and sports.

**UNIT-1: Modern concept of the curriculum**

- 1.1 Meaning of Curriculum Design. Need and importance of curriculum development, the role of the teacher in curriculum development.
- 1.2 The role of the teacher in curriculum development.
- 1.3 Factors affecting curriculum-Social factors- Personnel qualifications- Climatic consideration
- 1.4 Steps in curriculum construction.

**UNIT-2: Basic Guideline for curriculum construction.**

- 2.1 Focalization, Socialization and Individualization
- 2.2 Steps in curriculum construction.
- 2.3 Principles of Curriculum design according to the needs of the students and state and national level policies.
- 2.4 Professional Competencies to be developed- Facilities and special resources for library, laboratory and other facilities.

**UNIT-3: Concept on Gender**

- 3.1 Meaning and concept on gender, Types
- 3.2 Types - Transgender and third gender, sex, patriarchy.
- 3.3 Gender bias, gender stereotyping, and empowerment
- 3.4 Equity and equality in relation with caste, class, religion, ethnicity, disability and region

**UNIT-4: Gender and Education**

- 1.1 Role of Teacher in the light of Gender Identity, Sexuality and Sexual harassment
- 1.2 Socialisation Practices in Family, Schools, and Other formal and informal organization
- 1.3 Schooling of Girls and Women Empowerment
- 1.4 Agencies perpetuating violence: Family, school, work place and media

- Students will understand meaning, need, importance of curriculum design and its development.
- Students will know the role of the teacher in curriculum development.
- students will understand factors affecting curriculum-Social factors-Personnel qualifications- Climatic consideration and steps in curriculum construction.
- Students will know the basic guideline about curriculum construction. Students will gather knowledge about principle curriculum design according to the needs of the students upto national level policies and professional competencies to be develop facilities.
- Students will understand and ideas of concept of gender like meaning types etc. students will help to know equity and equality in relation with caste, class, religion, ethnicity, disability and region.
- Students will understand the gender with their education, role of teacher in the light of gender identity.
- Students will know socialisation practices in family, schools and other formal and informal organizations.
- Students will know Women are an important section of our society. Education as means of empowerment of women can bring about a positive attitudinal change.
- Students will know the Public awareness campaigns and other interventions delivered via television, radio, newspapers and other mass media can be effective for altering attitudes towards gender norms.

**UNIT- 1: Introduction to Test, Measurement & Evaluation**

- 1.1 Meaning of Test, Measurement & Evaluation in Physical education
- 1.2 Need, Importance of Test, Measurement & Evaluation in Physical Education
- 1.3 Application of Test, Measurement & Evaluation in Physical Education
- 1.4 Principles of Evaluation

**UNIT - 2: Criteria, Classification and Administration of Test**

- 2.1 Criteria of a good Test and Scientific authenticity (reliability, objectivity, validity and availability of norms)
- 2.2 Types of Test
- 2.3 Difference between Physical Fitness Test, Motor Fitness test, and Sports Skill Test
- 2.4 Administration of test- Advance preparation, Duties during test and after test.

**UNIT- 4: Physical Fitness; Motor Fitness and Cardio-respiratory Tests**

- 3.1 AAHPER Youth Fitness Test
- 3.2 AAHPERD Health Related Physical Fitness Test
- 3.3 Indiana Motor Fitness Test and JCR test
- 3.4 Harvard Step test and Tattle pulse ratio test

**UNIT- 5: Sports Skill Tests**

- 4.1 Mitchei's modification of McDonald Soccer Test
- 4.2 Johnson Basketball Test
- 4.3 Lockhart and McPherson Badminton Test
- 4.4 Russel-Lange Volleyball Test
- 4.5 Schmithal-French Field Hockey Test

- Students will understand the concept of Test, Measurement, Evaluation and Assessment Procedure in Physical Education and give examples of each.
- Students will differentiate formative and summative evaluation, Process and Product evaluation.
- Students will identify the purposes of measurement and Evaluation.
- Students will describe the features of Technical and administrative feasibility that should be considered when selecting test.
- Students will locate and select physical fitness and sports skill tests  
Students will properly administer psychomotor tests.

**UNIT – 1: Introduction to Kinesiology and Sports**

**Biomechanics**

- 1.1 Meaning and Definition of Kinesiology, Biomechanics and Sports Biomechanics
- 1.2 Importance and Scope of Kinesiology and Sports Biomechanics in Physical Education and Sports Science
- 1.3 Terminology of Fundamental Movements
- 1.4 Fundamental Concepts of Following Terms – Axes and Planes, Centre of Gravity, Line of Gravity, Scalars and Vectors Quantities, Equilibrium.

**UNIT – 2: Kinesiological Aspects of Human Movement**

- 2.1 Classification of Joints and Muscles, Name of the Major Superficial Muscles, movements around the joints
- 2.2 Types of Muscle Contractions
- 2.3 Posture – Meaning, Types and Importance of Good Posture.
- 2.4 Fundamental Concepts of Following Terms- Angle of Pull, All or None Law, Reciprocal Innervations

**UNIT – 3: Mechanical Concepts**

- 3.1 Force - Meaning, Definition, Types, Units and its Application to Sports Activities
- 3.2 Lever - Meaning, Definition, Types and Body Lever. Wheel, Axel and Pulley.
- 3.3 Motion – Concept, Types and its Application to Sports Activities. Newton’s Laws of Motion
- 3.4 Projectile Motion – Concept, Types, Principles and Factors Influencing Projectile Motion.

**UNIT – 4: Kinematics and Kinetics of Human Movement**

- 4.1 Linear Kinematics – Distance and Displacement, Speed and Velocity, Acceleration
- 4.2 Angular kinematics – Angular Distance and Displacement, Angular Speed and velocity, Angular Acceleration.
- 4.3 Linear Kinetics – Inertia, Mass, Momentum, Impulse, Friction.
- 4.4 Angular Kinetics – Moment of Inertia, Couple, Stability.

- Students will understand the basics concepts underlining Biomechanics
- Students will develop insight into the application of biomechanics in various sports
- Students will know how biomechanical factors influence motion in sport and exercise
- Students will understand kinematics and kinetics in human movement
- Students will evaluate movement and estimate force on human structures during exercise and sports
- Students will know how to analyse basic human movements

**UNIT- 1: Introduction to Research**

- 1.1 Definition of Research, Need and importance of Research in Physical Education and Sports.
- 1.2 Scope of Research in Physical Education & Sports.
- 1.3 Classification of Research
- 1.4 Research Problem, Quality of a good researcher

- Students will have basic knowledge of Research in Physical Education, Fitness & Sports to Student
- Students will know the fundamentals of research

**UNIT -2: Research Proposal and Project Report**

- 2.1 Need for surveying related literature and Literature Sources
- 2.2 Research Proposal- Meaning and Significance of Research Proposal.
- 2.3 Preparation of a Project proposal and Project report.
- 2.4 Methods of Collection of data

- Students will be able to select research problem & know the steps of developing it
- Students will understand methodology & research procedure

**UNIT-3: Basics of Statistical Analysis**

- 3.1 Statistics: Meaning, Definition, Nature and Importance
- 3.2 Class Intervals: Raw Score, Continuous and Discrete Series
- 3.3 Frequency and Frequency Distribution, Construction of Frequency Distribution Tables
- 3.4 Graphical Presentation of Data: Histogram, Frequency Polygon, Frequency Curve.

- Students will know different sampling techniques & data collection tools
- Students will know basic statistics & statistical techniques
- Students will apply & interpret descriptive statistics

**UNIT-4: Statistical Models in Physical Education and Sports**

- 4.1 Measures of Central Tendency: Mean, Median and Mode :
- 4.2 Definition, Importance, Advantages, Disadvantages and Calculation from Group and Ungrouped data
- 4.3 Measures of Variability: Meaning, importance, computing from group and ungroup data
- 4.4 Percentiles and Quartiles: Meaning, importance, computing from group and ungroup data

- Students will recognize appropriate inferential statistical tool as per research method
- Students will understand data processing

**UNIT – 1: Introduction**

- 1.1 General Introduction of specialized game and sports: athletics, badminton, basketball, Volleyball, cricket, football, gymnastics, hockey, hand ball, kabaddi, kho-kho, tennis, Yoga. Each Game or sports to be dealt under the following heads: history and development of the game and of sports (any two)
- 1.2 Ground preparation, dimension and marking
- 1.3 Standard equipment and their specification
- 1.4 Ethics of sports and sportsmanship

- Students will understand the different types and classification of sports & games.
- Students will understand the Values and Ethics of sports and sportsmanship.
- Students will understand the basic rules, equipment and terminologies in sports and Games.

**UNIT – 2: Scientific principles of coaching (particular sports and game specific)**

- 2.1 Motion- Types of motion and displacement, speed, Velocity, Acceleration, distance and Newton's Laws of motion.
- 2.2 Force- Friction, Centripetal and Centrifugal force, principles of force.
- 2.3 Equilibrium and lever: Their types
- 2.4 Sports training- Aims, Principles and characteristics. Training load- Component, principles of load, over load(Causes and symptoms), Crest load, Maximum and Sub maximum load.

- Students will know different State and National level Awards.
- Students will understand different technologies used in Sports and Games.

**UNIT – 3: Physical fitness components: (Particular sports and games specific)**

- 3.1 Definition and types of speed, Strength and endurance.
- 3.2 Flexibility and its types.
- 3.3 Coordinative ability and its types
- 3.4 Training methods: Development of Components of Physical fitness and motor fitness through following training methods (Continuous method, Interval method, Circuit method, Fartlek and Weight Training)

**UNIT – 4: Conditioning Exercise and warming up**

- 4.1 Concept and conditioning of warming up
- 4.2 Role of weight training in games and sports
- 4.3 Teaching of fundamental skill and their mastery (Technique, Tactics and different phases of skill acquisition). Recreational and lead up games
- 4.4 Strategy- Offence and defense, Principles of offense and defense.



**Sports Management (Elective) COURSE CODE : EC-402**

**UNIT – 1: Introduction to Sports Management**

- 1.1 Nature, Scope and Purpose of Sports Management
- 1.2 Steps and Principles of Sports Management
- 1.3 Qualities and Competencies require for the Sports Manager
- 1.4 Event Management in Physical Education and Sports

**UNIT – 2: Development of Leadership Qualities**

- 2.1 Meaning and Definition of Leadership
- 2.2 Forms of Leadership- Autocratic, Laissez-faire, Democratic, Benevolent Dictator
- 2.3 Qualities of administrative Leader
- 2.4 Preparation of administrative Leader

**UNIT – 3: Sports Management in Different Agencies**

- 3.1 Sports Management in schools, Colleges and Universities
- 3.2 Factors affecting planning
- 3.3 Planning a school or college sports programme
- 3.4 Controlling a school, college and University sports programme- Developing Performance standard, establishing a reporting system, Evaluation

**UNIT – 4: Financial Management in Physical Education**

- 4.1 Financial Management in Physical Education and Sports in different Institutions
- 4.2 Budget-Meaning, Importance, Criteria of preparing a good Budget
- 4.3 Steps of Budget making
- 4.4 Principles of Budgeting

- The Students will develop the understanding and knowledge of Definition, Meaning, importance & Scope of Sports management. Functions and principles of sports management. Progressive concept of sports management. Essential skills of sports management. Qualities and competencies required for the sports manager. Event management in physical education and sports
- The Students will learn the basic concepts of Leadership: Meaning and definition of leadership, Leadership style and method, Elements of leadership, Forms of leadership. Supervision: Supervision- Meaning and Need for Supervision – Guiding principles of Supervision. - Functions of the Supervisor, Instruction and Professional growth. Methods in supervision.

**Part – B**  
**Practical Courses**  
**Semester – I**

<b>TRACK AND FIELD COURSE CODE : PC-101</b>	
<p>Running Events: Starting techniques: Standing start, Crouch start and its variations, Proper use of blocks. Finishing Techniques: Run Through, Forward lunging, Shoulder Shrug Marking, Rules and Officiating Hurdles: Fundamental Skills- Starting, Clearance and Landing Techniques. Types of Hurdles, Marking and Officiating. Relay: Baton Exchange for different distances, Understanding of Relay Zones, Marking and interpretation of rules and officiating</p>	<ul style="list-style-type: none"> <li>➤ The Students will develop the understanding and knowledge regarding the Running Event: Running technique and starting techniques: running ABC, Standing start, Crouch start and its variations, Proper use of blocks, Finishing techniques: Run Through, Forward lunging, Shoulder Shrug.</li> <li>➤ The Students will develop the understanding and knowledge of Track &amp; Field Marking (400 meter &amp; 200 meter track marking, placement of hurdles for), Rules and Officiating</li> <li>➤ The Students will gain knowledge of Hurdles: Fundamental Skills-Starting, Clearance and Landing Techniques, Types of Hurdles, High and Low Hurdles- Technique, Ground Marking and Officiating.</li> <li>➤ The Students will gain knowledge of Relays: Fundamental Skills, Various patterns of Baton Exchange, Understanding of Relay Zones, Ground Marking, Interpretation of Rules and Officiating.</li> </ul>
<b>Swimming or Gymnastics COURSE CODE : PC-102</b>	
<p>Gymnastics: Floor Exercise, Forward Roll, Backward Roll, Hand stand, Cart Wheel, Leg Split, Different dancing steps (Combination) Table Vault: Approach Run, Take off from the beat board, Cat Vault, Squat Vault. Men: Parallel bar, Horizontal bar/Roman rings, Rhythmic Gymnastics, Pyramid (Pair, Trio, Quadrates, Penthats) Women: Uneven bars, Balance Beam, Rhythmic Gymnastics, Pyramid (Pair, Trio, Quadrates, Penthats) Swimming: Floating, Gliding, Leg Action, Arm action, Breathing technique Introduction of various strokes : Front crawl, Back crawl, Butterfly, Brest Stroke: Starting Technique and entry into water Medley, Life Savings</p>	<ul style="list-style-type: none"> <li>➤ The students will develop the understanding and knowledge regarding the Swimming: Fundamental skills: Entry into the pool, Developing water balance and confidence.</li> <li>➤ The Students will develop the understanding and knowledge of Floating, gliding with and without kickboard, Introduction of various strokes.</li> <li>➤ The Students will gain knowledge of Body position, Leg, Kick, Arm pull, Breathing and Coordination, Start and turns of the concerned strokes.</li> <li>➤ The students will gain knowledge of Rules of competitive swimming-officials and their duties, pool specifications, seeding heats and finals, Rules of the races.</li> <li>➤ The Students will develop the understanding and knowledge regarding the Floor Exercise: Forward Roll, Backward Roll, Sideward Roll, Different kinds of scales, Leg Split, Bridge, Dancing steps, Head stand, Jumps-leap, Scissor's leap.</li> <li>➤ The Students will develop the understanding and knowledge of Vaulting Horse: Approach Run, Take off from the beat board, Cat Vault, Squat Vault .</li> <li>➤ The Students will gain knowledge of Parallel bar: Straddle walking on parallel bars, Single and double step walk, Perfect swing, Shoulder stand on one bar and roll forward, Roll side, Shoulder stand.</li> </ul>

**March Past COURSE CODE : PC-103**

March Past – 40 (Compulsory)  
 Mass Demonstration Activities: Bratachari –(Compulsory) and  
 Dumbbells/ Wands/ Hoop/ Umbrella/ Tipri// Malkhamb/  
 Lezium/ Callisthenics.

- Student will understand and To develop the concept of the activities along with its rhythm.
- To understand the type of activities and its grace to perform in group.
- To get the idea of playing the activities on rhythm.
- To learn the demonstrate activities and thereon acquire the skill of teaching such activities for the group on certain rhythm.
- To innovate the new ideas of demonstrative activities.

**Yoga COURSE CODE : PC-104**

Surya Namaskar (Compulsory): 5 marks Sitting Position:  
 Paschimottanasana,  
 Gomukhasana, Ustrasana, Arda-maschandrasan Halasana,  
 Salvasana, Sarvangasana, Chakrasana Vrikshasana,  
 Padahastanasana, Trikonasana, Utkatasana.

Pranamayama: Anulom-Bhilom, Bhastika, Bhramiri,  
 Suryavedan-Chandravedan.

Kapalbhati (Compulsory): 5 marks  
 Kriya: Jalaneti, Sutraneti, Nauli, Dantdhouti. 15 marks.

- The Students will perform the twelve steps of performing surya namaskar.
- The Students will develop the understanding of how to perform different sitting,standing, supine and prone lying, inverted and twisting asanas. They will also learn kriyas like jalanidhi, sutranidhi and Vamananidhi.
- The Students will gain knowledge of how to perform bandhas and mudras.
- The Students will gain knowledge about various pranayamas and meditation.
- The Students will develop the understanding and knowledge regarding the Introduction of weight training and its significance, Safety principle of weight training, introduction of the muscular system of the body and types of muscular contraction
- The Students will develop the understanding and knowledge of The following exercise covering the major groups of muscles are to be taught and performed using different types of muscle contraction i.e. isometric and isotonic: Bicep curl, Reverse curl, Wrist curl, Reverse wrist curl, Triceps extension, Front press, Back press, Front raise, Lateral raise, Bench press: Flat, Inclined and Declined.

**Weight Training:** Crouch Sitting Position, Different types of grip, Standing with weight, Dead lift  
 Curling: Two arm dumbbell curling, Barbell curling,  
 Front Curling, Reverse Curling Dumbbell and Barbell  
 press, Front and back press, Bench press (Incline &  
 Decline) Squat: Front and back squat

**Aerobics:** Low impact core moves - 1. March, 2. Side to side, 3. Double side to side, 4. grapevine,  
 5. Knee up, 6. Leg curl, 7. Toe touch, 8. Side lunge, 9. Back lunge, 10. Kick front, 11. Kick side, 12. Heel to raft, 13. 'E' shape, 14. 'v' shape  
 15. Introduction of Bench Exercise

<b>TRACK AND FIELD COURSE CODE : PC-201</b>	
<p><b>Jumping:</b> High Jump- Approach run, Take off, Bar clearance, Landing Or Pole vault: Approach, Planting, Riding, Bar clearance, Landing Jumping: Running Broad Jump and Triple Jump Approach Run, Take-off, Flight and Landing</p>	<ul style="list-style-type: none"> <li>➤ The Students will develop the understanding and knowledge regarding the Long Jump: Different techniques - Approach run, Take off, Clearance over the bar/ Flight phase, Landing</li> <li>➤ The Students will develop the understanding and knowledge of High Jump/Pole Vault : Different techniques - Approach run, Take off, Clearance over the bar/ Flight phase, Landing.</li> <li>➤ The Students will gain knowledge of Triple Jump: Different techniques - Approach run, Take off, Clearance over the bar/ Flight phase, Landing.</li> <li>➤ The students after going through the sports will be able to execute the teaching and coaching of the sports skills.</li> <li>➤ The students acquire the skill of organizing &amp; conducting sports competition at various levels.</li> <li>➤ The students are able to understand and implement the knowledge of construction and marking of various sports fields and its maintenance.</li> </ul>
<b>Team Games Course Code : 202</b>	
<p>Football, Volleyball, Throwball, Netball, Softball. (Any two) (50x2 marks)</p>	<ul style="list-style-type: none"> <li>➤ The Students will develop the understanding and knowledge regarding the Kicks, tapping, dribbling, heading, throwing, tackling of football.</li> <li>➤ The Students will develop the understanding and knowledge regarding the Introduction of the various game and historical development with special reference to India, Important tournaments held at National and International levels and distinguished personalities related to the game.</li> <li>➤ The Students will develop the understanding and knowledge of Fundamental Skills: Player’s stance- Receiving the ball &amp; passing to the team mates, various types of service, spike of volleyball.</li> <li>➤ The students will gain the knowledge about understanding of the rules &amp; regulations of the sports and its appropriate interpretation and implementation during officiating of a competition.</li> <li>➤ The students after going through the sports will be able to execute the teaching and coaching of the sports</li> </ul>

	<p>skills.</p> <ul style="list-style-type: none"> <li>➤ The students acquire the skill of organizing &amp; conduct of sports competition at various levels.</li> <li>➤ The students are able to understand and implement the knowledge of construction and marking of various sports fields and its maintenance.</li> </ul>
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**Indigenous Sports Course Code : 203**

<p>Kho-kho and Kabaddi.</p>	<ul style="list-style-type: none"> <li>➤The Students will develop the understanding and knowledge regarding the Skills in Raiding- Touching with hand, various kicks, crossing of baulk line, crossing of Bonus line, luring the opponent to catch, pursue.</li> <li>➤The Students will develop the understanding and knowledge of Skills of Holding the Raider- Various formations, catching from particular position, Different catching formations and techniques.</li> <li>➤The Students will gain knowledge of Additional skills/Techniques of escaping from chain formation, combined formations in offence and defence.</li> <li>➤The Students will gain knowledge of Ground Marking, Rules and Officiating.</li> <li>➤The Students will develop the understanding and knowledge regarding the General skills of the game – running, chasing, dodging, faking etc, and rectification on foul.</li> <li>➤The Students will gain knowledge of Ground Marking.</li> <li>➤The Students will gain knowledge of Rules, their interpretations and duties of officials.</li> </ul>
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### Semester – III

<b>TRACK AND FIELD COURSE CODE PC : 301</b>	
<p>Track and Field: All throwing events.</p>	<ul style="list-style-type: none"> <li>➤ The students will develop the understanding and knowledge regarding the discus throw: Grip, stance, release, follow through. They will also learn the marking of the discus throw sector and rules interpretations of discus throw. The students will get introduced to the duties of officials in discus throw.</li> <li>➤ The students will develop the understanding and knowledge regarding the javelin throw: Grip, stance, release, follow through. They will also learn the marking of the javelin throw sector and rules interpretations of javelin throw. The students will get introduced to the duties of officials in javelin throw.</li> <li>➤ The students will develop the understanding and knowledge regarding the shot put: Grip, stance, release, follow through. They will also learn the marking of the shot put sector and rules interpretations of shot put. The students will get introduced to the duties of officials in shot put.</li> </ul>
<b>COMBATIVE SPORTS COURSE CODE PC : 302</b>	
<p>Combative Sports: Martial Art, Karate, Judo, Fencing, Boxing, Taekwondo, Wrestling, Lathi (Any two)</p>	<ul style="list-style-type: none"> <li>➤ The Students will develop the understanding and knowledge regarding the Rei (salutation)-Ritsurei (Salutation in Standing Position), Zarai (Salutation in The Sitting Position), Kumi Kata (Methods of holding Judo costume), Shisei (Posture inJudo)</li> <li>➤ The Students will develop the understanding and knowledge of The Kuzushi (Act of Disturbing The opponent Posture ), Tsukuri and kake (Preparatory action for attack), UKemi (Break fall),Mae MawariUKemi (Front Rolling breakfall)</li> <li>➤ The Students will gain knowledge of The Shin tai (Advance or retreat foot movement)- suri-ashi (Gliding foot), Twugi-ashi (Following footsteps),Ayumi-ashi(Waling steps), Tai Sabiki(Management of the body ) Learning.</li> <li>➤ The Students will gain knowledge of Kesagatame (Scaff Hold),SKata Gtame (Shoulder hold), Kami Shihogatama (Locking of upper four quarters), Method of escaping from each hold.</li> <li>➤ The Students will develop the understanding and knowledge of Fundamental Skills of various combative sports.</li> <li>➤ The students will gain the knowledge about understanding of the rules &amp; regulations of the sports and its appropriate interpretation and implementation during officiating of a competition.</li> </ul>
<b>TEAM GAMES COURSE CODE PC : 303</b>	

<p>Team Games: Handball, Cricket, Hockey, Basketball, Baseball. (Any two) (50x2 marks).</p>	<ul style="list-style-type: none"> <li>➤ The Students will develop the understanding and knowledge of Fundamental Skills of different games like Handball, Cricket, Hockey, Basketball,</li> <li>➤ The Students will develop the understanding and knowledge regarding the Introduction of the various game and historical development with special reference to India, Important tournaments held at National and International levels and distinguished personalities related to the game.</li> <li>➤ The students will gain the knowledge about understanding of the rules &amp; regulations of different games and its appropriate interpretation and implementation during officiating a competition.</li> <li>➤ The students after going through the games will be able to execute the teaching and coaching of the sports skills.</li> <li>➤ The students acquire the skill of organizing &amp; conducting sports competition at various levels.</li> <li>➤ The students are able to understand and implement the knowledge of construction and marking of various fields and its maintenance.</li> </ul>
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**SPORTS SPECIALIZATION COURSE CODE TP: 301**

<p>Sports Specialization: Minimum 20 Internal Coaching Lessons Plan in schools. 02 External Coaching Lessons Plans in separate games in schools</p>	<ul style="list-style-type: none"> <li>➤ Students will gather the practical knowledge of coaching lessons.</li> <li>➤ The students are able to understand and implement the knowledge of construction of Sport Specialization; coaching lesson plan Internal in the situation of school. They also perform another coaching lesson in separate games in the situation of school.</li> </ul>
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## Semester – IV

### RACKET SPORTS COURSE CODE PC : 401

Table Tennis, Badminton, Tennis, Squash. (Any one): 40 marks.

Measurement of AAHPERD Youth Fitness Test: 30 marks & Measurement of Motor Fitness Test: 30 marks.

➤ The students will develop the understanding and knowledge regarding Table Tennis, Badminton, Tennis, Squash : various type skill, stance, release, follow through. They will also learn the marking of the Table Tennis, Badminton, Tennis, Squash court and rules interpretations Table Tennis, Badminton, Tennis, Squash. The students will get introduced to the duties of officials in Table Tennis, Badminton, Tennis, Squash games.

- Students will understand The classification of sports person based on the testing of age, sex, body sized (weight and height), sports skill, interest, general physical fitness, etc.
- Students will understand Health status is evaluated by testing health markers like pulse rate, blood pressure, blood parameters (hemoglobin, sugar, lipids, etc.), routine urine testing, etc. fitness status is noted by testing basic fitness components like strength, suppleness, stamina, etc.
- It helps invariably used to select the best few participants for various categories of sports events on the basis of some scientific tests.
- Students will understand the training effects on the performance of the athlete can be evaluated with the help of specific measurement and evaluation procedures.
- : It serves as a very effective motivation device and tends to encourage students to try harder for improving their performance levels in comparison to their team mates in a positive competitive team spirit and sportsmanship.
- It helps to construct norms and standards of performance expected from a particular group of sport persons and to establish age, sex or grade level standards for different population groups.



**LAYOUT AND OFFICIATING ABILITY COURSE CODE PC : 402**

Layout and Officiating ability of Track and Field events- 40 marks.  
Layout and Officiating ability of all Court Marking- 60 marks.

- The Students will be able to understand and obtain the proficiency in the skill of various sports taught.
- The students will gain the knowledge about understanding of the rules & regulations of the sports and its appropriate interpretation and implementation during officiating of a competition.
- The students after going through the sports will be able to execute the teaching and coaching of the sports kills.  
The students acquire the skill of organizing & conduct of sports competition at various levels.
- The students are able to understand and implement the knowledge of construction and marking of various sports fields and its maintenance.
- The students gain knowledge about the maintaining of various sports equipments and their purchase from the market.
- The students will be able to design various court marking for display of mass demonstration activity which helps in various programs being organized.

**TEACHING PRACTICE COURSE CODE TP : 401**

Internal Teaching Lessons at school for Racket Sports, Team Games, Indigenous Sports – 20 Lessons.  
External Teaching Examination at school – 02 Lessons.  
(Racket Sports/ Team Games/ Indigenous Sports).

- The students are able to understand and implement the knowledge of construction lesson plan (Internal & External) and they learn how to apply lesson plan and how to take lessons in school situations of different types of sports such as indigenous sports, racket sports and team games.

**GAMES SPECIALIZATION COURSE CODE TP: 402**

Internal Coaching Lessons Plans at school – 20 Lessons.  
External Coaching Lessons Plans at school – 02 Lessons in separate game.

- Students will be able to perform or tak their coaching lessons plans internal and external both in the situation of school in their separate games.



## **BACHELOR OF COMPUTER APPLICATION (BCA)**

**Program Outcome:: Program Specific Outcome ::Course Outcome**

### **PROGRAM OUTCOME (PO)**

Bachelor of Computer Application is an Undergraduate degree program catering the need of the high demand of computer professionals in the country in the present context. For the rapid growth of IT industries in the country in the last couple of years, this program has become very important and relevant for the current and future generation. It enhances ability and competence of the learners to work as an IT professional in practical field. BCA program enables the youngster to achieve the following outcome on successful completion of their course:

- Ability to understand and apply mathematical, computational and domain knowledge in real life problems
- Ability to identify and analyze complex problems using fundamentals of computer science and application domains.
- Proficiency to transform modern complex business scenario and contemporary issues into integrated hi-tech solutions using emerging technologies.
- Ability to work out experiments, interpret data and provide well informed conclusions.
- Aptitude to select modern computing tools and techniques necessary for innovative software solutions
- Ability to apply professional ethics and cyber regulations in a global economic environment.
- Propensity to engage in continuous learning as a Computing professional in the ever changing technological environment
- Skill to communicate effectively with the computing community as well as the society through effective documentations and presentations.
- Ability to identify opportunities and value entrepreneurial vision and work as a member or leader in diverse environment.



## **BACHELOR OF COMPUTER APPLICATION (BCA)**

### **PROGRAM SPECIFIC OUTCOMES (PSO)**

**BCA Program is designed to prepare the learners in achieving the following Specific Outcomes:**

**PSO1:** It explores technical comprehension in varied areas of Computer Applications and cultivates skills for thriving career and higher studies.

**PSO2:** It enables building up knowledge in different computer programs in the allied areas like Algorithms, System Software, Multimedia, Web Design and Data Analytics for efficient design of computer-based systems of varying complexity.

**PSO3:** It develops programming skills, networking skill, programming language and modern techniques of IT.

**PSO4:** It enables the learners to mastering over computer graphics, web development, trouble shooting and different hardware and software skills

**PSO5:** It equips the learners to become employable in the field of computer applications with a flare knowledge on different IT skills and programs.

**PSO6:** It also opens up the opportunities of self-employment in different fields of computer applications.

**PSO7:** It meets the requirements of the Industrial standards by bossing the knowledge starting from the basics of C, C++, Java, Python along with SQL to the recent Software Codes on Big data.

**PSO8:** It provides solution mathematically about basic discrete structures such as numbers, sets, used in computer science.

**PSO9:** It familiarises the learners with mathematical Determinant and Matrices, Limit, Continuity and Differentiability.

**PSO10:** It leads to handle the practical computational field along with direct codes like ALP etc for programming with Microprocessors.



# BACHELOR OF COMPUTER APPLICATION (BCA)

## Course Outcome

Course Name: Bachelor of Computer Application(BCA)

Course Completion Time: 3 years (6 Semester)

Semester	Paper Code and Name	Outcome
1 <sup>st</sup>	<b>BCA 1101</b>  <b>Computer Fundamentals and application software</b>	<ol style="list-style-type: none"><li>1. To be able to recognize all the hardware components and the peripheral devices</li><li>2. To be Familiar with different software applications.</li><li>3. Understanding mamory of a computer and its Components</li><li>4. Familiarizing with different web applications like E mails etc</li></ol>
	<b>BCA 1102</b> <b>Programming in “C”</b>  & <b>BCA 1196</b> <b>C Programming Laboratory</b>	<ol style="list-style-type: none"><li>1. Learning the basic terminologies to be familiarized with C programming.</li><li>2. Learning data types and variables</li><li>3. To be able to learn how to write C programs</li><li>4. Learning conditions and loops</li><li>5. Familiarizing with array and pointers with proper C programs.</li><li>6. Having a proper knowledge on Files using C programs.</li></ol> <p>Lab Work:</p> <ol style="list-style-type: none"><li>1. Learning Numerical problem.</li><li>2. To get to know Statistical problem.</li><li>3. Learning Search and sorting problem.</li><li>4. Knowing String manuoulation</li><li>5. Solving Problems</li></ol>
	<b>BCA 1103</b> <b>Discrete Mathematics with application to computer science</b>	<ol style="list-style-type: none"><li>1. To be able to learn all about Set theory with Relations and functions</li><li>2. Learning Venn Diagram and laws of set theory</li><li>3. Familiarizing with basic definitions of relations and functions.</li><li>4. To be able to Rule of products, permutations, combinations, Algebra of Logic</li><li>5. Learning Algebraic Structures, Boolean Algebra</li><li>6. To gain knowledge regarding problem solving techniques.</li></ol>

	Paper Code and Name	Outcome
<b>1<sup>st</sup></b>	<b>BCA 1104 Digital Electronics</b>	<ol style="list-style-type: none"> <li>1. Learning Data and number representation- binary-complement representation BCD-ASCII, Gray Code</li> <li>2. To be able to know Code Conversion Learning Logic gates, basic logic operations, truth tables, Boolean expression</li> <li>3. Learning the use of K Map</li> <li>4. Learning .Combination circuits, adders, Subtractor, Decoder, encoder, Multiplexer, Sequential circuits, flip-flops, Registers, counter (Async &amp; Sync).</li> </ol>
	<b>BCA 1197 Digital Electronics Lab</b>	<p>To be able to know how to acquire practical knowledge on :</p> <p>Combinational and sequential circuit design using I-C, &amp; NOR, NAND GATES, their usage and related mathematical problems</p>
	<b>BCA 1195 Communication Skill and Language Laboratory</b>	<p><b>To be able to enhance communication skill know</b></p> <p>(i) Vocabulary by knowing</p> <ol style="list-style-type: none"> <li>a) Spelling of words (Orthographical)</li> <li>b) Semantic and phonetic aspect says words. Synonym/Antonym/ Homonym.</li> </ol> <p>(ii) Basic grammar and Grammar of words</p> <ol style="list-style-type: none"> <li>a) Sentence form (SVO, SVA), Question form, and Negative form.</li> <li>b) Tense and time. Number concepts-Singular, Plural, Collective, and Distributive.</li> <li>c) Verb manipulation-Passive Voice, Question tag, indirect narration, Cansative Conditionals.</li> <li>d) Agreement-Noun, Pronoun, Subject, Verb. Completion of Prediction-Object, Complement, Other Grammar objectives Learning Expression and Writing Skills.</li> </ol>

Semester	Paper Code and Name	Outcome
<b>2<sup>nd</sup></b>	<b>BCA 1201 Computer Organization and Architecture</b>	<ol style="list-style-type: none"> <li>1. To be able to learn combinational and sequential circuits</li> <li>2. To know all kinds of operations of Boolean algebra</li> <li>3. Learning pipelining methods along with its mathematical performance measurement</li> <li>4. Learning different kind of pipeline hazards and their solutions</li> <li>5. Familiarization with memory organization and their architectural diagrams</li> <li>6. Learning virtual memory, registers</li> <li>7. To be able to know different kinds of instructions</li> </ol>

<b>2<sup>nd</sup></b>		8. To know about control unit and its function
	<b>Paper Code and Name</b>	<b>Outcome</b>
	<b>BCA 1202 Data Structure</b>	<ol style="list-style-type: none"> <li>1. To know how to familiarize with the basic ideas of Data structure and Algorithms.</li> <li>2. Having knowledge of different Data structure like – Array , Linked list etc.</li> <li>3. Learning application of Stack and Queue</li> <li>4. Implementation of Stack and Queue as Array and Linked list</li> <li>5. Learning Trees and Graphs</li> <li>6. Learning different types of Algorithms</li> <li>7. To be able to know about different Searching and Sorting methods</li> <li>8. To know about Hashing</li> </ol>
	<b>BCA 1203 Mathematical Foundation for Computer Science</b>	<ol style="list-style-type: none"> <li>1. To know all the basics of Classical Algebra</li> <li>2. To be able to gain knowledge between roots and co-efficient up to 4<sup>th</sup> degree polynomial equation</li> <li>3. Learning Linear Algebra</li> <li>4. To know Linear independence and dependence of Vectors</li> <li>5. To gain knowledge on Eigen Vector and Eigen value</li> <li>6. Learning cayley-Hamilton theorem</li> <li>7. To gain knowledge on Matrix multiplication and other operational matrices</li> <li>8. To know Differential Calculus</li> <li>9. To know Integral Calculus</li> <li>10. To know about Mathematical probability</li> </ol>
	<b>BCA 1204 Financial and Management Accounting</b>	<ol style="list-style-type: none"> <li>1. To know about Conceptual Framework of Accounting</li> <li>2. To gain knowledge on Identifying and recording accounting transaction using traditional and accounting equations approach.</li> <li>3. To know whereabouts of Capital and Revenue items</li> <li>4. To be able to learn Fundamentals of Computerized Accounting System</li> <li>5. To learn to maintain the hierarchy of ledger accounts forpreparing control accounts.</li> </ol>
	<b>BCA 1205 System Analysis and</b>	<ol style="list-style-type: none"> <li>1. To acquire knowledge on Overview of System Analysis and Design.</li> <li>2. To be able to learn about the difference between Manual Systemand Automated System</li> <li>3. To know about the types of Systems, role of System Analyst, System Development Life Cycle and its</li> </ol>

<b>2<sup>nd</sup></b>	<b>Design</b>	<p>phases</p> <ol style="list-style-type: none"> <li>4. To know about DFD, Data Dictionary</li> <li>5. To know the difference between Logical and Physical design</li> <li>6. Familiarizing with File Organization and Database design</li> <li>7. To gain knowledge on testing strategies</li> </ol>
	<b>BCA 1296 Data Structure Lab</b>	<ol style="list-style-type: none"> <li>1. Implementation of Lists, Stacks, Queues, and trees with static and dynamic structure.(Using arrays and pointers).</li> <li>2. Sorting internal and external – heap, merge, quick and bubble sorts of arrays, files and lists.</li> <li>3. Tree traversal of binary trees.</li> <li>4. Implementation of Hash table of fixed sizes.</li> </ol>
	<b>BCA 1297 Financial Accounting Lab</b>	<p>Learning</p> <ol style="list-style-type: none"> <li>1. Tally</li> <li>2. Fact</li> </ol>

Semester	Paper Code and Name	Outcome
<b>3<sup>rd</sup></b>	<b>BCA 2101 Design and analysis of Algorithm</b>	<ol style="list-style-type: none"> <li>1. To learn about time and space complexity</li> <li>2. To learn about asymptotic notation, big O notation, Omega and Theta notation etc.</li> <li>3. To be able to know about the time complexity of well known algorithms like heapsort, search algorithms etc</li> <li>4. To be able to familiarize with different kind of algorithm design techniques .</li> <li>5. To know about all kinds of sorting techniques like merge sort quicksort, heapsort , bubble sort etc.</li> <li>6. To know about dynamic programming, greedy method, knapsack problem, job sequencing, Prim's and Kruskal's algorithm .</li> </ol>
	<b>BCA 2102 System Programming</b>	<ol style="list-style-type: none"> <li>1. To be able to know about system programming, it's differences with assembly language programming</li> <li>2. To gain knowledge on different data formats like Role and base register index register etc</li> <li>3. To know about compilers</li> <li>4. To know the applications of different grammars of compiler design</li> <li>5. To gain knowledge on software tools text editors, interpreters, program generators, debug monitors</li> </ol>
	<b>BCA 2103 Computer Oriented Numerical method and Statistical method</b>	<ol style="list-style-type: none"> <li>1. To gain knowledge on approximation in numerical computation</li> <li>2. To be able to know about interpolation for example language interpolation, forward differences, backward differences etc</li> <li>3. To be able to learn about numerical integration</li> <li>4. To know about trapezoidal rule, Simpsons one third rule etc</li> <li>5. To be able to learn about gauss elimination method</li> <li>6. To know about algebraic equation like Bisection method</li> <li>7. To acquire knowledge on a Regula-Falsi method, Newton Raphson method etc</li> </ol>



3<sup>rd</sup>

	<p><b>BCA 2104 Database Management System</b></p>	<ol style="list-style-type: none"> <li>1. To learn about the basics of DBMS</li> <li>2. To learn about different kind of DBMS users, importance of data dictionary, contents of data dictionary, types of database languages, data models</li> <li>3. To know about data manipulation and data definition</li> <li>4. To acquire knowledge on concepts of primary key, foreign key, candidate key etc</li> <li>5. To know how to create tables</li> <li>6. To familiarize with different kind of SQL commands</li> <li>7. To know relational model and definition of relation</li> <li>8. To acquire knowledge on relational algebra</li> </ol>
	<p><b>BCA 2105 Microprocessor</b></p>	<ol style="list-style-type: none"> <li>1. To learn about the introduction of microprocessors</li> <li>2. To gain knowledge on the block diagram of 8085 microprocessor</li> <li>3. To know about the Architecture of 8085 microprocessor</li> <li>4. To know about the instruction cycles machine cycles and T states</li> <li>5. To know about the 8085 programming by familiarizing with assembly language programming</li> <li>6. To know about 8085 instruction sets</li> <li>7. To know about different kind of addressing modes</li> <li>8. To know the basics of 8085 and 8086 microprocessors and their differences</li> <li>9. To acquire knowledge on the basic differences of microprocessors and microcontrollers</li> </ol>
	<p><b>BCA 2196 DBMS Lab</b></p>	<p>Learners will be able to understand:</p> <p>Structured Query Language : 1. Creating Database, : Creating a Database, , Creating a Table, ,Specifying Relational Data Types, Specifying Constraints, ,Creating Indexes.</p> <p>2. Table and Record Handling: INSERT statement ,Using SELECT and INSERT together ,DELETE, UPDATE, TRUNCATE statements, DROP, ALTER statements.</p> <p>3. Retrieving Data from a Database: The SELECT statement, Using the WHERE clause, Using Logical Operators in the WHERE clause Using IN, BETWEEN, LIKE , ORDER BY, GROUP BY and HAVING Clause Using Aggregate Functions, Combining Tables Using JOINS, Subqueries.</p> <p>4. Database Management: Creating Views, Creating Column Aliases ,Creating Database Users ,Using GRANT and REVOKE, Cursors in Oracle PL / SQL ,Writing Oracle PL / SQL Stored Procedures</p>
	<p><b>BCA 2197 Gr.A: Microprocessor Lab (8085)</b></p>	<p>Familiarization with 8085 register level architecture and trainer kit and TASM components, including the memory map. Familiarization with the process of storing and viewing the contents of memory as well as registers.</p> <p>2. Study of prewritten programs on trainer kit using the basic instruction set ( data transfer, Load/Store, Arithmetic, Logical) Assignments based on above.</p> <p>3. Familiarization with 8085 simulator on PC. Study of prewritten programs using basic instruction set ( data transfer, Load/Store, Arithmetic, Logical) on the simulator. Assignments based on above.</p> <p>4. Programming using kit/simulator for i) table look up ii) Copying a block of memory iii) Shifting a block of memory. iv) Packing and unpacking of BCD numbers , v) Addition of BCD numbers , vi) Binary to ASCII conversion , vii)String Matching , viii)Multiplication using Booth's Algorithm ,</p>

<b>3rd</b>	<b>System Programming lab(8086)</b> <b>Gr.B: Numerical Laboratory</b>	<ol style="list-style-type: none"> <li>1. Solving various problems related programme with C</li> <li>2. Implement Numerical problems Using C.</li> <li>3. Assignments on Interpolation: Newton forward &amp; backward, Lagrange .</li> <li>4. Assignments on Numerical Integration: Trapezoidal Rule, Simson's 1 /3 Rule, .</li> <li>5. Assignments on Numerical solution of a system of linear equation: Gauss elimination, Gauss Jacobi, Matrix Inversion, Gauss Seidel.</li> <li>6. Assignments on Algebraic Equation: Bisection, Secant, Regula-falsi, Newton Raphson</li> <li>7. Assignments on Ordinary Differential Equation: Taylor Series, Euler's method, RungeKutta</li> </ol>
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Semester	Paper Code and Name	Outcome
<b>4<sup>th</sup></b>	<b>BCA 2201 Object Oriented Programming using C++</b>	<ol style="list-style-type: none"> <li>1. To gain knowledge on object oriented programming language and its properties</li> <li>2. To be able to understand class and objects</li> <li>3. To know the whereabouts of constructor and destructor</li> <li>4. To be able to know about polymorphism, etc</li> <li>5. To be able to know about conditions and loops</li> <li>6. familiarizing with C++ coding</li> <li>7. Learning coding formations and deformations</li> <li>8. Learning file handling and exception handling</li> <li>9. Learning pointers and the uses of pointers NS C++ code</li> </ol>
	<b>BCA 2202 Operating System</b>	<ol style="list-style-type: none"> <li>1. Students will be able to understand the basic concept of operating system</li> <li>2. To be able to know about processes</li> <li>3. To gain knowledge on process control block and process state models</li> <li>4. To acquire knowledge on process scheduling and different types of scheduling algorithms</li> <li>5. To know about deadlocks</li> <li>6. To know about Different kinds of deadlock avoidance algorithms, recoveries from deadlocks, causes of deadlocks</li> <li>7. To know about virtual memory technique and different memory organizations</li> <li>8. To be able to understand PAGING, demand paging, differences between paging and synchronization</li> <li>9. To know about process synchronization and its techniques</li> <li>10. To acquire knowledge on page replacement algorithms</li> <li>11. To be able to understand different operating systems and their uses</li> </ol>
	<b>BCA 2203 Operation</b>	<ol style="list-style-type: none"> <li>1. To know the Characteristics of OR</li> <li>2. Basics of decision making</li> <li>3. To learn about Algebraic solution: simplex methods</li> </ol>

4<sup>th</sup>

	<p><b>Research</b></p>	<ol style="list-style-type: none"> <li>4. To be able to understand Transportation Model and its Definition along with formulation and solution of transportation models</li> <li>5. To know minima, column-minima, matrix-minima and vogel's approximation methods.</li> <li>6. To gain knowledge on Assignment model with the Definition of assignment model and its comparison with transportation model</li> </ol>
	<p><b>BCA 2204 Software Engineering</b></p>	<ol style="list-style-type: none"> <li>1. To be able to understand the basics of software engineering</li> <li>2. To acquire knowledge on different kind of software development lifecycle models</li> <li>3. To acquire knowledge on different COCOMO (Constructive cost estimation model ) models</li> <li>4. To be able to understand software engineering principles</li> <li>5. To be able to acquire knowledge on mathematical problems linked with person month and efficiency</li> <li>6. To have a havoc idea on software testing</li> <li>7. To gain knowledge on the basic differences between white box testing and black box testing</li> <li>8. To be able to know about software quality assurance</li> <li>9. To familiarize different diagrammatical approach off data flow diagrams</li> <li>10. Understanding basic differences between data flow diagram and control flow diagram</li> </ol>
	<p><b>BCA 2205 Computer Network</b></p>	<ol style="list-style-type: none"> <li>1. Understanding basics of computer networks</li> <li>2. To be able to know network categories</li> <li>3. Familiarizing with different network modes</li> <li>4. To gain knowledge on ISO /OS I model</li> <li>5. familiarizing with the seven layers of ISO /OSI model</li> <li>6. Learning different mathematical problems of the physical layer</li> <li>7. Learning the basics of the TCP /IP protocol</li> <li>8. Gaining knowledge on the IP addressing methods</li> <li>9. Having idea on the differences of classful addressing and classless addressing</li> <li>10. Familiarizing with mathematical problems of IP addressing</li> <li>11. Learning the basics off Bluetooth and other connectivity.</li> </ol>
	<p><b>BCA 2296 C++ Lab</b></p>	<p>Learning coding on</p> <ol style="list-style-type: none"> <li>1. Class, Object, Constructor &amp; Destructor. Class, Modifiers (Private, Public &amp; Protected), DataMember, Member Function,</li> <li>2. Static Data Member, Static Member Function, Friend Function, Object, Constructor (Default Constructor, Parameterized Constructor and Copy Constructor), Destructor.- Pointer, Polymorphism &amp; Inheritance. Pointer (Pointer to Object, this Pointer, Pointer to Derive Class), Introduction to Polymorphism (Runtime Polymorphism, Compile time Polymorphism), Operator Overloading, Virtual Function, Inheritance (Single Inheritance, Multiple Inheritance, Multilevel Inheritance, Hierarchical Inheritance, Hybrid Inheritance), Virtual Base Class, Abstract Class.- File Handling, Exception Handling. Files I/O, Etc</li> </ol>

4<sup>th</sup>

<b>Paper Code and Name</b>	<b>Outcome</b>
<b>BCA 2297 Gr.A: Operating System Lab</b>	Students will be able to know:  Shell programming : creating a script, making a script executable, shell syntax. Process: starting new process, replacing a process image, duplicating a process image , waiting for a process. Signal: signal handling, sending signals, signal interface, signal sets. Semaphore: programming with semaphores (use functions semctl, semget, semop, set_semvalue, del_semvalue, semaphore_p, semaphore_v). POSIX Threads : programming with pthread functions(viz. pthread_create, pthread_join, pthread_exit, pthread_attr_init, pthread_cancel) Inter-process communication: pipes(use functions pipe, popen, pclose), named pipes(FIFOs, accessing FIFO.
<b>Gr. B: Computer Network Lab</b>	Socket Programming: Simple Application using elementary socket system calls in client/server model in unix/linux using c language. TCP/UDP example using only the elementary socket system calls.

Semester	Paper Code and Name	Outcome
<b>5th</b>	<b>BCA 3101 OOPS using JAVA</b>	<ol style="list-style-type: none"> <li>1. Learning the basics of object oriented programming</li> <li>2. Learning the basics of Java</li> <li>3. To be able to know the proper programming format of Java</li> <li>4. To acquire knowledge on Java packages</li> <li>5. To know the different kinds of Java keywords and variables</li> <li>6. To know the basic properties of class and object</li> <li>7. To acquire knowledge on method overloading, constructor overloading</li> <li>8. To know different kind of exception and exception handling</li> <li>9. Do note different kind of input output streams</li> </ol>
	<b>BCA 3102 Profession Values and Ethics</b>	<ol style="list-style-type: none"> <li>1. To know the learning effects of technological growth.</li> <li>2. To know about the energy crisis and renewable energy resources</li> <li>3. do you know about the value crisis in contemporary society</li> <li>4. Psychological value of a good life</li> <li>5. To gain knowledge on moral and ethical values</li> <li>6. To know about the moral and ethics of duty</li> <li>7. To gain knowledge on the differences of work ethics and professional ethics</li> </ol>
	<b>BCA 3103 (.dot)NET Technology</b>	<ol style="list-style-type: none"> <li>1. To learn about the overview of .net</li> <li>2. To know about the .net web services and the dot NET Framework</li> <li>3. To acquire knowledge on the common language runtime</li> <li>4. To know about the web services of .net</li> <li>5. To familiarize with different kind of dot net languages and their platforms</li> <li>6. To know about the Microsoft dot NET</li> <li>7. To know about XML</li> </ol>

	<b>Paper Code and Name</b>	<b>Outcome</b>
<b>5th</b>	<b>BCA 3104 Compiler Design</b>	<ol style="list-style-type: none"> <li>1. Knowing about the structure of a compiler</li> <li>2. Knowing about the differences of code generation and code optimization</li> <li>3. To know about the programming language constructs such as data elements</li> <li>4. To know about the concept of parameter passing</li> <li>5. To familiarize with the concept of lexical analyzer</li> <li>6. To know the design of lexical analyzer</li> <li>7. To be able to know the basic parsing techniques</li> <li>8. To know about the differences of top down parsing and bottom up parsing</li> <li>9. To acquire knowledge on code generation</li> </ol>
	<b>BCA 3195 Seminar (Individual)</b>	<ol style="list-style-type: none"> <li>1. Students learn how to present seminar step by step.</li> <li>2. Every seminar topic is noted and guided by the department.</li> <li>3. Students learn to present their seminar.</li> </ol>
	<b>BCA 3196 JAVA Lab</b>	<ol style="list-style-type: none"> <li>1. Learning how to prepare assignments on constructors destructors in Java practical classes</li> <li>2. Practical example of Java using inheritance and method overriding</li> <li>3. Java programs showing the use of arrays and pointers</li> <li>4. Java assignments on developing interfaces</li> <li>5. Learning how to access Java packages in Java practical classes</li> <li>6. Learning how to use swing in Java programs</li> <li>7. Learning to handle errors and exceptions in codes</li> <li>8. Learning how to use Java applets</li> </ol>
	<b>BCA 3197 (.dot) NET Lab</b>	<p>Learning lab work on</p> <ol style="list-style-type: none"> <li>1. Web services</li> <li>2. XML and UDDI features</li> <li>3. Learning practical.net codes on meta data</li> <li>4. Learning about garbage collection</li> <li>5. To know about the common language runtime in .net programs</li> <li>6. Do you know how to compile dot net programs and run successfully for proper output</li> </ol>

Semester	Paper Code and Name	<u>Outcome</u>
<b>6<sup>TH</sup></b>	<b>BCA 3201 OOAD using UML</b>	<ol style="list-style-type: none"> <li>1. To know about the importance of modeling and to know about the principles of modeling</li> <li>2. To acquire knowledge on object oriented modeling</li> <li>3. To know about the conceptual model of the UML, the architectural development lifecycle of the UML</li> <li>4. To know about the terms concepts I am modelling techniques for class and object</li> <li>5. Do you know about the basic behavioral modeling</li> <li>6. To know about the events and signals</li> <li>7. About the architectural modeling</li> <li>8. To know about the unified library applications</li> </ol>
	<b>BCA 3202 PHP/MY SQL.</b>	<p><b>Outcome of PHP/MY SQL are:</b></p> <ol style="list-style-type: none"> <li>1. To know about the basics of Web Programming</li> <li>2. Knowing about the installation of PHP/MySQL and web server</li> <li>3. Knowing about PHP programming</li> <li>4. Writing PHP Programs</li> <li>5. Loops, Control Structure and Arrays</li> <li>6. PHP functions String functions , Array functions , Mathematical function , Graphics functions, File system function, Date and time function , Miscellaneous Functions ,</li> <li>7. Error handling</li> <li>8. Object Oriented Features of PHP</li> <li>9. File and Directory handling</li> <li>10. MySQL database Configuration of MySQL server , Starting MySQL server , MySQL tables ,Displaying MySQL data , Adding and removing user access.</li> <li>11. Web Servers IIS web Server ,Apache web server</li> </ol>
	<b>BCA 3203 Computer Graphics and Multimedia</b>	<ol style="list-style-type: none"> <li>1. To know about the development of computer graphics and multimedia</li> <li>2. To know about points lines and cards</li> <li>3. To know different line drawing algorithms</li> <li>4. To you know how to generate midpoint circle drawing algorithm</li> <li>5. To know about the three-dimensional concepts</li> <li>6. To know about circle and ellipse generation</li> <li>7. To you know about 3D viewing</li> <li>8. To know about multimedia systems</li> </ol>
	<b>BCA 3294 Computer Graphics and Multimedia Laboratory</b>	<ol style="list-style-type: none"> <li>1. Knowing Point plotting, line &amp; regular figure algorithms</li> <li>2. Drawing Raster scan line &amp; circle drawing algorithms</li> <li>3. Clipping &amp; Windowing algorithms for points, lines &amp; polygons</li> <li>4. 2-D / 3-D transformations</li> <li>5. Simple fractals representation , Demonstrate the properties of the Bezier curves.</li> <li>6. Filling algorithms , Clip line segments against windows</li> <li>7. Web document creation using Dreamweaver.</li> <li>8. Creating Animation using Flash.</li> </ol>
	<b>Project (Industrial)</b> <b>BCA 3295</b>	<ol style="list-style-type: none"> <li>1. Project is based on latest softwares and is guided by faculty members individually/group-wise.</li> <li>2. Students are given different project topics on technology and are trained to take out the best from them.</li> <li>3. A proper presentation and question &amp; answer series follow every project class.</li> </ol>
	<b>Grand VIVA</b> <b>BCA 3296</b>	A final viva is conducted to brush up the whole course in front of an External Examiner.





# Programme Specific Outcomes (PSOs)

## Bengali (Honours)

Bengali is one of the oldest Literature and Language based subject. It is originated by the Prakrita 'Magadhi Apabhransh'. Bengali is very much enriched with Classical Sanskrit Literature. Bengali is our proud inheritance. Several authors have contributed in Bengali language and literature. Rabindranath Tagore awarded with Nobel Prize for his contribution in Bengali Literature. Krittibas Ojha, Kasidas, Bijoy Gupta, Bankim Chandra Chattopadhaya, Iswar Chandra Vidyasagar, Bhudeb Mukhopadhyay, Parichand Mitra, Dinabandhu Mitra, Girish Ghosh, Michel Madhusudan Dutta, Bibhutibhusan Bandopadhyay, Tarasankar Bandopadhya, Manik Bandopadhay, Jibanananda Das, Swarnakumari Debi, Ashapura Debi, Kusmkumari Das, Mahashweta Sakti Chattopadhaya, Debi, Sankha Ghosh, Narayan Gangopadhaya, Adwita Mallabarman, Sukumar Roy, Satyajit Roy, Leela Majumder and many others authors contributed in Bengali language and literature. Famous scientist Jagadish Chandra Bose, Prafulla Chandra Roy, Meghnad Saha wrote their scientific experiments in Bengali language. Many films have been made based on Bengali literature.

After completing of the course the students will gather the knowledge of Bengali linguistics, sense of Bengali literature. The students also attain the sense of how to compare a language and literature with another. They can also achieve social, political, historical, and economical knowledge of a certain period. Students also gather the knowledge of how to writing a report, or how to interview a person and also drafting of advertisement.

### **After completion of the programme, the Graduates will be capable of-**

PSO1. Studying the course the students possess an idea about the evaluation of Bengali language since ancient period.

PSO2. Bengali literature provides the students a idea of relations between social science, History, Politics and economy.

PSO3. Bengali literature provides the knowledge of the relationship between Human and Nature.

PSO4. Bengali literature widens the scope of comparative studies among literature and different social science.

PSO5. Bengali literature has contributed to the world of film and theatre.

PSO 6. The students of Bengali literature are taught how to make a report, how to interview, how to write a creative work, how to prepare a project, and moreover how to investigate a research work.

PSO 7. Studying Bengali the students can choose a profession of teaching, critic, reporting or interpreting. PSO

# Programme Specifics Outcomes (PSOs)

## Bengali (General)

Bengali is one of the oldest Literature and Language based subject. It is originated by the Prakrita 'Magadhi Apabhransh'. Bengali is very much enriched with Classical Sanskrit Literature. Bengali is our proud inheritance. After completing of the course the students will gather the knowledge of Bengali linguistics, sense of Bengali literature. The students also attain the sense of how to compare a language and literature with another. They can also achieve social, political, historical, and economical knowledge of a certain period. Students also gather the knowledge of how to writing a report, or how to interview a person and also drafting of advertisement.

### After completion of the programme, the Graduates will be capable of-

PSO1. Studying the course the students posses an idea about the evaluation of Bengali language since ancient period.

PSO2. Bengali literature provides the students a idea of relations between social science, History, Politics and economy.

POS3. Bengali literature provides the knowledge of the relationship between Human and Nature.

POS4. Bengali literature widens the scope of comparative studies among literature and different social science.

POS5. Bengali literature has contributed to the world of film and theatre.

POS6. The students of Bengali literature are taught how to make a report, how to interview, how to write a creative work, how to prepare a project.

POS7. Studying Bengali the students can choose a profession of teaching, reporting and advertising etc.

# Course Outcome

## Bengali (Hons.)

Semester I	
Title of the Course	Bangla Bhasar Udbhab O Parichay
Paper Code	CC1
Credits	06
Hours	06 hours/week

Reading the paper students can acquire knowledge of linguistics features of Bengali language. They also learnt the development of Indo-Aryan language, comparative analysis of different stages of Indo-Aryan language.

**This course (CC1) provides the students with-**

CO1. Origin and development of Bengali language.

CO2. Different stages of Bengali language.

CO3. Development of Bengali Vocabulary and different sources with suitable examples.

CO4. Bengali Phonetics and its definition, classifications, features with suitable examples.

CO5. Bengali Semantics and its classifications, rules of transformation of words.

CO6. Bengali Grammar and its usages,

CO7. Bengali Folk languages and local dialects,- their phonetical and morphological features.

CO8. Origin and development of Indo-European languages and its different branches and origin of Indo-Aryan Language and its historical analysis and description.

Semester I	
Title of the Course	Bangla Sahityer Itihas (Prachin O Madhyajug)
Paper Code	CC2
Credits	06
Hours	06 hours/week

After completion of this course students are able to get the knowledge on Old and Medieval Bengali literature. They also able to get the knowledge of socio-economic-cultural-religious aspects of old and medieval age. They also learn the differences of literary views of old and middle ages with its modern age.

**This Course (CC2) provides the students with-**

CO1. Historical and cultural aesthetical studies of old Bengali literature with references of verse and Charyapada..

CO2. Studies of Sahajia Buddhist cult with reference of Charyapada.

CO3. Studies of the medieval literature with references of Shrikrishnakirtan, Baishnabpadabali, Mangalkabya, Arakan Rajsabaha's poet, Nath Sahitya etc.

CO4. Influences of Shri Chaitnyadev in Bengali literature and society. Also learn origin and development of translated verses and biographical verses in medieval Bengali literature.

CO5. Students learn the philosophy of mankind and humanity with study of Baul gitika.

CO6. Moreover, students learn about humanity and love to other people and to the world.

<b>Semester II</b>	
Title of the Course	Prachin O Madhyajuger Padapath
Paper Code	CC3
Credits	06
Hours	06 hours/week

After completion of this course student will students are able to know the verses of old and medieval literature. They also learn about the social arena of old and middle ages. Students will generate knowledge about love: love for lover and eternal force. They also get an idea of meters and figures of those ages literature.

**This course (CC3) provides the students with-**

CO1. Studying Charjaapada, students get knowledge about socio-cultural aspects of old age. They can know about poets of Charjapada, their works, religious aspects, historical features and literary value.

CO2. Critique on Baishnavpadabali, text reading, its religious features, aesthetic approaches, differences between pre and post Chaitanyadeb period, Baishnava cult and its reflections on these period.

CO3. Studying the verses of Vidyapati, Chandidas, Gyanadas, Govindadas, Balaramdas, students are deeply enriched. Students also able to learn about the influence of Chandidas over Gyanadas, influence of Jaydeb over Vidyapati, influence of Vidyapati on Gobindadas,

CO4. Reading of Shaktapadabali students are able to know about the society and religious aspects of eighteen century.

<b>Semester II</b>	
<b>Title of the Course</b>	<b>Chaitanya Jiboni O Mangal Sahitya</b>
<b>Paper Code</b>	<b>CC4</b>
<b>Credits</b>	<b>06</b>
<b>Hours</b>	<b>06 hours/week</b>

After completion of this course students will get an introduction with Medieval verses of Bengali literature. They will be capable to appreciate the text of Medieval literature., will get an idea on language, meters and figures of speeches of those days, will be bale to compare the literature of modern period with medieval ages.

**This course (CC4) provides the students with-**

CO1. Reading with Chaitanyabagabat (Adikhanda) by Brindaban das, students will able to know about Shri Chaitanyadeb, socio-economic culture of that period, and also able to compare Biographical poetry of those days with modern biographical works.

CO2. Reading by Chandimangal (Akhetic Khanda) by Mukunda Chakraborty, students can understand medieval society and the livelihood of Adivasis. They can occur a sense of subaltern studies.

CO3. Reading Annadamangal by Bharatchandra, students can learn about features of late eighteenth-century court literature.

<b>Semester III</b>	
<b>Title of the Course</b>	<b>Unis-Bis Sataker Probondho O Kabya Sahityer Itihas</b>
<b>Paper Code</b>	<b>CC5</b>
<b>Credits</b>	<b>06</b>
<b>Hours</b>	<b>06 hours/week</b>

After completion of this course, students will get an introduction with nineteenth and twenty century Bengali essays and poetries.

**This course (CC5) provides the students with-**

CO1. Outline of Nineteenth century and twentieth century Bengali essays, development, growth social purpose of the essays, and impact of renaissance on them.

CO2. Relationship between essays and Bengali Periodicals of Nineteenth and Twentieth century.

CO3. Outline of Nineteenth and Twentieth century Bengali poetries, growth and development and western influences on it.

CO4. Learn newly grow up Bengali prose style, content and features in reference with reading Shakuntala by Vidyasagar.

CO5. Get knowledge about socio-cultural background of nineteenth and twentieth century of Bengal.

<b>Semester III</b>	
<b>Title of the Course</b>	<b>Chanda-Alankar O Nirbachito Kobita</b>
<b>Paper Code</b>	<b>CC6</b>
<b>Credits</b>	<b>06</b>
<b>Hours</b>	<b>06 hours/week</b>

After completion of this course, students will get an introduction with Bengali meters and figures of speeches and poetry. They will be capable to appreciate the text, will get an idea on scansion of a text. Also they will be able to identify the figures of speeches, text reading of a poetry, socio-cultural study of the text, western and oriental influences on them.

**This course (CC6) provides the students with-**

CO1. Studies on Bengali meters and its classifications, methodologies and scansion of a poetry.

CO2. Studies on Bengali Figure of Speeches and its classification and process of its identification.

CO3. Applications of different meters in Bengali poetries with examples.

CO4. Applications of various Figures of speeches in Bengali poetries and prose with example.

CO5. Critical analysis with references of Nirbachita Kobitapath. Goes through Satyendranath Dutta, Shakti Chattopadhyay and many modern Bengali Poets creation.

<b>Semester III</b>	
<b>Title of the Course</b>	<b>Probandho Sahitya Path</b>
<b>Paper Code</b>	<b>CC7</b>
<b>Credits</b>	<b>06</b>
<b>Hours</b>	<b>06 hours/week</b>

After completion of this course, students will get an introduction with Bengali essays and its origin and development. They will be able to understand the binaries, polemics, politics, socio-cultural conflict and inequality of society. They are also able to understand about the western and oriental influences upon Bengali essays.

**This course (CC7) provides the students with-**

CO1. With reference of essays written by Bankimchandra Chattopadhyaya, the students are able to understand the reflection and revivalism of nineteenth century renaissance.

CO2. Features and narrative of Bankimchandra Chattopadhyay's writing.

CO3. Students are able to get an idea about colonialism and its effects on essays and Bengali literature and language also.

CO4. By studying eminent scientist and essayist Ramendra Sundar Trivedi's 'Charitakatha', students are capable to understand about various critique of Bengali language.

<b>Semester III</b>	
<b>Title of the Course</b>	<b>Bangla Byakaron O Anubadtattwa</b>
<b>Paper Code</b>	<b>SEC1</b>
<b>Credits</b>	<b>02</b>
<b>Hours</b>	<b>02 hours/week</b>

After completion this paper, students will able to gather the knowledge on Bengali grammar, construction of Bengali words, its applications, idioms, transforming a sentence into a word and forms of translation.

**This course (SEC1) provides students with-**

CO1. Students get knowledge about Bengali linguistics.

CO2. They get knowledge about case information of Bengali words.

CO3. Laern about Bengali idioms, proverbs and how to transforming a sentence into a word.

CO4. They studies about theories of translations, classifications.

CO5. Studies on Bengali Terminology and its development as well as recent trends of terminology.

<b>Semester IV</b>	
<b>Title of the Course</b>	<b>Unis O Bis Shataker Natya O Kathasahityer Itihas Ebong Chhotogalpo Path</b>
<b>Paper Code</b>	<b>CC8</b>
<b>Credits</b>	<b>06</b>
<b>Hours</b>	<b>06 hours/week</b>

After gone through this paper, students may capable to understand the art and style of drama, novel and short story writing skill. They also attain the knowledge of the text reading and analysis of fiction.

**This course (CC8) provides the students with-**

CO1. Outline of Nineteenth and Twentieth century Bengali Theatre, the development and influences of western and continental theatre on it.

CO2. They also get knowledge about armature theatre, professional theatre, peoples theatre and third theatre.

CO3. After completion of the course they will be capable to hold a sound knowledge of theatre personals and various drama writers, fiction writers and their creations.

CO4. Students are able to understand the sketches of nineteenth and twentieth century Bengali novels, its origin and development.

CO5. Students can understand various theories of fictions; such as Romanticism, Realism, Naturalism, stream of Consciousness, Marxist theory.

CO6. Students are able to know socio-structural reflections on Bengali drama, novel, short stories.

CO7. Students are also able to know the rhetoric of fictions.

CO8. After reading some selected short stories of several authors, students are attain the knowledge of impact and influences of western literature, first and second world war and colonialism.

CO9. After reading 'Atithi' and 'Samapti' by Rabindranath Tagopre students are capable to gather a knowledge that, how Romanticism reflected in Tagor's story.

CO10. Features of Bibhutibhusan Bandopadhyaya's stories with reference to story 'Umarani'.

CO11. Impact of Naturalism in Tarasankar Bandopadhyay's stories in connection with the short story 'Tarini Maghi'. They also able to understand the basic instinct of human beings; is to desire for living.

CO12. By reading 'Kachi Sansad' of Rajsekhar Basu, students can get a touch of the authors writing skill.



CO13. Crisis of mediocre people, ambiguity in class-struggle reflected on the story ‘Fossile’ written by Subodh Ghosh and ‘Telenapota Abiskar’ by Premendra Mitra.

<b>Semester IV</b>	
<b>Title of the Course</b>	<b>Kabya Path</b>
<b>Paper Code</b>	<b>CC9</b>
<b>Credits</b>	<b>06</b>
<b>Hours</b>	<b>06 hours/week</b>

After gone through this paper, students may capable to understand the art and style of poetry, and writing skill. They also attain the knowledge of the text reading and analysis of poetry. They also learn about the uses of meters, figures of speeches in poetry. They also generate the knowledge about socio-cultural and mythological reflection on Bengali poetry. They also learn the rhetoric of Bengali poetry.

**This course (CC9) provides the students with-**

CO1. By reading ‘Birangana’ of Michel Madhusudan Dutta students may acquired the knowledge of how nineteenth century Renaissance and its impact reflected on Bengali poetry. They can able to test the newly boost up modern concept.

CO2. Students are able to introduce with the style and writing skill of Madhusudan Dutta. They also get a touch with ‘Amritakshar’ meter.

CO3. By reading ‘Balaka’ of Rabindranath Tagore, students can understand influences of Kinetics theory on poetry. They also feel passion for love and its contradiction deserter of First World War.

CO4. By reading Banalata Sen’ of Jibonanda Das, students may understand how the Bengali poetry or Bengali literature turn around in the age of post-Rabindranath.

<b>Semester IV</b>	
<b>Title of the Course</b>	<b>Uponyas Path</b>
<b>Paper Code</b>	<b>CC10</b>
<b>Credits</b>	<b>06</b>
<b>Hours</b>	<b>06 hours/week</b>

After gone through this paper, students may capable to understand the art and style of novel, and writing skill. They also attain the knowledge of the text reading and analysis of novel.. They also generate the knowledge about socio-cultural and reflection on Bengali novel. They also learn the rhetoric and structure of Bengali novel.

**This course (CC10) provides the students with-**

CO1. Studying this paper students may be able to understand the development and growth of Nineteenth and twentieth century Bengali novels.

CO2. By reading 'Kapalkundala' of Bankim Chandra Chattopadhyay students are able to test of Romanticism. They also able to analyse of characters of a novel. They also learn about the personality and dignity of a woman. Kapalkundala and Motibibi are most dignified women characters of this novel.

CO3. By reading 'Sesher Kobita' of Rabindranath Tagore students are able to understand romantic novel, and the inner mind of characters. Tagore's concept of love reflected in this novel.

CO4. By reading "kabi" of Tarashankar Bandyopadhyay students are able to understand how subaltern concept reflect on Bengali novel.

CO5. 'Jibon eto chhoto kane'(Why the life is too short?) is the most significant and philosophical line of this novel.

<b>Semester IV</b>	
<b>Title of the Course</b>	<b>Bangla Bhasa O Sahitya Bisayok Prokalpa O Rachona</b>
<b>Paper Code</b>	<b>SEC2</b>
<b>Credits</b>	<b>02</b>
<b>Hours</b>	<b>02 hours/week</b>

After gone through this paper, students may capable to understand how to write a project. They also attain the methodology of project writing.

**This course (SEC2) provides the students with-**

CO1. Students are able to know how to write a project with applying proper methodology.

CO2. Students are able how to present a project work.

<b>Semester V</b>	
<b>Title of the Course</b>	<b>Natya Path</b>
<b>Paper Code</b>	<b>CC11</b>
<b>Credits</b>	<b>06</b>
<b>Hours</b>	<b>06 hours/week</b>

After gone through this paper, students may capable to understand the art and style of drama, and writing skill. They also attain the knowledge of the text reading and analysis of drama.. They also generate the knowledge about socio-cultural and reflection on Bengali drama. They also learn the rhetoric and structure of Bengali drama.

**This course (CC11) provides the students with-**

CO1. Discussion of play written by Dinabandhu Mitra with reference to ‘Sadhabar Ekadoshi’.

CO2. By reading the play ‘Sadhabar Ekadoshi’ students may able to know the impact of nineteenth century’s Young Benhgal movement in Bengali drama.

CO3. Students may able to analyse charecters.

CO4. By reading ‘sahjahan’ of Dwijendralal Roy, students mat get knowledge about the features of the dramatist.

CO5. By reading ‘Sahjahan’, students attain the knowledge of historical drama. They also analyse the characters.

CO6. By reading ‘Dakghar’ of Rabindranath Tagore, students may able to know the features of play writing of Rabindranath.

CO7. After studing ‘Dakghar’ students may get the knowledge about symbolic drama. They are also able to analyse the characters. They are also able to test the feelings of eternal world.

<b>Semester V</b>	
<b>Title of the Course</b>	<b>Kabyatattwa, Paschatya Sahitya Samalochona O Sahityer Rupriti</b>
<b>Paper Code</b>	<b>CC12</b>
<b>Credits</b>	<b>06</b>
<b>Hours</b>	<b>06 hours/week</b>

After gone through this paper, students may capable to understand about Oriental poetics, western literary theories, literary forms, comparative study of criticism and its influences on Bengali literature.

**This course (CC12) provides the students with-**

CO1. Studying 'Kabyajigyasa' by Atul Chandra Gupta, students are able to know about the rhetoric of a poetry.

CO2. Students are able to attain the knowledge of 'Rasa' and 'Dhoni'. How these theories are applied in literary criticism.

CO3. Students are able to understand about the western literary theories such as Classicism, Romanticism, Surrealism, Realism and Symbolism.

CO4. How the western literary theories reflected and impact in Bengali literature.

CO5. Students may attain the knowledge of Epic, Tragedy, Farce, Lyric, Elegy, Ode, Regional Novel, Psychological Novel and Historical Novel. How all the before said concepts impact and reflect in Bengali literature.

<b>Semester V</b>	
<b>Title of the Course</b>	<b>Prachin Sahityatattwa O Sahitya-Tattwik</b>
<b>Paper Code</b>	<b>DSE1</b>
<b>Credits</b>	<b>06</b>
<b>Hours</b>	<b>06 hours/week</b>

After gone through this paper, students may capable to get knowledge on Oriental poetics, description of theories, analysis of the theories, and impact of those theories in Bengali literature. Students also learn about the life and works of theoreticians.

**This course (DSE1) provides the students with-**

CO1. Students are able to learn about concepts of different oriental literary theories on verses, poetry and drama.

CO2. Students are able to learn various theories, such as 'Ritibad', Alonkar', 'Gun', Oichitya' and 'Bakroakti'.

CO3. Students are introduce with the life and works of Bharat, Bhamha, Baman, Dondi, Anadabardhan, Abhinaba Gupta and Biswanath Kabiraj.

<b>Semester V</b>	
<b>Title of the Course</b>	<b>Bangla Chhotogalpo, Bhramon Kahini O Goenda kahini Path</b>
<b>Paper Code</b>	<b>DSE2</b>
<b>Credits</b>	<b>06</b>
<b>Hours</b>	<b>06 hours/week</b>

After completion this course the students will be capable to learn about different types of short stories. They also learn about features of Detective novels and its impact in Bengali literature.

**This course (DSE2) provides the students with-**

CO1. After reading the story 'Rasamoyee Rosikata' by Prabhat Kumar Mukhopadhyay, the students may concern about inner conflict of a woman.

CO2. After reading 'Bedini' by Tarasankar Bandopadhyay, "Pragoitihasi" by Manic Bandopadhyay, 'Hoito' by Premendra Mitra, 'Aswamedher Ghora' by Dipen Bandopadhyay- the students may acquire knowledge of human mind and its inner conflicts.

CO3. After reading the novel 'Morutirtha Hinlaj' by Kalikananda Abadhut, the students are able to learn about travel history.

CO4. Studying Sharadindu Bandopadhyay's 'Sajarur Kanta', the students are able to attain the knowledge of detective stories.

<b>Semester VI</b>	
<b>Title of the Course</b>	<b>Loksahtya</b>
<b>Paper Code</b>	<b>CC13</b>
<b>Credits</b>	<b>06</b>
<b>Hours</b>	<b>06 hours/week</b>

After completion this course the students will be capable to get knowledge on traditional Bengali Folk literature. Text reading on lyrical ballads, students will be able to criticise folk culture.

**This course (CC13) provides the students with-**

CO1. Students may learn the definition, characteristics, and features of Folk literature. They also learn differences between folk culture and urban culture. They also learn about anthropological studies on Folk literature.

CO2. Students learn about various forms of Folk literature, such as Rhymes, Riddles, Proverbs, Folktales, Fairy tales, Folk songs and Folk drama.

CO3. Text reading of Maimonsinhagitika', students may able to know regional colour of the text, dramatic elements, lyricism in it.

CO4. By reading 'Banglar Brata' by Abanindranath Tagore, students attain the knowledge of conventional vows of Bengal.

<b>Semester VI</b>	
<b>Title of the Course</b>	<b>Sanskrita, Ingreji O Protibeshi Sahityer Itihas</b>
<b>Paper Code</b>	<b>CC14</b>
<b>Credits</b>	<b>06</b>
<b>Hours</b>	<b>06 hours/week</b>

After completion this course the students will capable to hold a concept on ancient Sanskrit, English and Regional Indian literature. Students can apply comparative criticism. Students are able to understand the values of humanity beyond geographical barrier.

**This course (CC14) provides the students with-**

CO1. Outline of history of Sanskrit literature with reference to studies on Vedic literature, Ramayana, Mahabharata, Kalidasa, Aswaghosh and Vasa.

CO2. Outline of history of English literature with reference to studies on Shakespeare, Wordsworth, Charls Dickens, Byron, Shelly and T.S Eliot.

CO3. Outline of history of Regional Indian literature with reference to studies on Hindi Bhaki sahitya, Premchand, Mahadebi Barba, Fokir Mohon Senapoti, Ramakanta Rath, Kalindicharan Panigrahi, Laxmikanta Bej Borua, Rajakanta Bordolui and Birinchi Kumar Borua.

CO4. Students are able to get an idea about humanities, love and passion beyond geographical, gender and races boundaries.

<b>Semester VI</b>	
<b>Title of the Course</b>	<b>Natya Sahitya Path</b>
<b>Paper Code</b>	<b>DSE3</b>
<b>Credits</b>	<b>06</b>
<b>Hours</b>	<b>06 hours/week</b>

After completion this course the students will capable to learn about different types of drama. They also learn about features of drama.

**This course (DSE3) provides the students with-**

CO1. Reading the drama ‘Sajan’ by Dwijendralal Roy, students may capable to learn about historical drama. They are also able to discuss of different characters and content of the drama. They can analyse the style of the drama.

CO2. By reading the drama ‘Sajano Bagan’ by Manoj Mitra, students may learn about social drama.

CO3. By reading various one act play of various dramatist such as ‘Shikabab’ by Banaphool, ‘Rajpuri’ by Manmatha Roy, ‘Choujananda’ by Tulsi Lahiri, ‘Ek pashla Bristi’ by Dhananjoy Bairagi and ‘Sorisrip’ by Manik Bandopadhyay, students may test different views and different types of human moods and mind.

CO4. Students get knowledge of one act play.

<b>Semester VI</b>	
<b>Title of the Course</b>	<b>Rabindra Sahitya Path</b>
<b>Paper Code</b>	<b>DSE4</b>
<b>Credits</b>	<b>06</b>
<b>Hours</b>	<b>06 hours/week</b>

After gone through this paper, students will attain specialised knowledge on the literature of Rabindranath Tagore.

**This course (DSE4) provides the students with-**

CO1. By reading the text ‘Se’ by Rabindranath Tagore, students may generate knowledge of prose writing style.

CO2. By reading ‘Muktadhara’, students learn about allegorical drama. They also learn about the victory of humanity over the instrument translate.

CO3. By reading some selected poetry of Tagore such as ‘Nirjharer Swapnabhanga’, ‘Sonartori’, ‘Bodhu’, ‘Swarga Hoite Bidai’, ‘Rup Sagare Dub Diechhi’ and ‘Sadaharan Meye’, students may introduction of versatile poetry talent of Rabindranath.

<b>Semester I</b>	
<b>Title of the Course</b>	<b>Bangla Bhasar Bibhinna Star O Bangla Bhasacharcha</b>
<b>Paper Code</b>	<b>GE1</b>
<b>Credits</b>	<b>06</b>
<b>Hours</b>	<b>06 hours/week</b>

After gone through this paper, students will attain the knowledge of origin and development of Bengali language, different stages of Bengali language, different dialect of Bengali language, the source of linguistics of the world, Indo-Aryan linguistics and linguistics of Bengali language.

**This course (GE1) provides the students with-**

CO1. After reading, the students are capable to generate the knowledge of origin and development of Bengali language, the different stages of Bengali language, different dialects of Bengali language.

CO2. Students may capable to get introduction with the main source linguistics of the world, Indo-Aryan linguistics.

CO3. Students may learn the reasons for the changes in sound and the formula of sound change.

CO4. Students may learn Semantics and reasons for the changes of Semantics and its formula.

CO5. Students may gather knowledge about Bengali vocabulary.

CO6. Students can learn about Standard language and Colloquial language.

CO7. Students can learn about sentence and the structure of a sentence.

<b>Semester II</b>	
<b>Title of the Course</b>	<b>Kabya Sahityer Dhara O Baishnab Padaboli Path</b>
<b>Paper Code</b>	<b>GE2</b>
<b>Credits</b>	<b>06</b>
<b>Hours</b>	<b>06 hours/week</b>

After gone through this paper, students will attain the knowledge on Ancient and Medieval and Modern Bengali poetry and verse. They also able to specific knowledge on Baisanab padaboli or Baisanab text.

**This course (GE2) provides the students with-**

CO1. Outline of Ancient, Medieval and Modern Bengali poetry and its features.

CO2. Students may generate knowledge about poets such as Vidyapati, Chandidas, Gyanandas, Gobindadas, Madhusudan Dutta, Rabindranath tagore, Jibananda Das, Nojrul Islam, Sudhindranath Dutta, Amiya Chakraborty, Bishnu De and Shakti Chattopadhyay.

CO3. Studying selected verses of Vidyapati, ChandidasGyandas and Gobindadas students are able to attain the test of Baisnab literature. Students are also learn various theory of Baisnab cult such as Purbarag, Abhisar, Mathur etc.



<b>Semester III</b>	
<b>Title of the Course</b>	<b>Uponyas O Chhotogalpo Path</b>
<b>Paper Code</b>	<b>GE3</b>
<b>Credits</b>	<b>06</b>
<b>Hours</b>	<b>06 hours/week</b>

After gone through this paper, students may capable to understand the art and style of novel and short story writing skill. They also attain the knowledge of the theory Psychological novel, stream of consciousness novel.

**This course (GE3) provides the students with-**

CO1. Understand about nineteenth and twentieth century Bengali novels and short stories and also origin, development, forms and content

CO2. By reading Bankimchanra Chattopadhyaya's 'Bisabrikksha' students can understand the theory of Psychological novel, stream of consciousness theory.

CO3. Students will be capable to classify and analyse the characters of a novel or story.

CO4. By reading Bibhutibhusan's 'Pather Panchali' students can understand the relations between Man and Nature.

CO5. After reading selected short stories students can gather knowledge of various thoughts and prejudice.

<b>Semester IV</b>	
<b>Title of the Course</b>	<b>Bangla Giti Sahitya, Sishu Sahitya O Ramya Rachonar Dhara</b>
<b>Paper Code</b>	<b>GE4</b>
<b>Credits</b>	<b>06</b>
<b>Hours</b>	<b>06 hours/week</b>

After gone through this paper, students will attain the knowledge on Bengali lyrics, the literature which were aimed to be reading for children's. They also learn about informal essays.

**This course (GE3) provides the students with-**

CO1. Outline of Bengali lyrics.

CO2. Outline of Bengali Children Literature and its development.

CO3. Students are introduce with the children literature authors such as Vidyasagar, Madonmohon Tarkalankar, Sibnath Shastri, Dakshina Ranjan Mitra Majumder, Rabindranath Tagore, Abanindranath, Jogindranath Sarkar, Upendra Kishore Roychowdhry, Satyajit Roy, Sukumar Roy,

Leela Mojumder, Narayan Gangopadhyay, Premendra Mitra, Trailokyanath Mukhopadhyay and Sukholata Rao.

CO5. Students may able to make a concept about informal essays and essay writers such as Hutom Pacha, Pramatha Chowdhury, Kalopacha, Mujataba Ali and Sanjib Chatopadhyaya.

# Course Outcome

## Bengali (DSC)

Semester I	
Title of the Course	Bangla Sahityer Itihas O Bangla Bhasatattwa
Paper Code	DSC1AT
Credits	06
Hours	06 hours/week

After gone through this paper, students may capable to understand the origin and development of Bengali linguistics and literature.

**This course (DSC1AT) provides the students with-**

CO1. CO1: Origin of Bengali language, its historical development and transformations.

CO2: Bengali vowels, its features, procedures and pronunciation, its classifications.

CO3: Bengali semantics, rules of transformations of meaning of a word; different sources in Bengali vocabulary.

CO4: Bengali Phonetics, its classifications, procedures of transformations, comparative study amongst processes.

CO 5: Bengali dialects, its classifications, Phonetics and morphological features of those with suitable examples.

CO6: Outline of old and medieval history of Bengali literature; discussion of the texts, significance of the texts, overview on the Poets and their poetic works.

CO7: Origin and development of Bengali proses, contribution of Fort William college, Rammohun Roy, Vidyasagar, Pyarichand Mitra, Kaliprassana Sinha and Bankim Chandra Chattopadhyay, - discussion of their texts, significance of their texts in the history of Bengali literature.

CO8: Development of Bengali poetries in nineteenth and twentieth centuries, Contribution of Madhusudan Dutta, Rabindranath Tagore, Kaji Najrul Islam, Jibonanondo Das, conents and styles of their writings, impact of Bengal renaissance, impact of European romantic movememt, impact of T. S Eliot, Ezra Pound and others in their works respectively.

CO9: Development of Bengali fictions in nineteenth and twentieth centuries, Contribution of Bankim Chandra Chattopadhyay, Rabindranath Tagore, Bibhutibhusan Bandopadhyaya , overview of their texts, significance of their works in the stream of Bengali fictions.

<b>Semester II</b>	
<b>Title of the Course</b>	<b>Kabya-Kobita</b>
<b>Paper Code</b>	<b>DSC1BT</b>
<b>Credits</b>	<b>06</b>
<b>Hours</b>	<b>06 hours/week</b>

After gone through the paper students will be able to attain the knowledge on different trends of medieval and modern Bengali literature.

**This Course (DSC1BT) provide the students with-**

CO1: Various trends of medieval Bengali literature, in connection with Vaishnava padabali, text reading, critical appreciation, about the poets, philosophy reflected in it.

CO2: Shaktapadabali, text reading, critical appreciation, about the poets, social issues reflected in it.

CO3: ‘Virangana Kavya’, text reading, critical appreciation, Western and Oriental influence in it, style, form and impact of nineteenth century renaissance in the text.

CO4: Poetries of nineteenth and early twentieth centuries, - text reading, features, content, influence of Tagore on Bengali poetry, about those poets who creates new trends beyond Tagore’s influence,- their features, their individuality.

CO5: Text reading of the Poetries of late Twenties, their novelty, individuality, setting of new trends in the stream of Bengali poetries.

<b>Semester III</b>	
<b>Title of the Course</b>	<b>Bangla Katahasahitya, Natok O Prabandho</b>
<b>Paper Code</b>	<b>DSC1CT</b>
<b>Credits</b>	<b>06</b>
<b>Hours</b>	<b>06 hours/week</b>

After gone through the paper students will be able to attain the knowledge on different trends and development of Bengali drama, fiction and essays..

**This Course (DSC1CT) provide the students with-**

CO1: Text reading of Bengali short stories, their content, style, social issues reflected in it,

comparison amongst the authors.

CO2: Text reading of the novel 'Pother Panchali' by Bibhutibhusan Bandopadhyaya; its content, style, treatment of nature reflected in it, novelty of the text in the Bengali, comparative study with other rural life-oriented stories.

CO3: Text reading of 'Sahajahan' by D.L. Roy, features of tragedy reflected in it, comparison with western tragedy, critical appreciation of the text, style, songs used in the text, qualities of acceptance in professional theatre.

CO4: Text reading of collected essays, their content, styles, about the essayist, significance of the texts in Bengali essays.

<b>Semester IV</b>	
<b>Title of the Course</b>	<b>Sahityatattwa O Sahitya Nirmankala</b>
<b>Paper Code</b>	<b>DSC1DT</b>
<b>Credits</b>	<b>06</b>
<b>Hours</b>	<b>06 hours/week</b>

After gone through the paper students will be able to attain the knowledge on awsthetics, Sanskrit aesthetics, it will enrich the analytical sense of the students. Knowledge of meters wills capable them to read poetry well, knowledge of rhetoric enhances the literary sense of the students.

**This Course (DSC1DT) provide the students with-**

CO1: Studies of Rasa and Dhawni, the analysis of sanskrit poetics, its definition, examples, application in Sanskrit literature, applicability in Bengali literature.

CO2: Studies on Bengali metres, definition, classifications, features, scantion of a text, comparison amongst their varieties.

CO3: Studies on Bengali rhetorics, definition, classifications, features, applications in a text, identification of a rhetoric in a poetic language, comparison amongst their varieties

<b>Semester V</b>	
<b>Title of the Course</b>	<b>Bangla Natok O Kobit</b>
<b>Paper Code</b>	<b>DSC1T</b>
<b>Credits</b>	<b>06</b>
<b>Hours</b>	<b>06 hours/week</b>

After gone through the paper students will be able to attain the knowledge on development of Bengali literature in its modern period through the text reading of a drama. Students may get an idea on influence of Greek tragedy in Bengali drama in the light of text specified for. Students have to read collected Bengali poems of nineteenth and twentieth century for acquiring knowledge on growth of Bengali poetries for nineteenth century.

**This course (DSE1T) provides the students with-**

CO1: Text reading of the drama ‘Krishnakumari’, its content, form, influence of oriental history and antiquities in it, impact of Greek tragedy on the plot, significance of the text in the perspective of Bengali drama, craftsmanship of Madhusudan Dutta reflected in it, novelty of the text.

CO2: Text reading of nineteenth century Bengali poetry through the sonnet by Madhusudan Dutta, content, patriotism of nineteenth century reflected in it, structure of sonnets and its application in Bengali literature.

CO3: Text reading of ‘Balaka’ by Rabindranath Tagore, content, philosophy reflected in the poetry, influence of world war in it, style, significance of the text in Tagore’s creation and Bengali literature as well.

CO4: Text reading on Tagore-contemporary and post- Tagore poetries, its content, style, influence of western poets on post – Tagore poetries, significance of the poems in Bengali poetries, literary values.

<b>Semester V</b>	
<b>Title of the Course</b>	<b>Kabya</b>
<b>Paper Code</b>	<b>GE1T</b>
<b>Credits</b>	<b>06</b>
<b>Hours</b>	<b>06 hours/week</b>

After gone through this paper, the students may introduce with Tagore poetry and modern poetry in reference with Amiya Chakraborty.

**This course (GE1T) provides the students with-**

1. Text reading of Rabindranath Tagore's 'Chitra', students may attain the knowledge of Tagore's poetry. They can analyse the text's content and form. Students also attain the knowledge of Rabindranath's idealistic view over eternity.
2. Text reading of 'Parapar' by Amiya Chakraborty, students may attain the knowledge of modern Bengali poetry. They can analyse the text content and form.

<b>Semester III</b>	
<b>Title of the Course</b>	<b>Likhan Naipunya Briddhi</b>
<b>Paper Code</b>	<b>SEC1T</b>
<b>Credits</b>	<b>02</b>
<b>Hours</b>	<b>02 hours/week</b>

After gone through this paper students will be able to attain the knowledge on development of writing skill, through the practices of extempore writing and format-related writing.

**The Course (SEC1T) provides the students with-**

CO1: Practice of writing of explanation and summary, its technique, how to write the effective language through this practice.

CO2: How to write an effective news features, its techniques and skills which will be practiced.

CO3: How to write effective Paragraphs on different topics, its techniques, improvement of vocabulary, practice of effective sentence constructions.

CO4: How to write a Formal letter, its forms, specifications in presentations.

CO5: How to draft an effective advertisement write up, classifications of advertisements, its purpose, techniques of writing.

<b>Semester IV</b>	
<b>Title of the Course</b>	<b>Bangla Dhonitattwa O Ruptattwa</b>
<b>Paper Code</b>	<b>SEC2T</b>
<b>Credits</b>	<b>02</b>
<b>Hours</b>	<b>02 hours/week</b>

After gone through this paper students may attain the knowledge on Bengali phonetics and morphology.

**This course (SEC2) provides the students with-**

CO1: Bengali phonetics, - its description, definition, classifications, rules with suitable examples.

CO2: Bengali morphology- its description, definition, classifications, rules with suitable examples.

CO3: Bengali suffixes, its descriptions, definitions, examples; ‘Pratyayas’ and ‘Bibhakties’ used in Bengali words, definitions, examples, constructions of Bengali words – its applications.

<b>Semester V</b>	
<b>Title of the Course</b>	<b>Shaili, Kabya Shaili, O Natya Shoili Bichar</b>
<b>Paper Code</b>	<b>SEC3T</b>
<b>Credits</b>	<b>02</b>
<b>Hours</b>	<b>02 hours/week</b>

After gone through this paper students will attain the knowledge on Style, different types of stylistics views used in poetry, prose and drama.

**This course (SEC3T) provides with-**

CO1: Definition of stylistics, theories, its component, classifications – relation between style and content.

CO2: Stylistics of poetries, its applications, rules, examples, stylistic analysis of a text. CO3:

Stylistics of proeses, its applications, rules, examples, stylistic analysis of a text. CO4:

Stylistics of dramas, its applications, rules, examples, stylistic analysis of a text.



<b>Semester I</b>	
<b>Title of the Course</b>	<b>Bangla Bhasa Prosango, Anubad O Kathon Dakshata</b>
<b>Paper Code</b>	<b>AECC-MIL</b>
<b>Credits</b>	<b>02</b>
<b>Hours</b>	<b>02 hours/week</b>

After gone through this paper students will attain the knowledge on Bengali linguistics, translation and its methodologies, oration and techniques of oration.

**This course (AECC-MIL) provides with-**

CO1: Definition of Socio-linguistic, development of the concept of socio linguistics, Language planning, history of its development, definition of language planning, its features.

CO2: Bengali social linguistics, its components, factors, discussion on Religion, Profession, Age groups as a deciding factor of creating of social language groups.

CO3: Contemporary Standard colloquial Bengali language, its features, its phonetics and morphological features, regions where the language is used, examples.

CO4: Translations, its classifications, rules, practice on translation from Bengali to English and English to Bengali.

CO5: Practice of orations, definition of Oration, why it is important, practice of two types of orations, - Interview and delivery of a speech, its techniques, with suitable examples.

<b>Semester II</b>	
<b>Title of the Course</b>	<b>Kobita O Chhotogalpo</b>
<b>Paper Code</b>	<b>AECC-MIL-CL-1</b>
<b>Credits</b>	<b>02</b>
<b>Hours</b>	<b>02 hours/week</b>

After gone through this paper students will attain the knowledge on development of Bengali poetries since the era of Tagore and its changing trends. Students attain the knowledge on short stories and its variant content and style.

**This course (AECC-MIL-CL-1) provides with-**

CO1: Text reading of a poetry ‘Ami’ by Tagore, its features, comparative study of the text, philosophy reflected in it, significance of the poem in Tagore’s creation.

CO2: Text reading on ‘Mohuyar desh’ by Samar Sen, its features, comparative study of the

text, philosophy reflected in it, significance of the poem in Bengali poetries.

CO3: Text reading on 'Samyabadi' by Kaji Najrul Islam, its features, comparative study of the text, philosophy reflected in it, social message lying behind the thought, significance of the poem in Bengali poetries.

CO4: Text reading on 'Utpakhi' by Sudhindranath Dutta, its features, comparative study of the text, philosophy reflected in it, significance of the poem amongst Bengali poetries.

CO5: Text reading on 'Barababur Kachhe nibedon' by Amiya Chakraborty, its features, comparative study of the text, philosophy reflected in it, significance of the poem amongst Bengali poetries.

CO6: Text reading 'Mahesh', short story by Sarat Chandra Chattopadhyay, its features, comparative study of the text, philosophy reflected in it, significance of the story in the stream of Bengali short stories.

CO7: Text reading,- 'Lambakorno', short story by Rajsekhar Bosu, its features, humour and social satire of the text, style, significance of the story in the stream of Bengali short stories.

CO8: Text reading,- 'Puimancha', short story by Bibhuti bhusan Bandopadhyaya, its features, treatment of nature in the story and social crisis reflected in the text, style, significance of the story in the stream of Bengali short stories.

CO9: Text reading,- 'Girgiti', short story by Jyotirindra Nandi, psychological perspective reflected in the text, style, significance of the story in the stream of Bengali short stories.

CO10: Text reading, -'Teacher', short story by Manik Bandopadhyayay, social crisis reflected in the text, style, significance of the story in the stream of Bengali short stories.

CO10: Text reading, 'Tarini Majhi', short story by Tarasankar Bandopadhyayay, regionality of the text, crisis in human nature reflected in the text, style, significance of the story in the stream of Bengali short stories.

<b>Semester IV</b>	
<b>Title of the Course</b>	<b>Inish Shakatek Bangla Prabandho O LokSahitya</b>
<b>Paper Code</b>	<b>AECC-MIL-CL-2</b>
<b>Credits</b>	<b>02</b>
<b>Hours</b>	<b>02 hours/week</b>

After gone through this paper students will attain the knowledge on development of Bengali essays of nineteenth century and its changing trends. Students will also acquire knowledge on Bengali folk literature and its variant contents and style.

**This course (AECC-MIL-CL-2) provides with-**

CO1: Text reading,-‘ Gitikabya’, an essay by Bankim Chandra Chattopadhyay, its features, comparative study of the text, style, philosophy reflected in it, significance of the essay in the stream of Bengali proses.

CO2: Text reading, - ‘Vidyasagar’, an essay by Ramendra Sundar Trivedi, its style, comparative study of the text, philosophy reflected in it, significance of the essay in the stream of Bengali proses.

CO3: Text reading,- ‘BhabbarKotha’ , an essay by Swami Vivekananada, its style, comparative study of the text, philosophy reflected in it, significance of the essay in the stream of Bengali proses.

CO4: Text reading,- ‘Musalmanibangla’ , an essay by Haraprasad Shastri, its style, comparative study of the text, philosophy reflected in it, significance of the essay in the stream of Bengali proses.

CO5: Text reading,- ‘Mohuya pala’ , a lyrical ballad of Maimansingha, , Characters, dialogue, conflict of the story, its style, comparative study of the text, social crisis and philosophy reflected in it, significance of the story in the stream of Bengali folk literature.



# GARHBETA COLLEGE

(Affiliated to Vidyasagar University)

Accredited by NAAC

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## M. A. –Bengali

### Programme Specific Outcome (PSOs)

Bengali is one of the oldest Literature and Language based subject. It is originated by the Prakrita 'Magadhi Apabhransh'. Bengali is very much enriched with Classical Sanskrit Literature. Bengali is our proud inheritance. Several authors have contributed in Bengali language and literature. Rabindranath Tagore awarded with Nobel Prize for his contribution in Bengali Literature. Krittibas Ojha, Kasidas, Bijoy Gupta, Bankim Chandra Chattopadhyaya, Iswar Chandra Vidyasagar, Bhudeb Mukhopadhyay, Parichand Mitra, Dinabandhu Mitra, Girish Ghosh, Michel Madhusudan Dutta, Bibhutibhusan Bandopadhyay, Tarasankar Bandopadhyaya, Manik Bandopadhyay, Jibanananda Das, Swarnakumari Debi, Ashapura Debi, Kusmkumari Das, Mahashweta Sakti Chattopadhyaya, Debi, Sankha Ghosh, Narayan Gangopadhyaya, Adwita Mallabarman, Sukumar Roy, Satyajit Roy, Leela Majumder and many others authors contributed in Bengali language and literature. Famous scientist Jagadish Chandra Bose, Prafulla Chandra Roy, Meghnad Saha wrote their scientific experiments in Bengali language. Many films have been made based on Bengali literature.

**After completion of the programme , the students will be capable of-**

PSO1: The human aspects and subtle senses get widen in the close touch of literature.

PSO2. The evolution of Bengali language since the ancient period and the medieval ages and its present position has fully been described in the Bengali language and literature.

PSO3: The History of Bengali literature gives us an idea about the economic, social, political, cultural history of Bengal.

PSO4: Drama, Novel, Short stories, Poems which are written in Bengali were transformed into performing art.

PSO5: Students of Bengali literature are taught how to make a critical appreciation of a text

PSO6: Students of Bengali literature are taught to evaluate a text through its transformation and re-editing.

PSO7: Translation studies are also taught by the Students of Bengali literature.

PSO8: Research intelligence is nurtured through the programme.

PSO9: Revelation of eternity of human being through the study of regional and world literature.

PSO10: Bengali literature has contributed to the world cinema, Indian cinema, theatres with its many rich creations. Transformation of an art form will be discussed through the programme.

## Course Outcome

Semester I	
<b>Title of the Paper</b>	<b>Bhasar Itihas O Parichoy</b>
<b>Course Code</b>	<b>BNG 101</b>

After gone through this paper students will be able to attain the knowledge on origin and developments of Bengali linguistics and origin and development of Bengali scripts.

*This course (BNG 101) provides the student with-*

CO1: Outline of Indo-European Language groups; its branches, origin of Indo-Aryan languages, its historical development and transformations.

CO2: Discussion on Middle -Indo- Aryan languages, its classifications, linguistic features, transformations.

CO3: Discussion on Neo -Indo- Aryan languages, its classifications, linguistic features, transformations.

CO4: Discussion on languages, originated from Magahi – Prakrit, its phonics and morphological features.

CO5: Origin of Bengali languages, its development, three stages of its development.

CO6: Origin and development of scripts, historical development of Bengali scripts.

<b>Semester I</b>	
<b>Title of the Paper</b>	<b>Madhya Juger Sahitya Dhara</b>
<b>Course Code</b>	<b>BNG 102</b>

After gone through this paper, students will be able to attain the knowledge on different trends of medieval Bengali literature.

*This course (BNG 102) provides the student with-*

CO1: History of Bengali people, its anthropological features, rituals, different religious movements with special reference to Shakta, Sufi and Baul Sects.

CO2: Discussion on various trends of medieval Bengali literature, in connection with Influence of Sri Chaitanya deva, development of translated verses, biography- oriented verses, Vaishnava literature.

CO3: Discussion on Nath Sahitya, its features, literary qualities, elements of acculturation in it.

CO4: Discussion on Mangal Sahitya, its classification, impact of sociological changes in it, its literary value, different poets of this stream.

CO5: Discussion on Arakan Court literature, its distinctive features which reflects in its humanitarian view, poets of this stream, literary values.

CO6 : Discussion on late eighteen century Bengali literature with reference to Shaktapadabali and Kabigaan, the societal changes reflects in it, its literary value, important poets of these streams.

<b>Semester I</b>	
<b>Title of the Paper</b>	<b>Prachin O Madhya Juger Sahityapath</b>
<b>Course Code</b>	<b>BNG 103</b>

After gone through this paper, students will be able to attain the knowledge on origin and development of Bengali language through the literature.

*This course (BNG 103) provides the student with-*

CO1: Outline of early Bengali verses, -Jaydev, PrakritaPaingal, Subhasito Ratnakosh, SaduktiKarnamrito, Aryasaptasati, Gathasaptasati.

CO2: Discussion and selected reading on prakritopaingal, text analysis, literary and linguistic

features.

CO3: Discussion and selected reading on Gitagobindam, text analysis, literary and linguistic features, trends of Baishnava lyrics.

CO4: Discussion and selected reading on Saraherdohakosh , text analysis, literary and linguistic features.

CO5: Discussion and selected reading Charyapada and Srikrishna kirtan, text analysis, literary and linguistic features.

CO6: Origin and development of Bengali language through literature, historical development of Bengali language, society, aesthetic features reflected in early Bengali verses.

Semester I	
<b>Title of the Paper</b>	<b>Anta Madhya Juger Sahityapath</b>
<b>Course Code</b>	<b>BNG 104</b>

After gone through this paper, students will be able to attain the knowledge on post middle age Bengali literature.

*This course (BNG 104) provides the student with-*

CO1: Verses of Vidyapati,- selected text reading, its literary values, features of pre-ChaitanyaBaishnava traits in Baishnava texts.

CO2:Verses of Chandidasa,- selected text reading, its literary values, features of pre-ChaitanyaBaishnava traits in Baishnava texts.

CO3: Verses by Gyanadasa,- selected text reading, its literary values, features of post-ChaitanyaBaishnava traits in Baishnava texts.

CO4:Verses by Gobindadasa,- selected text reading, its literary values, features of post-ChaitanyaBaishnava traits in Baishnava texts.

CO5: Discussion and selected reading on ChitaynyaCharitamrita, features of Gouriobaishnava philosophy reflected in it, its literary values, historical elements.

CO6: Discussion and selected reading on ShivayanKabya, features of late eighteen century societal, ethical decays reflected in it, its literary values, historical elements, about the poets.

<b>Semester I</b>	
<b>Title of the Paper</b>	<b>Unish-Bis Shataker Gadya Sahityer Itihas O Gadya Sahitya Path</b>
<b>Course Code</b>	<b>BNG 105</b>

After gone through this paper, students will be able to attain the knowledge of origin and development of Bengali essay writing. They will also be able to learn nineteenth and twentieth century essay writing in Bengali.

*This course (BNG 105) provides the student with-*

CO1: Development of Bengali Prose, its styles, contents through the essays written by Scholars of Fort William College; contribution of Rammohan Roy, Vidyasagar, Pramatha Chaudhury, Annadasankar Roy, content of their writing, style of writing, literary values.

CO2: Discussion and selected reading on the essays, - BangalarItihas, Monpassant, Chekhov O Rabindranath, shikha o sanskriti, -content of the essays, different styles of proses reflected in it, its literary values, socio -cultural elements.

CO3: Discussion and selected reading on the essays, KamalakanterDofter by Bankim Chandra Chattopadhyaya, content of the book, features of Bankim Chandra's writing, styles of proses reflected in it, its literary values, socio -cultural elements and impact of Dequincy reflected on it.

CO4: Discussion and selected reading on the text Shakuntala by Vidysagar, features of Vidyasagar's writing, style of prose reflected in it, its literary values, socio - cultural elements and comparison of this translation work with its original written by Kalidasain Sanskrit.

<b>Semester II</b>	
<b>Title of the Paper</b>	<b>Sadharan Bhasabigyan</b>
<b>Course Code</b>	<b>BNG 201</b>

After gone through this paper, students will be able to attain the knowledge on the development of Bengali linguistics.



*This course (BNG 201) provides the student with-*

CO1: Bengali Phonetics, its basic elements, - Phone, Phonemes, Allophones; undistributed vowels, positions of vowels, about vowels and consonents, International phonetic alphabets and its applications.

CO2: Morphology and its elements, - morph, morphemes, Allomorphs, varieties in Bengali morphology.

CO3: Sentence, Part of sentences, structure of Bengali sentences, transformations theories- its discussion and classifications.

CO4: Socio-linguistics and its components, - social dialect, its discussion; register, diglossia, definition, features; languages through variation of age, religion, profession, gender; language planning and its development and features.

<b>Semester II</b>	
<b>Title of the Paper</b>	<b>Unish-Bish Shataker Kabya-Kobita</b>
<b>Course Code</b>	<b>BNG 202</b>

After gone through this paper, students will be able to attain the knowledge of the development of Bengali verses of nineteenth and twentieth century's and its style, content, impact of Bengal renaissance, and also impact of western theories.

*This course (BNG 202) provides the student with-*

CO1: Text reading on 'Meghnadbodhkabya' by Madhusudan dutta, its content, styles, Blank verse introduced by poet known as amitkhorchhanda, influence of oriental and western elements in this text, features of literary epic in it, literary values.

CO2: Text reading on 'Banalata Sen' by Jibinanda Das, its content, style, features of post - Tagore writings in it, influence of oriental and western elements in this text, images of this text, neo- romanticism reflected in it, literary values.

CO3: Text reading on collected poems by the poets of twentieth century, its content, styles, features of post - Tagore writings in it, influence of oriental and western elements in these texts, images of these texts, neo- romanticism, impact of second world war reflected in it, literary values.

<b>Semester II</b>	
<b>Title of the Paper</b>	<b>Rabindra Sahitya Path</b>
<b>Course Code</b>	<b>BNG 203</b>

After gone through this paper, students will be able to attain the knowledge on Rabindranath Tagorean literature.

*This course (BNG 203) provides the student with-*

CO1: Text reading on 'Shymali' by Rabindranath Tagore, its content, styles, philosophy of mortality and immortality reflected in this poem, images used in this text, meters of this book, significance of this text amongst Tagore,s creations.

CO2:Text reading on 'Raktakorobi' by Rabindranath Tagore, its content, styles, philosophy and social conflict reflected in this drama, images and songs used in this text, songs dialogues, charactersof this text, significance of this text amongst Tagore,s creations.

CO3:Text reading on 'Chaturanga' by Rabindranath Tagore, its content, styles, philosophy and social conflict reflected in this novel, images used in this text, plot, dialogues, characters of this text, significance of this text amongst Tagore's creations.

CO4: Text reading on short stories by Rabindranath Tagore, its content, styles, philosophy and social conflict reflected in this story, images used in this text, plot, dialogues, characters of this text, treatment of nature, super-naturalism, significance of these texts amongst Tagore's creations.

<b>Semester II</b>	
<b>Title of the Paper</b>	<b>Bangla Bhasatattwa O Sahityer Path</b>
<b>Course Code</b>	<b>BNG 204 (CBCS)</b>

This course is aimed to the students who are not belonging to Bengali Postgraduate course. After gone through this paper, students will be able to attain the knowledge on Bengali language and literature. They can attain the basic knowledge on Bengali linguistics.

*This course (BNG 204) provides the student with-*

CO1: Discussion on Bengali linguistics, - Phoneme, Morpheme, Bengali morphology.

CO2: Discussion on old Bengali literature in connection with Charyapada, text reading, its religious aspects, societal features, literary values, eminent poets and their poetic features.

CO3: Discussion on medieval Bengali literature in connection with Baishnavapada, text reading, its religious aspects, philosophy reflected in it, difference between pre and post baishnava traits, literary values, eminent poets and their poetic features.

CO4: Discussion on GouriyoBaishnava philosophical movements, its features, its connection with other Indian philosophies, its social impacts, main poets of this traits.

CO5: Discussion on modern Bengali drama with refence to 'Bur salikherGhare Roan' by Madhusudan Dutta; text reading, its social satire, plot, characters, dialogue, literary values.

<b>Semester II</b>	
<b>Title of the Paper</b>	<b>Bangla Bhasatattwa O Sahityer Path</b>
<b>Course Code</b>	<b>BNG 205</b>

After gone through this paper, students will be able to write a Project paper or thesis paper with applying proper methodologies.

*This course (BNG 205) provides the student with-*

CO1: Discussion on research methodologies, its definition, different views with suitable examples.

CO2: Discussion on different components of a Project paper as mentioned by affiliating university with suitable examples.

CO3: Discussion on the process of selection of title of the project.

CO4: Practical work on writing of a Project paper.

<b>Semester III</b>	
<b>Title of the Paper</b>	<b>Unish-Bish Shataker Uponyaser Itihas O Path</b>
<b>Course Code</b>	<b>BNG 301</b>

After gone through this paper students will get knowledge on development of Bengali novel.

*This course (BNG 301) provides the student with-*

CO1: Historical outline and development of Bengali novels of nineteenth and twentieth century; its contents, forms, socio-cultural perspectives reflected in it, literary values.

CO2: Text reading on 'Krishnakanter Will' by Bankim Chandra Chattopadhyaya, its content, style, philosophy and social conflict reflected in this novel, significance of this text in the stream of Bengali novels.

CO3: Text reading on 'PotherPanchali' by Bibhutibhusan Bandopadhyaya, its content, style, philosophy and treatment of nature reflected in this novel, significance of this text in the stream of Bengali novels.

CO4: Text reading on 'Prothom protisruti' by Ashapurna Devi, its content, style, philosophy and protest against patriarchal structure of the society, journey of a woman for her identity- reflected in this novel, significance of this text in the stream of Bengali novels.

<b>Semester III</b>	
<b>Title of the Paper</b>	<b>Unish-Bish Shataker Chhotogalpoer Itihas O Path</b>
<b>Course Code</b>	<b>BNG 302</b>

After gone through this paper, students will get knowledge on development of Bengali short stories, its historical outlines, text reading, and analysis of Bengali short stories.

*This course (BNG 302) provides the student with-*

CO1: Historical outline and development of Bengali short stories of twentieth century; its

contents, forms, socio -cultural perspectives reflected in it, literary values.

CO2: Text reading on collected short stories by the eminent and contemporary writers as well, contents, styles, philosophy and social conflict reflected in these short stories, impact of second world war, impact of contemporary social changes in it.

CO3: Text reading on collected short stories written by the eminent writers of world literature, contents, styles, philosophy and social conflict reflected in these short stories, enlightenment of the students with the masterworks of short stories of world literature, their literary values.

CO4: Text reading on collected short stories written by the eminent writers of regional Indian literature, its content, styles, philosophy and social conflict reflected in these short stories, to enlighten the students with the masterworks of Indian regional short stories, their literary values; revelation of common Indian human life and struggle reflected in these stories.

<b>Semester III</b>	
<b>Title of the Paper</b>	<b>Bangla Natok O Prahosan</b>
<b>Course Code</b>	<b>BNG 303</b>

After gone through this paper, students will get knowledge on development of Bengali dramas and fares of nineteenth and twentieth century. They can read and analyze the text.

*This course (BNG 303) provides the student with-*

CO1: Historical outline and development of Bengali dramas and Bengali farses of Nineteenth and Twentieth century; its contents, forms, socio -cultural perspectives reflected in it, literary values.

CO2:Text reading on ‘Bur SalikherGhare Roan’ by Madhusudan Dutta, its content, style, philosophy and social conflict reflected in this text, impact of Young Bengal movement in it.

CO3: Text reading on ‘Jana’ by Girish Ghosh, its content, style, impact of nineteenth century Nabya Vedanta movement of Bengal in it.

CO4:Text reading on ‘Nabanna’ by Bijan Bhattacharya, its content, style, impact of People’s theatre movement (GananatyaAndolan) of Bengal in it.

<b>Semester III</b>	
<b>Title of the Paper</b>	<b>Praachya Sahityatattwa O Bangla Sahityer Bibidhapath</b>
<b>Course Code</b>	<b>BNG 304</b>

After gone through this paper, students will get the oriental poetics and its applications, development of Bengali literature, in nineteenth and twentieth century.

***This course (BNG 304) provides the student with-***

CO1: Historical outline and development oriental poetics, the theory of Dwanibad, Rasa bad, its definition, explanation, application, possibilities and limitations, its application in contemporary Bengali literature.

CO2:Text reading on ‘Aranyok’ by BibhutiBhusanBandopadhyaya , its content, form, style, treatment of nature done by the author, regionality, uniqueness amongst

Bengali fictions, characteristics of BhubhutiBhusan’swritngs reflected in this text, literary values.

CO3: Text reading on short stories by RabindranathTagore,Sarat Chandra Chattopadhyaya, RajsekharBasu, its content,distictive features reflected in theirworks, - in Tagore; romanticism, in Saratchandra ; social conflict and approach of critical realism, in RajsekharBasu; social satire and humour-critical appreciation of these texts.

CO4:Text reading on collected poems byTagore, Amiya Chakraborty, Jibanonda Das, its content, meters, imagism, differentiation between pre- and post-Tagore concept of poetry through the comparative study of the texts.

<b>Semester IV</b>	
<b>Title of the Paper</b>	<b>Banglahahitye Rupantor, Pathantor, Anubad, Sahitya Prerona</b>
<b>Course Code</b>	<b>BNG 401</b>

After gone through this paper, students will get the concept and knowledge on transformation of a text, re-structure of a text, translation of a text and how can a text inspired other authors.

***This course (BNG 401) provides the student with-***

CO1: Discussion on the concept of transformation of a text, re-structuring and re writing of a text, translation of a text, meaning and significance of literary inspiration.

CO2:Text reading on 'Rajani' by Bankim Chandra Chattopadhyaya and its comparative study of multiple editions and find out the differences among the texts and evaluation of the changes done by the author.

CO3: Discussion on the works of Madhusudan Dutta, Rabindranath Tagore and Jibonanonda Das, to find out the literary inspiration of them from Oriental and Western sources and their adaptation with the sources.

CO4: Discussion on the translation works of 'Meghdoot by RajsekharBasu, its evaluation as a translation work, comparison with original text of Kalidasa and other Bengali translations on the text which are available.

Semester IV	
Title of the Paper	Prachya Sahitwattawa
Course Code	BNG 402

After gone through this paper, students will get the concept and knowledge on Oriental literature.

*This course (BNG 402) provides the student with-*

CO1: Discussion on the oriental concept of poetics- Dwani, its definition, classifications, explanations, application on contemporary literature.

CO2:Rasa, definition,explanations, application on contemporary literature CO3:

Bokrokti, definition,explanations, application on contemporary literature. CO4:

Alonkar,definition, explanations, application on contemporary literature

CO5: Oichitya, its definitions, features, applications, possibilities, limitations, application on contemporary literature. Students may able to make comparative study with Western concept of aesthetics.

CO6:Text reading on Sahitya Darpan by Viswanath Kabiraj, its analysis on Sthayibhab, its merits, limitations, its influence on Bengali Texts.

CO7: Discussion on the works of Rabindranath on aesthetics in the text Sahitya, - text reading, analysis on concept of literature, concept of literary criticism, concept of beauty, concept of truth, connection between picture and literature, search for humanity and eternity in literature.

Semester IV
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<b>Title of the Paper</b>	<b>Paschatya Sahitwattawa</b>
<b>Course Code</b>	<b>BNG 403</b>

After gone through this paper, students will get concept and knowledge on classical Western poetics, historical outline of western literary movement and criticism theory. They also attain the knowledge of comparative study of weteren aesthetics and oriental theories.

*This course (BNG 403) provides the student with-*

CO1: Discussion on Western literary movements, its background, traits, impact on world literature, influence on Bengali literature.

CO2: Discussion on Western theory of criticism, its background, traits, impact on world literature, influence on Bengali literature, literary analysis of the text with studied theories.

CO3: Discussion on ‘Poetics’ by Aristotle, features of Greek aesthetics, analysis on the book Poetics, features of tragedy, epic, comparison between tragedy and epic, possibilities of Aristotle’s concept, its limitations.

CO4: Discussion on ‘Ars poetica’ by Horace, features of Greeko-roman aesthetics, analysis on the book ‘Ars poetica’, duties of a poet, concept of realism, comparison between ‘Poetics’ and ‘Ars poetica’, possibilities of Horace’s concept, its limitations.

<b>Semester IV</b>	
<b>Title of the Paper</b>	<b>Bohir Bangyia Bangla Sahityacharcha O Bhasa Andolon</b>
<b>Course Code</b>	<b>BNG 404</b>

After gone through this paper, students will get the concept and knowledge on Bengali literature created and natured of outside Bengal. This course will enhance the knowledge sphere of the students and widen the geographical boundaries of the literature and encourage the concept of acculturation amongst the literature.

*This course (BNG 404) provides the student with-*

CO1: Historical back ground and discussion on Bengali literature inculcated in Tripura; about



the writers, how the local factors influenced the Bengali literature.

CO2: Historical background and discussion on Bengali literature inculcated in Assam; about the writers, how the local factors influenced the Bengali literature.

CO3: Historical background and discussion on Bengali literature inculcated in Bihar and Jharkhand; about the writers, how the local factors influenced the Bengali literature.

CO4: Discussion on the freedom movements occurred for the liberty of mother language, its history, and description, its overall impact on the people, region and language.

<b>Semester IV</b>	
<b>Title of the Paper</b>	<b>Special Paper: I. Bhasa Bigyan O Bhasatattwa II. Rabindra Sahitya Path</b>
<b>Course Code</b>	<b>BNG 404A and 405C</b>

After gone through this paper, students may attain the specialized knowledge on Bengali linguistics and Tagore literature.

**This course (405A) provides the students with-**

CO1. Students can attain the knowledge on various definitions of style and stylistics. They will also able to analyze poetry.

CO2. Students may gather concept on foregrounding and various types of deviation, parallelism style and choice.

CO3. Students are able to generate the knowledge of phonological-morphological-syntactic-lexical and semantic context.

CO4. Students can know the place of language centre of human brain.

CO5. Students can learn about various stage of child-language acquisition.

CO6. Students can know about the role of inborn skill and socio-environment in language acquisition.

CO7. Students can learn about pragmatics.

CO8. Students can know about study of language of ancient India and Greece.

CO9. Students can learn about historical-comparative method, descriptive method, and transformational generative grammar.

CO10. Students may gather knowledge about dialectology.

CO11. Students may capable to get introduction with dialect- sub dialect, idiolect, dialect survey, dialect atlas and Bengali dialect.

**This course (405C) provides the students with-**

CO1. Students can gather specialized knowledhe on Tagore's literature.

CO2. By reading 'Sesh Saptok', students can get a vast knowledge on Tagor's poetry. They will be capable to analyze a text, style, form and content.

CO2. By reading the novel 'Gora' students may introduce with Rabindranth's vision, ideology, and his concept on nation and internationalism. They are also able to analyze characters of a novel.

CO3. By reading the dance drama 'Chitrangada', students attain the knowledge of dance drama. They also learnt about the transformation of ancient literature into modern Bengali literature.

CO4. By reading autobiography of Rabindranath's 'Jibansmriti', students are get a introduce with Tagore's biography.



**Department of Botany**

**Garhbeta College**

**Garhbeta: :Paschim Medinipur::721127 West Bengal**

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**Programme Outcome(PO) For B.Sc.Hons.**

<b>PO</b>	<b>Description</b>
PO1	Knowledge and understanding of the range of plant diversity in terms of structure, function and environmental relationships.
PO2	Think logically and organize tasks into a structured form. Understand the evolving state of knowledge in a rapidly developing field.
PO3	Learn to carry out practical work, in the field and in the laboratory.
PO4	Apply the knowledge of basic science ,life science and fundamental process of plants to study and analyze any plant form.
PO5	Identify the taxonomic position of plants, formulate the research literature and analyze non reported plants with substantiated conclusion using first principles and methods of nomenclature and classification in botany
PO6	Design solutions from medicinal plants for health problems, disorders and disease of human beings and estimate the phytochemical content of plants which meet the specified needs to appropriate consideration for the public health.
PO7	Apply reasoning informed by the contextual knowledge to assess plant diversity, its importance for society, health, safety, legal and environmental issues and the consequent responsibilities relevant to the biodiversity conservation practice.
PO8	Understand the impact of the plant diversity in societal and environmental contexts and demonstrate the knowledge of and need for sustainable development.
PO9	Create ,select and apply appropriate techniques, resources ,and modern instruments and equipments for biochemical estimation, Molecular Biology, Biotechnology, Plant Tissue culture experiments, cellular and physiological activities of plants with an understanding of the application and limitations.
PO10	Use research based knowledge and research methods including design of experiments, analysis and interpretation of data and development of the information to provide valid conclusion.

**Programme Specific Outcome(PSO)For B.Sc Hons. in Botany**

<b>PSO</b>	<b>Description</b>
PSO1	Students acquire fundamental Botanical knowledge through theory and practical's.
PSO2	To explain basis plant of life, reproduction and their survival in nature.
PSO3	Helped to understand role of living and fossil plants in our life.
PSO4	Use modern Botanical tools, Models, Charts and Equipments.
PSO5	To know advance techniques in plant sciences like tissue culture, phytoremediation, plant disease management, formulation of new herbal drugs etc.
PSO6	To create awareness about cultivation, conservation and sustainable utilization of biodiversity.
PSO7	Students able to start nursery, mushroom cultivation, biofertilizer production, fruit preservation and horticultural practices.
PSO8	Study and understand the recombinant DNA technology.
PSO9	Understand good laboratory practices and safety.
PSO10	Make aware and handle the sophisticated instruments/equipments

**COURSE OUTCOME(CO) FOR THE ACADEMIC YEATR 2018-2019****Name of the course: B.Sc. Honours. in Botany****Core Course: Botany****Semester -I**

<b>Paper Code &amp; Name</b>	<b>CO</b>	<b>Outcomes</b>
<b>CC1 (Phycology &amp; Microbiology)</b>	<b>CO1</b>	Know the concept and characteristics of Virus, Bacteria, Algae.
	<b>CO2</b>	Understand the structure and replication of DNA and RNA Virus.
	<b>CO3</b>	Learn about the microbial genetics and recombination of Bacteria.
<b>C1T</b>		

<b>C1P</b>	<b>CO1</b>	Understand the staining procedure of the bacteria.	
	<b>CO2</b>	Know about the types of bacteria through microscope.	
	<b>CO3</b>	Study the vegetative and reproductive structure of <i>Nostoc</i> , <i>Chlamydomonas</i> , <i>Volvox</i> , <i>Chara</i> , <i>Fucus</i> , <i>Polysiphonia</i> , <i>Vaucheria</i> .	
<b>CC2 (Bio-molecules and Cell Biology)</b>	<b>CO1</b>	Know about the structure, functions and biological roles of carbohydrates, proteins, lipids and nucleic acids.	
	<b>CO2</b>	Learn about the concept of thermodynamics, free energy and structure of ATP.	
	<b>CO3</b>	Get the detail knowledge about structure, classification, function and mechanism of enzymes in metabolic pathway.	
	<b>CO4</b>	Understand the detail structure, function, characteristics of prokaryotic and eukaryotic cells.	
	<b>C2T</b>	<b>CO5</b>	Know the structure, function, composition, transport mechanism of cell wall and cell membranes,
		<b>CO6</b>	Gain knowledge about structure, function of nucleus, cytoskeleton, chloroplast, mitochondria, peroxisomes and endomembrane system.
		<b>CO7</b>	Understand the eukaryotic cell cycle and mitotic and meiotic cell division.
<b>C2P</b>	<b>CO1</b>	Know the quantitative test for carbohydrates, reducing sugar, non-reducing sugar, lipids and proteins.	
	<b>CO2</b>	Learn about the measurement of cell size by the technique of micrometry.	
	<b>CO3</b>	Get detail knowledge about cell and its organelles	
	<b>CO4</b>	Understand the phenomenon of plasmolysis and deplasmolysis.	
	<b>CO5</b>	Know the different stages of mitosis and meiosis.	

### Semester-II

Paper code & Name	CO	Outcomes	
<b>CC3 (Mycology &amp; Phytopathology)</b>	<b>CO1</b>	Understand the general account on occurrence, organisation, reproduction, classification of Fungi <i>Saccharomyces</i> , <i>Aspergillus</i> , <i>Penicillium</i> and <i>Rhizopus</i> .	
	<b>CO2</b>	Know about the brief account on pathogen etiology, mode of action and symptoms of fungal diseases of plant and a brief discussion of Biopesticides.	
	<b>CO3</b>	Understand nature and significance of Mycorrhiza.	
	<b>CO4</b>	Learn about the role of fungi in biotechnology, food industry, Agriculture.	
	<b>C3T</b>	<b>CO5</b>	Acquire knowledge about medical mycology and its application.
		<b>CO6</b>	Know the symptoms of viral, bacterial and fungal disease of plants.

<b>C3P</b>	<b>CO1</b>	Know the introduction to the World fungi(Unicellular, coenocytic/septate mycellium, ascocarps and basidiocarps).
	<b>CO2</b>	Get an idea about asexual and sexual stage of <i>Rhizopus</i> , <i>Aspergillus</i> , <i>Penicillium</i> .
	<b>CO3</b>	Learn about the sectioning of gills of <i>Agaricus sp.</i>
	<b>CO4</b>	Understand the Herbarium specimens of bacterial ,viral and fungal diseases.
<b>CC-4 (Archegoniate)</b>	<b>CO1</b>	Understand the unifying features of Archegoniates.
	<b>CO2</b>	Know the evolution of algae, fungi, bryophytes, pteridophytes.
	<b>CO3</b>	Understand the classification of the bryophytes, pteridophytes, and gymnosperms.
	<b>CO4</b>	Know the systematics, morphology, anatomy and reproduction of bryophytes, pteridophytes, and gymnosperms.
	<b>CO5</b>	Learn about ecological and economic importance of bryophytes, pteridophytes, gymnosperms.
	<b>CO6</b>	Gain knowledge about Alternation of generation of cryptogams.
<b>C4P</b>	<b>CO1</b>	Learn about sectioning the thallus of <i>Marchantia</i> , <i>Anthoceros</i> , <i>Riccia</i> .
	<b>CO2</b>	Know about whole mount of leaf in <i>Funaria</i> , transverse section stem in <i>Selaginella</i> .
	<b>CO3</b>	Identify the male cone and female cone of <i>Pinus</i> and <i>Gnetum</i> .



**Semester -III**

<b>Paper Code &amp; Name</b>	<b>CO</b>	<b>Outcomes</b>
<p align="center"><b>CC-5</b> <b>(Anatomy of Angiosperm)</b></p> <p align="center"><b>C5T</b></p>	<b>CO1</b>	Know the internal organisation and development of plant body.
	<b>CO2</b>	Learn about the classification of tissues.
	<b>CO3</b>	Understand the evolution concept of organisation of shoot apex and root apex.
	<b>CO4</b>	Get an idea about structure, function and seasonal activity of cambium and secondary growth in root and stem.
	<b>CO5</b>	Know about anatomical adaptations of xerophytes and hydrophytes.
<p align="center"><b>C5P</b></p>	<b>CO1</b>	Acquire knowledge about detail anatomical structure of leaf , stem, and root.
	<b>CO2</b>	Understand heart wood and sap wood
	<b>CO3</b>	Know about the adaptive anatomical features of xerophytes and hydrophytes.
<p align="center"><b>CC-6</b> <b>(Economic Botany)</b></p> <p align="center"><b>C6T</b></p>	<b>CO1</b>	A detailed knowledge on origin, morphology, cultivation and importance of Wheat, Rice Legumes to man and ecosystem.
	<b>CO2</b>	Know about morphology, cultivation, processing and uses of sugarcane and potato.
	<b>CO3</b>	Gain knowledge about family and economic importance of saffron, clove, black pepper.
	<b>CO4</b>	Learn about morphology, processing, and uses of Tea and Coffee.
	<b>CO5</b>	Get detailed idea on uses of natural rubber, drug yielding plants, timber plants, and fiber yielding plants.
<p align="center"><b>C6P</b></p>	<b>CO1</b>	Acquire knowledge about micro-chemical test of starch grains, Soybean and Groundnut.
	<b>CO2</b>	Understand sources of oil and fats from oil yielding plants.
	<b>CO3</b>	Know the fibre and drug yielding plants.

<p style="text-align: center;"><b>CC-7 (Genetics)</b></p> <p style="text-align: center;"><b>C7T</b></p>	<b>CO1</b>	Understand the Mendelian and neo-Mendelian genetics.
	<b>CO2</b>	Know about interaction of genes, multiple alleles, linkage and crossing over.
	<b>CO3</b>	Gain knowledge about sex linked inheritance, chromosomal aberrations.
	<b>CO4</b>	Learn about variation in chromosome number and structure.
	<b>CO5</b>	Get an idea about fine structure of gene.
	<b>CO6</b>	Know the population evolutionary genetics.
<p style="text-align: center;"><b>C7P</b></p>	<b>CO1</b>	Learn about pretreatment ,fixation, staining and squash procedure for mitosis study.
	<b>CO2</b>	Enhances the knowledge on study of Mitosis and Meiosis by smear preparation.
	<b>CO3</b>	Understand the Mendel's laws through seed ratios.
	<b>CO4</b>	Get an idea about chromosome mapping using point cross data.
	<b>CO5</b>	Know about Pedigree analysis for dominant and recessive autosomal and sex linked traits.
<p style="text-align: center;"><b>SEC-1 (Biofertilizers)</b></p> <p style="text-align: center;"><b>SEC1T</b></p>	<b>CO1</b>	Know about the microbes used as biofertilizer( <i>Rhizobium</i> , <i>Azospirillum</i> , <i>Cyanobacteria</i> )
	<b>CO2</b>	Understand the classification, characteristics of <i>Azotobacter</i> .
	<b>CO3</b>	Learn about role of blue green algae and <i>Azolla</i> in rice cultivation.
	<b>CO4</b>	Acquire knowledge on organic farming and types of mycorrhizal association, taxonomy, occurrence and distribution.
	<b>CO5</b>	Know various steps in protein synthesis.

**Semester-IV**

<b>CC-8 (Molecular biology)</b>  <b>C8T</b>	<b>CO1</b>	Understand the biochemical nature of nucleic acids their role in living system.
	<b>CO2</b>	Know the various models and mode of replication of DNA.
	<b>CO3</b>	Learn about transcription in prokaryotes and eukaryotes.
	<b>CO4</b>	Understand the processing and modification of RNA.
	<b>CO5</b>	Know various steps in protein synthesis.
<b>C8P</b>	<b>CO1</b>	Know the preparation of LB medium and raising <i>E.coli</i> .
	<b>CO2</b>	Acquire knowledge on DNA isolation and estimation by Spectrophotometry.
	<b>CO3</b>	Understand the isolation of genomic DNA from <i>E.coli</i> .
<b>CC-9 (Plant Ecology &amp; Phytogeography)</b>  <b>C9T</b>	<b>CO1</b>	Get an idea on ecology and ecosystem, level of organisation, components and inter-relationship between living world and environment.
	<b>CO2</b>	Know the origin, formation, composition of soil, and soil profile and role of climate in soil development.
	<b>CO3</b>	Acquire the knowledge on importance of water, precipitation types, water in soil, water table.
	<b>CO4</b>	Gain the knowledge on food chain, food web and ecological pyramids
	<b>CO5</b>	Understand the characteristics of population and ecological speciation.
	<b>CO6</b>	Learn about the major terrestrial biomes, phytogeographical division of India and local vegetation.
	<b>CO2</b>	Gain knowledge on the pH of various soil and water samples.
	<b>CO3</b>	Understand the morphological adaptations of hydrophytes and xerophytes.

	<b>CO4</b>	Learn about minimum quadrat size for the study of herbaceous vegetation in college campus by species area curve method.
	<b>CO5</b>	Understand the quantitative analysis of herbaceous vegetation for density and abundance.
<p style="text-align: center;"><b>CC-10 (Plant Systematics)</b></p> <p style="text-align: center;"><b>C10T</b></p>	<b>CO1</b>	Understand the concept of systematics and Identification, Classification, Nomenclature of plants.
	<b>CO2</b>	Know about Herbarium and its role in plant systematics.
	<b>CO3</b>	Gain knowledge about concept of taxa ,categories and taxonomic hierarchy.
	<b>CO4</b>	Acquire knowledge on principles and rules of ICBN, Typification, author citation and principles of priority.
	<b>CO5</b>	Understand the classification system of plants by different taxonomists.
	<b>CO6</b>	Know the origin and evolution of angiosperms.
<p style="text-align: center;"><b>C10P</b></p>	<b>CO1</b>	Understand the vegetative and floral parts of different families of plants.
	<b>CO2</b>	Know the floral diagram, floral formula and systematic position of plants of different families according to Bentham and Hooker's systems of classification.
	<b>CO3</b>	Learn about mounting of properly dried and pressed specimens of any wild plant with herbarium label.

<b>SEC-2 (Mushroom Culture Technology)</b>	<b>CO1</b>	Know the concept of edible and poisonous mushroom and nutritional and medicinal value of edible mushrooms.
	<b>CO2</b>	Acquire the knowledge about mushroom cultivation process.
	<b>CO3</b>	Understand the composting technology in mushroom production.
	<b>CO4</b>	Learn about short term and long term storage of mushroom.
	<b>CO5</b>	Get an idea about types of food prepared from mushroom and know the national and regional level research centre's, marketing in India and abroad.

#### Semester-V

<b>Paper Code &amp; Name</b>	<b>CO</b>	<b>Outcomes</b>
<b>CC-11 (Reproductive biology of Angiosperm)  C11T</b>	<b>CO1</b>	Know about flower as a modified determinate shoot.
	<b>CO2</b>	Understand the structure and function of anther wall, microsporogenesis, megagametogenesis.
	<b>CO3</b>	Gain knowledge about pollen wall protein, pollen viability, storage and germination of pollen.
	<b>CO4</b>	Get detail on organisation and ultrastructure of mature embryo sac.
	<b>CO5</b>	Know about types, significance and adaptation of pollination.
	<b>CO6</b>	Understand methods to overcome self-incompatibility, <i>in vitro</i> pollination and <i>in vitro</i> fertilization
<b>C11P</b>	<b>CO1</b>	Know about pollen viability test.
	<b>CO2</b>	Learn on types of ovule.
	<b>CO3</b>	Know the intra-ovarian pollination.

<p><b>CC-12 (Plant Physiology)</b></p> <p><b>C12T</b></p>	<b>CO1</b>	Know scope and importance of plant physiology.
	<b>CO2</b>	Understand plant and water relation.
	<b>CO3</b>	Learn about role of macro and micronutrients for growth and development of plants.
	<b>CO4</b>	Understand transport of ions across cell membrane and function of carrier proteins.
	<b>CO5</b>	Gain knowledge about translocation in phloem.
	<b>CO6</b>	Enhances the knowledge about physiological role of plant growth regulators.
	<b>CO7</b>	Know the role of phytochrome, cryptochromes and phototropins in photomorphogenesis.
<p><b>C12P</b></p>	<b>CO1</b>	Understand osmotic potential of plant cell sap by plasmolytic method.
	<b>CO2</b>	Know about stomatal index and stomatal frequency.
	<b>CO3</b>	Learn about germination of seed.
	<b>CO4</b>	Gain knowledge about rooting from cutting portion of plants.
<p><b>DSE-1 (Natural resource management)</b></p> <p><b>DSE-1T</b></p>	<b>CO1</b>	Gain knowledge about natural resources and its sustainable utilization.
	<b>CO2</b>	Know the scope ,importance ,significance and management of biodiversity.
	<b>CO3</b>	Get idea about forest products and management of forests.
	<b>CO4</b>	Understand renewable and non-renewable sources of energy.
	<b>CO5</b>	Know the national and international efforts in resource management and conservation.

<b>DSE-1P</b>	<b>CO1</b>	Know about solid waste generated by domestic system.
	<b>CO2</b>	Understand the data on forest cover of specific area.
	<b>CO3</b>	Learn about the measurement of the dominant woody species by DBH method.
<b>DSE-2 (Plant breeding)</b>  <b>DSE-2T</b>	<b>CO1</b>	Gain scientific knowledge about breeding systems of plants.
	<b>CO2</b>	Know about the selection methods and hybridization of plants for crop improvement.
	<b>CO3</b>	Understand the monogenic and polygenic inheritance.
	<b>CO4</b>	Get idea about genetic basis of inbreeding depression and heterosis and its application.
	<b>CO5</b>	Know the role of biotechnology in crop improvement.
<b>DSE-2P</b>	<b>CO1</b>	Understand the process of hybrid variety ,development and their release
	<b>CO2</b>	Know the technique of production of new superior crop varieties.

#### Semester-VI

<b>Paper Code &amp; Name</b>	<b>CO</b>	<b>Outcomes</b>
<b>CC-13 (Plant Metabolism)</b>  <b>C13T</b>	<b>CO1</b>	Understand the concept of anabolic and catabolic pathways ,regulation of metabolism.
	<b>CO2</b>	Know the process of photosynthesis,C3,C4,CAM pathways.
	<b>CO3</b>	Get an idea about synthesis and catabolism of sucrose and starch.
	<b>CO4</b>	Know about carbon oxidation mechanism in plants.

<b>C13P</b>	<b>CO1</b>	Understand the chemical separation of photosynthetic pigments.
	<b>CO2</b>	Learn about experiment of Hill's reaction.
	<b>CO3</b>	Understand the rate of respiration in different parts of a plant.
<b>CC-14 (Plant Biotechnology)</b>  <b>C14T</b>	<b>CO1</b>	Understand the fundamental of recombinant DNA technology.
	<b>CO2</b>	Gain knowledge about tissue culture techniques.
	<b>CO3</b>	Get an idea about gene cloning.
	<b>CO4</b>	Know the methods of gene transfer.
	<b>CO5</b>	Acquire knowledge about application of biotechnology in agriculture, horticulture and industry.
<b>C14P</b>	<b>CO1</b>	Know the preparation of MS medium.
	<b>CO2</b>	Understand the <i>in vitro</i> sterilization and inoculation methods.
	<b>CO3</b>	Acquire knowledge about the steps of genetic engineering for production of Bt cotton, Golden rice and Flavr Savr tomato.
<b>DSE-3 (Industrial and Environmental Microbiology)</b>  <b>DSE-3T</b>	<b>CO1</b>	Acquire knowledge of fermentation technology and production of fermented products.
	<b>CO2</b>	Know the application of microbial enzymes in industry.
	<b>CO3</b>	Understand the BOD,COD,TDS and TOC of water samples.
	<b>CO4</b>	Get an idea about uses of microbes in agriculture and bioremediation of contaminated soil.



<b>DSE-3P</b>	<b>CO1</b>	Know the principles and functions of instruments in microbiology laboratory.
	<b>CO2</b>	Understand the sterilization techniques and preparation of medium.
<b>DSE-4 (Analytical Techniques in Plant Sciences)  DSE-4T</b>	<b>CO1</b>	Understand the principles of microscopy and application of different microscope in plant sciences.
	<b>CO2</b>	Know the process of various centrifugation technique.
	<b>CO3</b>	Gain knowledge about uses of radioisotopes in biological research.
	<b>CO4</b>	Get ideas on principles of different chromatography.
	<b>CO5</b>	Learn about application of spectrophotometry in research.
	<b>CO6</b>	Understand the principles of Gel-electrophoresis.
<b>DSE-4P</b>	<b>CO1</b>	Learn about the Southern, Northern and Western blotting techniques.
	<b>CO2</b>	Learn about the analysis of nitrogenous bases by paper chromatography.
	<b>CO3</b>	Understand the separation of chloroplasts by differential centrifugation.
	<b>CO4</b>	Know the estimation of protein concentration by Lowry's methods
	<b>CO5</b>	Gain knowledge about the separation of protein and DNA by Gel-electrophoresis.

## Department of Chemistry

### Garhbeta College

Garhbeta :: Paschim Medinipur :: 721127 West Bengal

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#### Programme Outcome (PO) For B.Sc. Hons.

PO	Description
PO1	Demonstrate knowledge and understanding of the fundamental concepts in all areas of science
PO2	Demonstrate critical thinking analytical reasoning and judgment in identifying and solving specific problems with intellectual independence
PO3	Design and carry out scientific experiments as well as accurately record and analyse the result of the experiments
PO4	Demonstrate communication skills to present a clear, coherent and independent expression of knowledge and ideas
PO5	Develop the ability to communicate scientific information and research results in written and oral formats
PO6	Demonstrate understanding of the interconnections of knowledge within and across disciplines
PO7	Apply knowledge, theories methods and practices in their chosen field of study to address real-world challenges and opportunities
PO8	Inculcate the ability to find jobs in different fields like teaching, banking, industry and also in different fields of higher study and research
PO9	Accomplish a nature of lifelong learning to acquire the ability of grasping any scientific text in the broadest context of scientific development
PO10	Demonstrate sensitivity and readiness to share their knowledge, experience and capabilities with the marginalized and oppressed in their communities

## Programme Specific Outcome (PSO) For B.Sc. Hons. in Chemistry

PSO	Description
PSO1	Create the skills to operate various chemicals, apparatus and instruments
PSO2	Demonstrate knowledge and understanding of the fundamental concepts in all areas of Chemistry
PSO3	Gains the ability to synthesise, separate and characterize compounds using instrumentation techniques
PSO4	Have information about the fundamentals and applications of chemical and scientific theories
PSO5	Produce scope to shine in academics, research or Industry
PSO6	Learn better laboratory practices and safety
PSO7	Produce problem solving skills in application of chemical principles
PSO8	Demonstrate knowledge for betterment of Environment
PSO9	Demonstrate knowledge about fertilizers, pesticides, nature of soil etc. for betterment of Agriculture
PSO10	Demonstrate knowledge for betterment of our daily life

## COURSE OUTCOME (CO) FOR THE ACADEMIC YEAR 2018-2019

Name of the Course: B.Sc. Honours. in Chemistry

Core Course: Chemistry

### Semester - I

Paper Code & Name	Outcomes	
CCI ( Organic Chemistry)  C1T	CO1	Know the basic of structure, bonding, reactivity and reaction mechanisms of molecules
	CO2	Identify the aromatic, anti aromaticity and non-aromatic compounds
	CO3	Identify electrophile, nucleophiles, free radicals and intermediates along the reaction pathways
	CO4	Understand stability of organic molecules, structure & stereochemistry
C1P	CO1	Judge the solubility of the mixture of compounds
	CO2	Identify the pure organic compounds
CC2 ( Physical Chemistry)  C2T	CO1	Understand the kinetic model of gas and its properties
	CO2	Understand the behaviour of real gas
	CO3	Understand the concept of heat, work, and laws of thermodynamics and different thermodynamic properties
	CO4	Know the concepts of chemical kinetics in different chemical processes
	CO5	Learn the mechanism of catalytic action and enzyme catalysis
C2P	CO1	Carry out kinetics of decomposition of Hydrogen peroxide and decomposition of ester
	CO2	Determine heat of solution of organic acid from solubility measurement and heat of neutralization of strong acid and base
	CO3	Determine pH of unknown buffer by colour matching method

## Semester - II

Paper Code & Name	Outcomes	
<b>CC3</b> <b>( Inorganic Chemistry)</b>  <b>C3T</b>	<b>CO1</b>	Understand the atomic theory and its development
	<b>CO2</b>	Understand the concept of wave function and explain the quantum numbers and its significance
	<b>CO3</b>	Understand modern periodic law to explain periodic properties
	<b>CO4</b>	Understand the acid-base behaviors of different organic and inorganic compounds
<b>C3P</b>	<b>CO1</b>	Design acid and Base titrations of mixture of compounds
	<b>CO2</b>	Produce the results of mixture of compounds by redox titration
<b>CC4</b> <b>(Organic Chemistry)</b>  <b>C4T</b>	<b>CO1</b>	Know about the concepts of stereochemistry
	<b>CO2</b>	Understand the different conformational nomenclature
	<b>CO3</b>	Learn nucleophilic substitution reactions mechanism by stereochemistry approach
	<b>CO4</b>	Assess the concept of Elimination reactions
	<b>CO5</b>	Understand the basics of chemical kinetics in organic chemistry
<b>C4P</b>	<b>CO1</b>	Check the yield of organic preparations
	<b>CO2</b>	Compare the melting point value of an experiment with the literature

## Semester - III

Paper Code & Name	Outcomes	
<b>CC5</b> <b>(Physical Chemistry)</b>  <b>C5T</b>	<b>CO1</b>	Acquire knowledge about different flow methods, specially viscosity of liquid and conductance of electrolyte solution
	<b>CO2</b>	Acquire knowledge about different application of thermodynamics : Chemical equilibrium, Nernst distribution law
	<b>CO3</b>	Know about concept of activity and fugacity
	<b>CO4</b>	Know basic concepts of quantum mechanics: wave function, operators etc.
	<b>CO5</b>	Apply quantum mechanics in particle in 1D box and harmonic oscillator
<b>C5P</b>	<b>CO1</b>	Determine coefficient of viscosity of different solution by Ostwald viscometer
	<b>CO2</b>	Determine strength of different acid solution by conductometric titration
	<b>CO3</b>	Determine partition coefficient and verify Nernst distribution law
<b>CC6</b> <b>( Inorganic Chemistry)</b>  <b>C6T</b>	<b>CO1</b>	Explain the fundamental concepts of ionic bond and covalent bond
	<b>CO2</b>	Understand the basic principles involved in nuclear chemistry
	<b>CO3</b>	Aware the advanced level of nuclear chemistry
	<b>CO4</b>	Assess the knowledge on molecular orbital theory
	<b>CO5</b>	Solve practical problem on chemical bonding
<b>C6P</b>	<b>CO1</b>	Design Iodo-/ Iodimetric Titrations of a given sample
	<b>CO2</b>	Experimenting the estimation of metal content in some selective samples
<b>CC7</b> <b>( Organic Chemistry)</b>  <b>C7T</b>	<b>CO1</b>	Enhances the knowledge on name reaction with examples
	<b>CO2</b>	Learn the mechanism of rearrangement reaction by using synthetic reagent
	<b>CO3</b>	Recognize various oxidation and reduction reactions
	<b>CO4</b>	Create interest and thinking in the mechanisms of organic reactions

<b>C7P</b>	<b>CO1</b>	Construct the qualitative analysis of single solid organic compounds.
	<b>CO2</b>	Classify of the compound through literature survey
<b>SEC-1 (Pharmaceutical Chemistry )  SEC1T</b>	<b>CO1</b>	Learn about drug analysis and synthesis.
	<b>CO2</b>	Know the various green techniques for drug synthesis
	<b>CO3</b>	Understand the pharmaceutical chemistry
	<b>CO4</b>	Knowledge about antibiotic drugs
<b>SEC1P</b>	<b>CO1</b>	Design the preparation of drug and its analysis
	<b>CO2</b>	Demonstrate the drug preparation procedure

### Semester - IV

<b>Paper Code &amp; Name</b>	<b>Outcomes</b>	
<b>CC8 (Physical Chemistry)  C8T</b>	<b>CO1</b>	Learn thermodynamic view on dilute solution and colligative properties
	<b>CO2</b>	Understand phase rule and phase diagram of different system
	<b>CO3</b>	Understand the concept of ionic equilibrium
	<b>CO4</b>	Learn about different types of electrodes, galvanic cells and application of emf measurement
	<b>CO5</b>	Apply the wave mechanics to one-electron system like hydrogen atom
<b>C8P</b>	<b>CO1</b>	Construct a potentiometric titration experiment
	<b>CO2</b>	Construct phase diagram and determine critical solution temperature
	<b>CO3</b>	Determine pK value of weak acid by pH meter
<b>CC9</b>	<b>CO1</b>	Learn the basic concept and theory in coordination chemistry
	<b>CO2</b>	Know about complex formation, stability and nature of metal ligand bonding on coordination chemistry

<b>(Inorganic Chemistry)</b>  <b>C9T</b>	<b>CO3</b>	Understand the chemistry of a various of compounds of the s-block and p-block periodic elements
	<b>CO4</b>	Know the applications of the compounds of s and p block elements in different industrial needs
<b>C9P</b>	<b>CO1</b>	Assemble the experimental result on complexometric titration
	<b>CO2</b>	Judge the metal content present in mixture of solution
<b>CC10 (Organic Chemistry)</b>  <b>C10T</b>	<b>CO1</b>	Apply mechanism concept in retro synthesis reactions
	<b>CO2</b>	Understand about disconnection approach in retro synthesis
	<b>CO3</b>	Understand the fundamental principles of different spectroscopy
	<b>CO4</b>	Learn the mechanism of rearrangement reaction
<b>C10P</b>	<b>CO1</b>	Investigate the saponification value of an experiment
	<b>CO2</b>	Judge the quality of commercial product
<b>SEC2 (Basic Analytical Chemistry)</b>  <b>SEC2T</b>	<b>CO1</b>	Make scientific reports from chemical experiments and draw conclusions
	<b>CO2</b>	Formulate the important factors on analytical experiments and results
	<b>CO3</b>	Understand the theoretical principles of various separation techniques in chromatography.
<b>SEC2P</b>	<b>CO1</b>	Test the metal present in a tablet by Spectrophotometric method
	<b>CO2</b>	Investigate the acidity and alkalinity of a water sample by pH measurement
<b>SEC-2 (Fuel Chemistry)</b>	<b>CO1</b>	Know about different types of coal and its byproducts
	<b>CO2</b>	Judge the quality of fuel
	<b>CO3</b>	Acquire knowledge about oil refinery and petroleum industry
	<b>CO4</b>	Acquire knowledge about different types of lubricants



## Semester - V

Paper Code & Name	Outcomes	
<b>CC11 (Inorganic Chemistry)  C11T</b>	<b>CO1</b>	Understand the nature of metals of d-block elements
	<b>CO2</b>	Describe the bonding models, structures and applications of coordination complexes
	<b>CO3</b>	Acquire knowledge on crystal field theory
	<b>CO4</b>	Learn the chemistry of Lanthanoids and Actinoids
<b>C11P</b>	<b>CO1</b>	Demonstrate the chromatographic separations of metal ions
	<b>CO2</b>	Understand the $\lambda_{\max}$ of metal complexes
<b>CC12 (Organic Chemistry)  C12T</b>	<b>CO1</b>	Understand the principles of pericyclic reactions
	<b>CO2</b>	Know the nomenclature of hetero-cyclic
	<b>CO3</b>	Know the synthesis and reactions of different heterocycle
	<b>CO4</b>	Know the optical activity & chirality of cyclohexane
<b>C12P</b>	<b>CO1</b>	Predict the $\delta$ -values and splitting pattern of a organic compounds
	<b>CO2</b>	Assign frequencies of the absorptions of a organic compounds
<b>DSE - 1 ( Advanced Physical Chemistry)  DSE1T</b>	<b>CO1</b>	Acquire knowledge about solid state chemistry/ crystallography
	<b>CO2</b>	Know classical and quantum theory of heat capacity of solid
	<b>CO3</b>	Get an idea about of polymers
	<b>CO4</b>	Get an idea about classical statistical thermodynamics and quantum statistical thermodynamics on an elementary level
<b>DSE1P</b>	<b>CO1</b>	Design the computer programs based on numerical methods
	<b>CO2</b>	Operate the computer programs on Matrix operations
	<b>CO1</b>	Understand different types of electroanalytical methods

<b>DSE - 2 (Analytical Methods in Chemistry)</b>  <b>DSE2T</b>	<b>CO2</b>	Gain the fundamental knowledge on spectroscopic instrumentation
	<b>CO3</b>	Understand various separation techniques in chromatography
	<b>CO4</b>	Understand thermal methods of analysis
<b>DSE2P</b>	<b>CO1</b>	Apply chromatographic separation techniques of mixtures of compounds
	<b>CO2</b>	Estimate the metal present in given compound.
<b>DSE - 2 (Instrumental Methods of Chemical Analysis)</b>  <b>DSE2T</b>	<b>CO1</b>	Acquire knowledge about different spectroscopic methods
	<b>CO2</b>	Acquire knowledge about chromatography and other separation techniques
	<b>CO3</b>	Get idea about radiochemical methods
	<b>CO4</b>	Get idea about electroanalytical methods: Potentiometry & Voltammetry
<b>DSE2P</b>	<b>CO1</b>	Analysis of compounds and estimate metal ions in a mixture in spectroscopic method
	<b>CO2</b>	Determine calcium, Iron and Copper in Food by atomic absorption

## Semester - VI

<b>Paper Code &amp; Name</b>	<b>Outcomes</b>	
<b>CC13 (Inorganic Chemistry)</b>  <b>C13T</b>	<b>CO1</b>	Understand the biological aspects of metal
	<b>CO2</b>	Know about the function of the catalysts and its surface action
	<b>CO3</b>	Identify the bonding of inorganic & organometallic compounds
	<b>CO4</b>	Know about metal ion transport and storage
<b>C13P</b>	<b>CO1</b>	Interpret the radicals present in a given compound
	<b>CO2</b>	Assign the most probable composition in qualitative

<b>CC14 (Physical Chemistry)</b>  <b>C14T</b>	<b>CO1</b>	Gain the theoretical knowledge about different molecular spectroscopy. CO 3. Learn about Beer Lamberts law and photo chemical Groueters- Dropper law. CO 4
	<b>CO2</b>	Acquire knowledge about different photophysical and photochemical processes
	<b>CO3</b>	Know about surface chemistry : Surface tension of liquid and adsorption
	<b>CO4</b>	Acquire knowledge about preparation, properties and classification of colloids and application of colloidal chemistry
<b>C124P</b>	<b>CO1</b>	Verify Beers law and determine the strength of solution
	<b>CO2</b>	Determine surface tension of liquid
<b>DSE - 3 (Green Chemistry)</b>  <b>DSE3T</b>	<b>CO1</b>	Focus on the principles of green chemistry
	<b>CO2</b>	Learn alternative solvent media for chemical process
	<b>CO3</b>	Tell the future trends in green chemistry
	<b>CO4</b>	Learn the synthesis of any type of organic compounds with green chemistry
<b>DSE3P</b>	<b>CO1</b>	Understand the principle of atom economy
	<b>CO2</b>	Sketch an experiment by Safer starting materials
<b>DSE - 3 (Inorganic Materials of Industrial Importance)</b> <b>DSE3T</b>	<b>CO1</b>	Acquire knowledge about different types of glass , ceramics and alloys
	<b>CO2</b>	Know about manufacturing process of different fertilizers
	<b>CO3</b>	Know about manufacturing process of cement and the setting process of cement
	<b>CO4</b>	Know about different types of paints and their manufacturing process
<b>DSE3P</b>	<b>CO1</b>	Analysis of fertilizers an alloys
	<b>CO2</b>	Analysis of cement and determine iron content in cement
<b>DSE – 4</b>	<b>CO1</b>	Know different aspects of polymer chemistry

<b>( Polymer Chemistry)</b>  <b>DSE4T</b>	<b>CO2</b>	Understand how different polymers are synthesized and characterized
	<b>CO3</b>	Assess kinetics and mechanism of polymer
	<b>CO4</b>	Know the structure and properties of polymers
<b>DSE4P</b>	<b>CO1</b>	Construct a free radical solution polymerization reaction
	<b>CO2</b>	Test the quality of polymer by Instrumental techniques

**Department of Economics**  
**Garhbeta College**  
Garhbeta, Paschim Medinipur – 721127  
West Bengal

**Course Outcome (CO)**

**Economics (Generic Electives)**

<b>Academic stream and Semester</b>	<b>Paper code and Name</b>	<b>Outcomes</b>
B.Sc. Semester I	GE-1: GE1T – Introductory Microeconomics	<ul style="list-style-type: none"> <li>✓ Introducing microeconomic analysis as a way of understanding our society;</li> <li>✓ Understanding the behavior of individuals, households and firms;</li> <li>✓ Introducing how theories of demand and supply work in understanding the functioning of markets;</li> <li>✓ Analyzing standard microeconomic theories of consumer behavior, producer behavior and theories of firms;</li> <li>✓ Developing economic intuition regarding input markets;</li> <li>✓ At the same time, getting trained in the relevant economic tools that support the gained intuitions along the way.</li> </ul>
B.Sc. Semester II	GE-2: GE2T – Introductory Macroeconomics	<ul style="list-style-type: none"> <li>✓ Introducing macroeconomic analysis as a way of understanding our nation;</li> <li>✓ Defining the term “economic indicator” and identifying the major economic indicators used to assess the state of the macroeconomy;</li> <li>✓ Explaining the expenditure and national income approaches to calculating GDP;</li> <li>✓ Describing the relationships among GDP, net domestic product, national income, personal income, and disposable income;</li> <li>✓ Defining the rate of inflation and explaining how the rate of inflation is calculated;</li> <li>✓ Associating the current economic phenomenon with existing theory and put their views on contemporary economic issues;</li> </ul>
B.Sc. Semester III	GE-3: GE3T – Environmental Economics	<ul style="list-style-type: none"> <li>✓ Studying how economic activity and policy may affect the environment in which we live.</li> <li>✓ Identifying the key economic issues in the analysis of controlling environmental degradation and externalities;</li> <li>✓ Understanding the theoretical and methodological tools that helps to apply principles of economics to study how natural resources are (or should be) evaluated and managed;</li> <li>✓ Analyzing and assessing the implications of using various environmental policy instruments and assessing the costs and</li> </ul>

		<p>benefits of undertaking pollution control projects;</p> <ul style="list-style-type: none"> <li>✓ Discussing various approaches and methods developed for valuing environmental goods and services.</li> <li>✓ Understanding the concept of sustainable development and learning about the measures of sustainability, with particular focus on the Indian context.</li> </ul>
	GE-3: GE3T – Money and Banking	<ul style="list-style-type: none"> <li>✓ Introducing the concepts, functions and measurements of money and learning the theories of money supply determination;</li> <li>✓ Understanding several key models and concepts of monetary economics and banking theory;</li> <li>✓ Applying both micro and macro theory to real-world situations in the areas of money and banking;</li> <li>✓ Identifying the main determinants of interest rates in the financial markets, understanding the implications of interest rate differentials, learning about the functions of interest rates in India;</li> <li>✓ Learning the relevance of the Central Bank and related central banking topics, including the causes, policy responses, and lessons associated with the current financial market situation;</li> </ul>
B.Sc. Semester IV	GE-4: GE4T – Economic History of India (1857-1947)	<ul style="list-style-type: none"> <li>✓ Identify the features of Indian economy during colonial period;</li> <li>✓ Understanding the core macroeconomic characteristics of India, its national income, demographic trends and occupational structures and how they apply to a wide range of real-world issues;</li> <li>✓ Analyzing the agrarian structure and land relations, agricultural markets and institutions, role of technology and productivity;</li> <li>✓ Learning about Indian industrialization and deindustrialization, railways, heavy industries and labour issues;</li> <li>✓ Understanding the nature of colonial impact on Indian economy, trade, drain of wealth and capital flows;</li> <li>✓ Knowing about the development processes in the backdrop of the colonial past of India.</li> </ul>
	GE-4: GE4T – Public Finance	<ul style="list-style-type: none"> <li>✓ Understanding the economics of government expenditure and taxation; Using economic analysis to predict and verify the effects of government intervention on behaviour of individuals, households, and firms;</li> <li>✓ Discussing the implications of policy for efficiency and equity; analyzing public goods, externalities, and information asymmetries;</li> <li>✓ Understanding market failures, taxes and expenditures;</li> <li>✓ Analyzing policy applications including welfare assistance, education, healthcare spending, and tax policies such as income taxes and consumption taxes;</li> <li>✓ Critically analyzing fiscal policies and its implication in Indian Economy.</li> </ul>
B.Com Semester I	GE-1: GE1T – Microeconomics	<ul style="list-style-type: none"> <li>✓ Explaining the role of scarcity, specialization, opportunity cost and cost/benefit analysis in economic decision-making; Identifying the determinants of supply and demand; demonstrating the impact of shifts in both market supply and demand curves on equilibrium price and output;</li> </ul>

		<p>Understanding the law of diminishing marginal utility; Describing the process of utility maximization; Calculating supply and demand elasticities; Identifying the determinants of price elasticity of demand and supply, and learning the relationship between elasticity and total revenue;</p> <ul style="list-style-type: none"> <li>✓ Understanding the production function and the Law of diminishing marginal productivity; Calculating and drawing the short-run and long-run costs of production;</li> <li>✓ Identifying the four market structures by characteristics; Calculating and drawing the profit maximizing price and quantity in the output markets by use of marginal analysis.</li> <li>✓ Determining the profit maximizing price and quantity of resources in factor markets under perfect and imperfect competition by use of marginal analysis;</li> <li>✓ Describing governmental efforts to address market failure such as monopoly power, externalities, and public goods.</li> </ul>
B.Com Semester II	GE-2: GE2T – Macroeconomics	<ul style="list-style-type: none"> <li>✓ Defining and measuring national income and rates of unemployment and inflation; Identifying the phases of the business cycle and the problems caused by cyclical fluctuations in the market economy; Learning the difference and relation between static macroeconomic analyses of short and long run;</li> <li>✓ Defining the term “economic indicator” and identifying the major economic indicators used to assess the state of the macroeconomy; Explaining the expenditure and national income approaches to calculating GDP; Describing the relationships among GDP, net domestic product, national income, personal income, and disposable income;</li> <li>✓ Analyzing short run economy in the IS-LM framework, policy implications and aggregate demand and supply models;</li> <li>✓ Understanding inflation, its types, characteristics, policy impacts; Learning about unemployment, its types, characteristics and policy impacts; Analyzing the short-run trade-off between inflation and unemployment; Learning about theories of expectations;</li> <li>✓ Learning the open economy Mundell-Fleming model, exchange rates – both fixed as well as flexible and interest rate differentials;</li> <li>✓ Learning the theories of investment and theories of money as cornerstones of behavioural economics.</li> </ul>
B.Com Semester III	GE-3: GE3T – Business Statistics	<ul style="list-style-type: none"> <li>✓ Defining the nature and classification of various categories of data; Learning about various measures of central tendencies;</li> <li>✓ Learning the theory of probability; Understanding expectations and different types of probability distribution;</li> <li>✓ Understanding simple correlation analysis and the basics of regression analysis;</li> <li>✓ Defining Index numbers, its concept, characteristics, classification and applications;</li> <li>✓ Learning Time Series Analysis; Using least squares method and understanding trend analysis, linear and exponential, moving averages; Learning the calculation of seasonal trends;</li> <li>✓ Analyzing the concept of sampling and learning about different</li> </ul>

		categories of sampling; Understanding the concept of sampling distribution and the theory of estimation.
B.Com Semester IV	GE-4: GE4T – Indian Economy	<ul style="list-style-type: none"> <li>✓ Identifying the concept and different measure of development, underdevelopment and human development;</li> <li>✓ Learning about the basic features of Indian economy regarding national income, agriculture, industry as well as demographic structures;</li> <li>✓ Understanding Indian policy experiences and their evolution;</li> <li>✓ Analyzing Indian economic growth, development and structural changes during different times periods; Learning about the regulatory role of the institutional framework;</li> <li>✓ Emphasizing the structural break experienced in 1991 and its larger, long-run implications; Learning about specific relevant issues, such as, growth and distribution, poverty and unemployment, human development, environmental issues and demographic concerns;</li> <li>✓ Analyzing the agricultural, industrial and financial sectors specifically to learn about their evolutions, performances, policy impacts and roles in the Indian development experience.</li> </ul>



**Department of Economics**

**Garhbeta College**

**Garhbeta, Paschim Medinipur – 721127**

**West Bengal**

**Programme Specific Outcome (PSO) 2020-21**

**Economics (General)**

<b><u>Outcomes</u></b>	<b><u>Objectives</u></b>
Introduction of the subject of Economics	To acquaint the students with the subject matter of Economics.
Explanation of the significance of the subject	To communicate, with numerous examples, the indispensable role of Economics in human life; to show how the concepts of choices, costs and benefits, utility, as well as economic growth, recession, inflation, unemployment, business cycles, trade, poverty, investment etc. influence everyone's lives.
Learning to 'think like an Economist'	To enable students in understanding the approach of an Economist in deciphering any social phenomenon; to help them differentiate between the

	‘economic’ way of thinking and that of any other social sciences.
Learning the tools of Economics	To guide students through the major Micro and macroeconomic topics; to help the students know how to think of underdevelopment, the rural-urban as well as agriculture-industry dualities; to explain the basic mathematical and statistical tools used in Economics.
Understanding the role and importance of Economic models	To emphasize the role of modelling in Economics, with the help of basic micro and macroeconomic models.
Introduction to the applications of the theories of Economics	To show the students the use of the basic models in studying income determination, poverty alleviation, economic growth; to examine the roles of the theories in relation to trade and development, development and environment as well as growth, technology and productivity.
Understanding the relation between theories, policies and the real world	To enable the students learn the impacts of economic policies, which are grounded in the economic theories they learn, on their own lives; To understand the economic experiences and challenges of Indian agriculture,

	industry, banking sector, demographics as well as national income trends.
Realization of the significance of critical thinking in life	To inculcate an appreciation for critical thinking in the students; to show them that reasoning, generating hypotheses, building models, making arguments, attempting careful explanation and the ability to revise, correct and improve one's understanding of a phenomena are crucial to any scientific mind.
Learning about the employment and career opportunities	To help students learn about the myriad opportunities for employment as well as higher studies in Business studies, Statistics, management studies, marketing, insurance, law, and many other fields including those leading to the jobs as a school teacher and/or other government jobs.
Awareness on moral and ethical code of conduct	To impart the moral and ethical approach to learning and using the learned subject in every aspect of life.

**Department of Economics**

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**Programme Specific Outcome (PSO)**

**Economics (General)**

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Introduction of the subject of Economics	To acquaint the students with the subject matter of Economics.
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Learning to 'think like an Economist'	To enable students in understanding the approach of an Economist in deciphering any social phenomenon; to help them differentiate between the 'economic' way of thinking and that of any other social sciences.

<p>Learning the tools of Economics</p>	<p>To guide students through the major Micro and macroeconomic topics; to help the students know how to think of underdevelopment, the rural-urban as well as agriculture-industry dualities; to explain the basic mathematical and statistical tools used in Economics.</p>
<p>Understanding the role and importance of Economic models</p>	<p>To emphasize the role of modelling in Economics, with the help of basic micro and macroeconomic models.</p>
<p>Introduction to the applications of the theories of Economics</p>	<p>To show the students the use of the basic models in studying income determination, poverty alleviation, economic growth; to examine the roles of the theories in relation to trade and development, development and environment as well as growth, technology and productivity.</p>
<p>Understanding the relation between theories, policies and the real world</p>	<p>To enable the students learn the impacts of economic policies, which are grounded in the economic theories they learn, on their own lives; To understand the economic experiences and challenges of Indian agriculture, industry, banking sector, demographics as well as national income trends.</p>

<p>Realization of the significance of critical thinking in life</p>	<p>To inculcate an appreciation for critical thinking in the students; to show them that reasoning, generating hypotheses, building models, making arguments, attempting careful explanation and the ability to revise, correct and improve one's understanding of a phenomena are crucial to any scientific mind.</p>
<p>Learning about the employment and career opportunities</p>	<p>To help students learn about the myriad opportunities for employment as well as higher studies in Business studies, Statistics, management studies, marketing, insurance, law, and many other fields including those leading to the jobs as a school teacher and/or other government jobs.</p>
<p>Awareness on moral and ethical code of conduct</p>	<p>To impart the moral and ethical approach to learning and using the learned subject in every aspect of life.</p>

## Course Outcome (CO)

### Economics (General)

<b>Paper code</b>	<b>and Name</b>	<b>Outcomes</b>
DSC1A	Microeconomics	<ul style="list-style-type: none"><li>✓ Understand how consumers behave or choose and express their demand following a rational way using the various understanding of utility including measurement of degree of responsiveness of demand with respect to important affecting factors and thus the resulting economic theory.</li><li>✓ Understand producers' behavior in developing supply decision by knowing production function and going through various concepts of cost and revenue and thus resulting theory for different time periods.</li><li>✓ Understand the possible types of markets in which economic agents have to be operative and resulting features.</li><li>✓ Understand existing mainstream theory of how factors of production receive their share of the pie that they generate.</li><li>✓ Understand concept of welfare generation because of the operations of economic agents through the prism of Pareto .</li></ul>
DSC1B	Macroeconomics	<ul style="list-style-type: none"><li>✓ Understand different relevant concepts and issues related to national income accounting. Accumulate knowledge regarding circular flow of income, injection and withdrawal from it, equilibrium income/production.</li><li>✓ Understanding the contesting theories regarding operation of aggregate economy and macroeconomic variables like income, employment etc, and realizing effectiveness of different stabilizing methods. Accessing knowledge regarding effective demand and its important constituents, consumption &amp; investment.</li><li>✓ Gaining knowledge about different concepts of money and different motives of holding money. Thus understanding money through the lens of contesting theorists.</li><li>✓ Understanding inflation- its causes, types and effects and control mechanisms.</li><li>✓ Understanding role of commercial bank and their supervisory authority, central bank.</li></ul>
DSC – 1C	Development Economics	<ul style="list-style-type: none"><li>✓ Understanding the meanings and differences between economic development and economic growth;</li><li>✓ Learning about the various indicators of economic and human development;</li><li>✓ Getting an overview of the major models of economic growth and their policy implications;</li><li>✓ Analyzing the crucial aspects of poverty and inequality at</li></ul>

		<p>various levels and among various classes, communities and geographical areas;</p> <ul style="list-style-type: none"> <li>✓ Learning about different types of political and economic institutions, their role and functioning in developing economic performances of the underdeveloped countries;</li> <li>✓ Identifying different forms and roles of foreign investment in economic development.</li> </ul>
DSC – 1D	Features of India Economy	<ul style="list-style-type: none"> <li>✓ Identifying the concept and different measure of development, underdevelopment and human development;</li> <li>✓ Learning about the basic features of Indian economy regarding national income, agriculture, industry as well as demographic structures;</li> <li>✓ Understanding Indian policy experiences and their evolution;</li> <li>✓ Analyzing Indian economic growth, development and structural changes during different times periods; Learning about the regulatory role of the institutional framework;</li> <li>✓ Emphasizing the structural break experienced in 1991 and its larger, long-run implications; Learning about specific relevant issues, such as, growth and distribution, poverty and unemployment, human development, environmental issues and demographic concerns;</li> <li>✓ Analyzing the agricultural, industrial and financial sectors specifically to learn about their evolutions, performances, policy impacts and roles in the Indian development experience;</li> </ul>
DSE - 1	Economic Development and Policy in India - I	<ul style="list-style-type: none"> <li>✓ Introducing various issues relating to the Indian experiences of economic growth, development as well as sustainability;</li> <li>✓ Learning about the factors of economic development pertaining to the case of India, especially, different types of capital formation, technology and institutions;</li> <li>✓ Discussing the trends in Indian demography and the pattern of urbanization;</li> <li>✓ Analyzing the occupational structure of India, both in rural and urban areas, rural and urban disguised unemployment;</li> <li>✓ Understanding various employment schemes Indian have and had in the past along with their impacts;</li> <li>✓ Evaluating critically, the issues like economic growth, inequality, poverty, competitiveness, savings, investment, finance mobilization etc;</li> <li>✓ Understanding economic reforms and their impacts, financial responsibilities of the center and the states, and the structure of fiscal and monetary policy in India;</li> </ul>
DSE – 1	Money and Banking	<ul style="list-style-type: none"> <li>✓ Introducing the concepts, functions and measurements of money and learning the theories of money supply determination;</li> <li>✓ Understanding several key models and concepts of monetary economics and banking theory;</li> <li>✓ Applying both micro and macro theory to real-world situations in the areas of money and banking;</li> <li>✓ Identifying the main determinants of interest rates in the financial markets, understanding the implications of interest rate differentials, learning about the functions of interest rates in India;</li> </ul>



		<ul style="list-style-type: none"> <li>✓ Learning the relevance of the Central Bank and related central banking topics, including the causes, policy responses, and lessons associated with the current financial market situation;</li> </ul>
DSE – 1	Environmental Economics	<ul style="list-style-type: none"> <li>✓ Studying how economic activity and policy may affect the environment in which we live.</li> <li>✓ Identifying the key economic issues in the analysis of controlling environmental degradation and externalities;</li> <li>✓ Understanding the theoretical and methodological tools that helps to apply principles of economics to study how natural resources are (or should be) evaluated and managed;</li> <li>✓ Analyzing and assessing the implications of using various environmental policy instruments and assessing the costs and benefits of undertaking pollution control projects;</li> <li>✓ Discussing various approaches and methods developed for valuing environmental goods and services.</li> <li>✓ Understanding the concept of sustainable development and learning about the measures of sustainability, with particular focus on the Indian context.</li> </ul>
DSE – 1	Applied Statistics	<ul style="list-style-type: none"> <li>✓ Introducing time-series analysis, along with its various components and illustrations through additive and multiplicative models, trend determination, seasonal fluctuations;</li> <li>✓ Learning about index numbers, their types, constructions, uses and limitations;</li> <li>✓ Understanding the concept of statistical quality control; their functions, types, constructions, roles and problems;</li> <li>✓ Learning about the concepts of AQL, LTPD, AOQL, ATI functions and Dodge and Romig Tables;</li> <li>✓ Discussing the application of statistics in demographic analyses; learning to deal with demographic data;</li> <li>✓ Learning about measurements of mortality, fertility as well as reproduction data;</li> </ul>
DSE – 1	Econometrics	<ul style="list-style-type: none"> <li>✓ Introducing important econometric concepts like normal, chi-square, T and F distributions and estimation of parameters;</li> <li>✓ Learning about hypothesis testing including definitions, distributions of test statistics, Type I and II errors;</li> <li>✓ Learning about SLRM, OLS, goodness of fit, scaling and units of measurement and confidence intervals;</li> <li>✓ Understanding Gauss-Markov theorem, forecasting, MLRM, OLS, R<sup>2</sup> and adjusted R<sup>2</sup>;</li> <li>✓ Understanding partial regression coefficients, individual and joint hypothesis testing and dummy independent variables;</li> <li>✓ Learning about the violations of classical assumptions;</li> </ul>
DSE – 2	Economic Development and Policy in India - II	<ul style="list-style-type: none"> <li>✓ Introducing the perspectives of India economic policies targeted at different sectors;</li> <li>✓ Learning about the policies for agricultural productivity, rural credit and farm labour;</li> <li>✓ Understanding agricultural markets and pricing systems, land reforms and their regional diversities;</li> <li>✓ Learning about the trends of industrial production in India as well as the issues relating to the small scale industries;</li> </ul>

		<ul style="list-style-type: none"> <li>✓ Understanding the public sector and foreign investments;</li> <li>✓ Knowing about the balance of trade as well as balance of payment scenario of India, learning about the relation and interactions between India and the World Trade Organization;</li> </ul>
DSE – 2	Public Finance	<ul style="list-style-type: none"> <li>✓ Understanding the economics of government expenditure and taxation; Using economic analysis to predict and verify the effects of government intervention on behaviour of individuals, households, and firms;</li> <li>✓ Discussing the implications of policy for efficiency and equity; analyzing public goods, externalities, and information asymmetries;</li> <li>✓ Understanding market failures, taxes and expenditures;</li> <li>✓ Analyzing policy applications including welfare assistance, education, healthcare spending, and tax policies such as income taxes and consumption taxes;</li> <li>✓ Critically analyzing fiscal policies and its implication in Indian Economy.</li> </ul>
DSE – 2	Economic History of India (1857-1947)	<ul style="list-style-type: none"> <li>✓ Identify the features of Indian economy during colonial period;</li> <li>✓ Understanding the core macroeconomic characteristics of India, its national income, demographic trends and occupational structures and how they apply to a wide range of real-world issues;</li> <li>✓ Analyzing the agrarian structure and land relations, agricultural markets and institutions, role of technology and productivity;</li> <li>✓ Learning about Indian industrialization and deindustrialization, railways, heavy industries and labour issues;</li> <li>✓ Understanding the nature of colonial impact on Indian economy, trade, drain of wealth and capital flows;</li> <li>✓ Knowing about the development processes in the backdrop of the colonial past of India.</li> </ul>
DSE – 2	Basic Statistics	<ul style="list-style-type: none"> <li>✓ Defining the nature and classification of various categories of data; Learning about various measures of central tendencies;</li> <li>✓ Learning the theory of probability; Understanding expectations and different types of probability distribution;</li> <li>✓ Understanding simple correlation analysis and the basics of regression analysis;</li> <li>✓ Defining Index numbers, its concept, characteristics, classification and applications;</li> <li>✓ Learning Time Series Analysis; Using least squares method and understanding trend analysis, linear and exponential, moving averages; Learning the calculation of seasonal trends;</li> <li>✓ Analyzing the concept of sampling and learning about different categories of sampling; Understanding the concept of sampling distribution and the theory of estimation.</li> </ul>
DSE – 2	Project Work	<ul style="list-style-type: none"> <li>✓ Formulated according to the project undertaken to work on by the students;</li> </ul>
SEC – 1	Basic Computer Application	<ul style="list-style-type: none"> <li>✓ Learning about file creation and management system;</li> <li>✓ Learning about word processing;</li> <li>✓ Learning to use spreadsheets;</li> <li>✓ Learning to prepare and navigate through presentations;</li> </ul>

		<ul style="list-style-type: none"> <li>✓ Allowing students to apply the concepts learned in practical situations;</li> </ul>
SEC – 1	Indian Financial System	<ul style="list-style-type: none"> <li>✓ Introducing the concepts, functions and measurements of money and learning the theories of money supply determination;</li> <li>✓ Understanding several key models and concepts of monetary economics and banking theory, relating to the Indian financial system;</li> <li>✓ Understanding the NBFIs, their difference from the commercial banks and central bank's control over them;</li> <li>✓ Introducing the capital market in India, both organized and unorganized, learning the difference between the primary and secondary markets and that between shares and bonds;</li> <li>✓ Introducing the operations of Indian stock market and its various aspects;</li> <li>✓ Learning about the role and functions of the regulatory authorities, learning about SEBI;</li> </ul>
SEC – 1	Indian Official Statistics	<ul style="list-style-type: none"> <li>✓ Introducing the basic features and characteristics of Indian official statistics, what it means, the methods of data collection and the institutional framework;</li> <li>✓ Understanding what economic census means, knowing about the statistics relating to population, employment, agriculture and financial;</li> <li>✓ Understanding Economic Survey;</li> <li>✓ Learning about the sources of demographic statistics, measures of mortality, fertility and reproduction data and their use in policy formulation;</li> <li>✓ Learning about international statistical system and its similarity and dissimilarity with the Indian system;</li> <li>✓ Learning the macro topics like purchasing power parity, environment, energy, industry, gender indicators and national income as well as trade statistics;</li> </ul>
SEC – 2	Computer Applications in Economics	<ul style="list-style-type: none"> <li>✓ Introducing the importance of basic computer applications in modern Economics;</li> <li>✓ Learning about file creation and management system;</li> <li>✓ Learning about word processing, text formatting and learning to create reference list;</li> <li>✓ Learning to use spreadsheets for various categories of data;</li> <li>✓ Learning to represent data graphically through different data charts;</li> <li>✓ Using spreadsheets for calculations of descriptive statistics;</li> <li>✓ Learning to prepare and navigate through presentations;</li> <li>✓ Allowing students to apply the concepts learned in practical situations;</li> </ul>
SEC – 2	Business Project Proposal	<ul style="list-style-type: none"> <li>✓ Identifying business opportunities, especially in India;</li> <li>✓ Understanding the RAMP model of evaluating business opportunities;</li> <li>✓ Understanding the purpose of a business plan and learning about the contents like marketing, operations and financial plan, learning to present a business plan;</li> <li>✓ Analyzing the process of setting up a business project, selection</li> </ul>

		<p>of projects and learning the significance and formulation of project reports;</p> <ul style="list-style-type: none"> <li>✓ Learning about project evaluation and its various aspects, such as, the payback period, the NPV, IRR and the cost-benefit ratio;</li> <li>✓ Knowing about different sources of project financing;</li> </ul>
SEC – 2	Financial Economics	<ul style="list-style-type: none"> <li>✓ Introducing the basic theories of interest, present value and discounting, rate of return;</li> <li>✓ Knowing about evaluation criteria, securities, bond prices, yields and interest rate sensitivity;</li> <li>✓ Learning about the term structure of interest rates, yield curves, spot and forward rates;</li> <li>✓ Understanding random asset returns, asset portfolios, mean and variance and the mean-variance portfolio analysis;</li> <li>✓ Learning the Markowitz model and the two-fund and one-fund theorem;</li> <li>✓ Learning and analyzing the CAPM and its various aspects;</li> </ul>
SEC - 3	Research Methodology	<ul style="list-style-type: none"> <li>✓ Understanding the nature of research;</li> <li>✓ Learning to formulate a research Question;</li> <li>✓ Understanding what makes a research question important?</li> <li>✓ Learning to prepare literature review to situate the research work in the network of others' research;</li> <li>✓ Understanding various aspects of using primary as well as secondary data;</li> <li>✓ Describing the methodology of research and learning to justify it;</li> <li>✓ Learning data analysis/theoretical analysis;</li> <li>✓ Explaining the results;</li> <li>✓ Learning to write project report and the style of referencing;</li> </ul>
SEC – 3	Contemporary Economic Issues	<ul style="list-style-type: none"> <li>✓ Understanding economic development and its difference with economic growth;</li> <li>✓ Learning about the evolution of the concept of economic development and the traditional as well as the modern views of it;</li> <li>✓ Learning about the capability approach to economic development;</li> <li>✓ Understanding fiscal policy and government budget;</li> <li>✓ Learning about various types of budget, different sources of government revenue and that of tax and non-tax revenues;</li> <li>✓ Understanding the process of budget formulation in India;</li> <li>✓ Learning about the contemporary issues of Indian economy, such as, urban bias, industrialization and land acquisition, the service sector, food security and PDS;</li> <li>✓ Knowing about the parallel economy in India;</li> </ul>
SEC – 3	Indian Stock Market Trading	<ul style="list-style-type: none"> <li>✓ Introducing the Indian stock market and its functioning;</li> <li>✓ Reviewing the market of share, both the primary and the secondary markets;</li> <li>✓ Learning about the key indicators of stock market, such as, index, market capitalization and turnover;</li> <li>✓ Knowing about the role of different participants like, investors, hedgers, speculators, arbitragers and stock brokers;</li> </ul>

		<ul style="list-style-type: none"> <li>✓ Learning about stock trading, the broker-client relationship, the sub-broker and client relationship, the neat system and the market phases;</li> <li>✓ Knowing about clearing and settlements and the various aspects of those;</li> </ul>
SEC – 4	Data Analysis	<ul style="list-style-type: none"> <li>✓ Introducing statistical data, the methods of data collection, their classifications and presentations;</li> <li>✓ Learning about sampling, tabulation of data and diagrammatic representation of data;</li> <li>✓ Understanding frequency distribution, its construction methods and the diagrammatic representation;</li> <li>✓ Learning about descriptive statistics, the measures of central tendency, measures of dispersion, about the skewness and Kurtosis;</li> <li>✓ Learning the concept of simple correlation and regression;</li> <li>✓ Introducing the analysis of Indian statistical data; learning about different sources and types of Indian statistical data;</li> </ul>
SEC – 4	Entrepreneurship Development	<ul style="list-style-type: none"> <li>✓ Introducing the evolution of the concept of entrepreneurship and its role in economic development;</li> <li>✓ Learning about the theories of motivation, such as, Maslow's need Hierarchy theory, McCell and Acquired Needs theory and the Kakinada experiment;</li> <li>✓ Understanding the methods of project identification and selection;</li> <li>✓ Knowing about different sources of project financing;</li> <li>✓ Learning about the growth strategies in small businesses, different stages of growth, such as, expansion, diversification, joint venture, merger and subcontracting;</li> <li>✓ Learning about sickness in small businesses, its symptoms, causes and consequences;</li> </ul>
SEC – 4	Insurance Market and Its Products	<ul style="list-style-type: none"> <li>✓ Introducing the evolution of the concept of insurance, its nature, functions, classifications and various regulations;</li> <li>✓ Learning the basic principles of insurance, insurable interest, indemnity, subrogation and Contribution and Proximity Cause;</li> <li>✓ Understanding the procedure of claim management in insurance;</li> <li>✓ Knowing about disputes, arbitration and litigations.</li> </ul>

# **Garhbeta College**

## **Department of English**

### **BA English ( Honours)**

**Course outcome, Programme outcome and Programme specific outcome of Under Graduate Syllabus (3- Tier Examination old Pattern) .**

#### **COURSE OUTCOME (CO)**

The Department of English of Garhbeta College seeks to foster the intellectual development of its students by encouraging study of literature and creative writing. The Department strives to make its pass and honours programme students familiar with a wide range of works of British writers in particular and World literature in general with a special focus on Indian writings in English. The issues of culture, history, gender, race, ethnicity, politics are addressed and negotiated in the process of imparting knowledge of English literature in its multiple forms , to help student to develop an individual critical mindset of their own .The Department wishes that each student who graduates with a BA Honours in English from Garhbeta College, will have an enduring interest in language and literature, an awareness of their historical and cultural legacies, knowledge of complexities of human existence, the political and social upheavals and its bearing on literature, an understanding of the ability of great literature to arouse and challenge people to struggle with insightful questions of human identity and values.

#### **Part -III**

The course of part -III contains the Social and cultural History of England and History of English Literature from twentieth century to Period up to present. It focuses on the 20th century's fiction and non fictions including modern poetry and drama. The second unit of the paper deals with Indian writing in English especially poetries, drama, novels and short stories etc. The third unit contains literary and non literary essays including basic phonetics and American literature.

#### **PROGRAMME OUTCOME (PO)**

Part - 1

Paper - I

Group – A - History of English Language

Group - B - Old and Middle English literature

Group – C - Literary Terms and types

Group - D - Rhetoric and Prosody

This paper is meant for comprehensive understanding of English Literature, language and society with some interesting texts. To acquaint students with the major developments in the evolution of the English Language. Distinguish the major influences on the English language identify changes in its structure , and trace the developments in the evolution of the English language,. This paper also helps to develop the critical insight into various literary types and theories of literary genre. Students are expected to develop in depth knowledge regarding four literary types i.e. tragedy ,comedy, epic, and novel. Rhetoric and Prosody helps the students understanding the rhythm and melody of the language.

#### Paper - II

English literature 1500 - 1630

Group - A - Social, Cultural and Literary History

Group – B - Drama

Group – C - Poetry and Prose

Literary culture and social History with the supporting texts further the understanding of literature with a sense of historical sense of continuity. To encourage students to develop their own readings on Elizabethan drama and import understanding of the Elizabethan stage and its relation to the contemporary society. To acquaint students with the structural features and of the different forms of poetry represented in the syllabus and English prose develop the understanding level of students

#### Paper - III

English Literature 1630 - 1780

Group-A - social, Cultural and Literary History

Group –B - Drama and prose

Group –C - Poetry

To acquaint students with the structural features of different forms of poetry of this age represented in the syllabus. Drama and prose also represent the society of that time.

#### Paper - IV

English literature 1780 - 1840

Group-A - Social, Cultural, and Literary History

Group – B – Prose (Fiction and Non-Fiction)

Group –C - Poetry

This paper makes an effort to encourage the students to read prose literature of various tastes and more. The fictional prose literature by Jane Austen and others are a good exposure to modern English Prose . The Essays and poetry of this period provide refreshing variety.

#### Paper - V

English literature 1900-1840

Group-A - social, cultural, and Literary History

Group –B – Prose (Fiction and Non-Fiction)

Group –C - Poetry

Learning this paper students can understand and realize prose literature of various tastes and mores. Dickens , Hardy, Bronte’s fictional prose literature are a good exposure to modern English prose. Refreshing variety is found in the essays of this period. To acquaint students with the structural features of different forms of poetry of this age represented in the syllabus.

#### Paper-VI

English literature -1900-2000

Group-A-social, cultural, and Literary History

Group –B- Fiction

Group –C-Poetry

This paper continues historical and social understanding of modern English literature. Poetry of Modern English period is complex and challenging and the students are intellectually upgraded through the study of this component. Short Stories add flyovers to the general appreciation of modernist literature and develop their vision with a critical and creative eye .



## **Paper - VII**

### **Indian Indian Writing in English and Indian Writing in English Translation.**

The paper deals with Indian English literature before and after independence including Social, Cultural and Literary History . A novel like " Man Eater of Malgudi " by R.K. Narayan is worth reading in any standard. A play like "Silence! The Court is in Session" by Vijay Tendulkar and helps students to face burning social issues like gender inequality and hazards women encounter in their professional life. The Indian short stories are meant for comprehensive idea of the development of Indian English literature. In the case of Indian poetry Derozio and Toru Dutt who naturally wrote in English, to those writers who trained and expressed their genius, their exceptional intellectual qualities, in the English language. The play like "Tughlaq" by Karnad and " Train to Pakistan" by Khushwant Singh focuses contemporary historical phenomenon.

## **Paper VIII**

### **Literary & Non-Literary essays , Basic Phonetics and American Literature**

This course helps students develop their writing skills to develop complex thinking based on sincere evaluation and synthesis of information from research. Integration of ideas and apply it in proper way is also a significant outcome of this course. Basic Phonetics helps students to know proper way of pronunciation as per IPA rules.

This course makes familiar to the students with American literary, cultural and political history through a wide-ranging selection of texts from drama, novel, and poetry by the great masters like Whitman, Miller, Faulkner, Fitzgerald, Poe, Hemingway, to famous literary figure like Plath. The students' take away from this course is a sense of race, class and gender in the American social and cultural domain. This course is an exposition of the American views of mind and their life style.

### **PROGRAMME SPECIFIC OUTCOME**

English Literature course seeks to familiarize students to a wide range of writing from British, American and Anglophone traditions. It helps students to know how the authors use the creative resources of language-in fiction, poetry, non-fiction prose, and drama-to portray the entire range of human experience. Students are expected to strive, to be imaginative, rhetorically dexterous, and technically proficient and as a result, to gain a deeper insight into life. With the introduction of old syllabus under 3-Tier Examination old Pattern promotes a thematic frame work where classical Indian language literature share space with contemporary literary crosscurrents. Under Graduates syllabus under 3- Tier Examination old Pattern at Garhbeta College will acquaints students to build efficiency of analytical and interpretive argument, to become sincere and critical readers. Again, students' involvement with multiple strategies of drafting and revising, style of writing and analytical skills, diagnosing and developing scholarly methodologies, use of language as a means of creative expression, will make them effective thinkers and communicators — qualities which are crucial for choosing careers in our modern dynamic society.

# Garhbeta College

## Department of English

### BA English (General)

**Course outcome ,Programme outcome and Programme specific outcome of Under Graduate Syllabus (3- Tier Examination old Pattern) .**

#### **COURSE OUTCOME (CO)**

The Department of English of Garhbeta College seeks to foster the intellectual development of its students by encouraging study of literature and creative writing. The Department strives to make its general students familiar with a wide range of works of British writers in particular along with Indian English literature. The Department wishes that each student who graduates with a BA English General in English from Garhbeta College, will have an enduring interest in language and literature, an awareness of their historical and cultural legacies, knowledge of complexities of human existence, the political and social upheavals and its bearing on literature, an understanding of the ability of great literature to arouse and challenge people to struggle with insightful questions of human identity and values.

#### **PROGRAMME OUTCOME (PO)**

##### **Paper - I**

The course of part -I contains the British poetry from the Elizabethan age to modern age . This course traces the evolution of English poetry from Shakespeare to the modernists.As an introduction to British poetry, this paper includes representative authors from Elizabethan, Romantic, Victorian and modernist poetic traditions. Apart from this, students will also learn the rhetorical devices used in English language, along with use of appropriate punctuations.

##### **Paper - II**

As a course on literary fiction, this paper offers a selection from Victorian novels **like Dickens's Hard Times Hardy's The Return of the Native**, essays composed in various ages by Charles Lamb J.Neheru, H. Nicolson and S.C. Bose and short stories by H. E. Bates, James Joyce and Katherine Mansfield and O. Henry . They will also learn to write précis and essays. This course will help develop their abilities for critical thinking and writing.

##### **Paper - III**

This course also focuses exclusively on two drama Shakespeare's "Julius Caesar" and Galsworthy's "Justice" giving the opportunity to develop into every aspect of dramatic theory and dramaturgy of a

single play. Another outcome of this course is literary and non literary essays and literary terms like Allegory, Ballad, Comedy, Dramatic Monologue, Elegy, Image, Ode, Round and Flat Character, Soliloquy, Stream-of-consciousness, Symbol, Tragedy etc, help the students to convey the different literary theory and criticism.

#### **Paper – IV**

The course of part –III English general contains few British and poetries like Yeats, "An Acre of Green Grass" Owen "s" Anthem for Damned Youth" Auden's "The Unknown Citizen" "De la Mare's " Farewell" R. R. Parthasarathy 's "Delhi "Pritish Nandy's " Calcutta, If you Must Exile Me" Kamala Das "Summer in Calcutta which helps the students to understand modernist poetic technique and traditions and a Drama - J.M. Synge : Riders to the Sea describes a vivid realistic picture of Aran island of Ireland .

#### **PROGRAMME SPECIFIC OUTCOME**

English Literature general course seeks to familiarize students to a wide range of writing from British, and Indian literature along with literary term and Rhetoric. It helps students to know how the authors use the creative resources of language-in fiction, poetry, non-fiction prose, and drama-to portray the entire range of human experience. Students are expected to strive, to be imaginative, rhetorically dexterous, and technically proficient and as a result, to gain a deeper insight into life. With the introduction of old English general syllabus under 3- Tier Examination old Pattern promotes a thematic frame work where classical Indian language literature share space with contemporary literary domain.

#### **COMPULSORY ENGLISH COURSE**

##### **Compulsory English (B.A. Part III)**

This is a compulsory Course for all departments for both honours and general. Students will study a selection of texts including poems, reflective essay, short story and drama. They will also learn the basics of language skill as in writing formal and informal letters, job application with curriculum vitae and paragraph. Another outcome of the course is improvement of comprehension and communication abilities.

**Garhbeta College**  
**Department of English**  
**Course Outcome (CO)**  
**B.A. ENGLISH (General)**

**Syllabus General Under CBCS curriculum affiliated to Vidyasagar University**

<b>Name of the Programme</b>	<b>Year of Introduction</b>	<b>Status of implementation in CBCS Curriculum (YES/NO)</b>	<b>Programme Specific Outcome</b>	<b>Course Outcome</b>
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<p><b>B.A English</b> <b>(General)</b></p>	<p><b>Session-</b> <b>18-19</b></p>	<p><b>Yes</b></p>	<p>The programme seeks to familiarize students with representative literary and cultural texts within a significant number of historical, geographical, and cultural contexts. It enables them to apply critical and theoretical approaches to the reading and analysis of literary and cultural texts in multiple genres. Students are then able to identify, analyze, interpret and describe the critical ideas, values, and themes that appear in literary and cultural texts and understand the way these ideas, values, and themes inform and impact culture and society, both now and in the past. They are encouraged to develop their writing &amp; analytics skills in a variety of formats, including essays, research papers, reflective writing, and critical reviews of secondary sources. They are taught to ethically gather, understand, evaluate and synthesize information from a variety of written and electronic sources. Finally the programme helps students to understand the process of communicating and interpreting human experiences through literary representation using historical contexts and disciplinary methodologies.</p>	<p><b>Semester I</b></p> <p><b>DSC-1AT</b></p> <p><b>Poetry and Short Story</b></p> <p>This course, offered to students from Departments other than English, consists of poetry written by Shakespeare, Wordsworth,, Keats and Wilfred Owen and two modern short stories. In all, this course offers diverse texts belonging to different genres and contexts to give the student an overall idea about English literature. Apart from the appreciation of literature, at the end of the course, a student is expected to analyse literary texts critically.</p> <p><b>AECC-1(core)Language core</b></p> <p><b>Poetry -1</b></p> <p>This course consists of poetry written by Shakespeare, John Done, Milton, Pope William Blake Wordsworth, Shelley, Keats ,and Rhetoric and Prosody . All this course offers diverse texts belonging to different genres and contexts to give the student an overall idea about English literature. Apart from the appreciation of literature, at the end of the course, a student is expected to analyse literary texts critically.</p>
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				<p><b>AECC 1(Elective)</b></p> <p><b>Communicative English</b></p> <p>This course is offered to all students across all disciplines. At the end of the course, a student is expected to identify and correct sentence errors, read excerpts of fiction, creative non-fiction and essays, while analysing the structural and sentence level arrangement of the writing and write in an effective manner that demonstrates an understanding of the basic concepts of grammar</p> <p><b><u>Semester II</u></b></p> <p><b>DSC-1B</b></p> <p><b>Essay, Drama, Novel</b></p> <p>Students from other departments who opt for English find a refreshing introduction to a creative, imaginative and artistic world through Lamb's essay, 'Dream Children', while they get an insight into the complex, ambiguous conditions of life in the postcolonial world in Orwell's essay. Shakespeare's romantic comedy offers a charming experience of a journey to a pastoral world, in contrast to city life, depicting a variety of characters and their relationships .Bernard Shaw's play presents to students an interesting and innovative approach to the theme of love and war, being set against the backdrop of the Serbo-Russian war. Thomas Hardy's novel, set in late 19th century England, and written in highly evocative prose, offers students a deep insight into the accidents and coincidences of life which lead to great emotional upheavals.</p>
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## **Semester III**

### **DSC-1CT**

#### **Contemporary India: Women and Women's Empowerment**

With authors as diverse as British poet Elizabeth Barrett Browning, Christina Rossetti, American Poet Emily Dickinson, Indian poets and prose writers Sarojini Naidu, Rassundari Devi and Rokeya Sakhawat Hussain this gender based course introduces the students of other disciplines to a slice of English prose and Poetry by women of various origins. It empowers them with the history of women's struggles in societies of different times and teaches them resilience as well as the need to rise up for their own sake in the face of discriminations in society

### **SEC-1T**

#### **Soft skills**

This course give the student an overall idea about teamwork, emotional intelligence, adaptability, leadership, and problem solving. It gives students continuous practice with teamwork. Students will be able to Demonstrate their familiarity with the leadership and problem solving.

				<p><b>AECC-3(core)</b> <b>Language core</b> <b>Poetry 2</b></p> <p>Students will be able to gain an understanding of society and its people through literature. They will appreciate literary language .Apart from the appreciation of literary language,at the end of the course, a student is expected toanalyse literary texts critically</p>
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<p>B.A. ENGLISH (General)</p>	<p>Session 2018-19</p>	<p>Yes</p>	<p>This programme teaches the students that everything in the world today that has ever existed, exists, or will exist is rooted in history and cannot be independent of its past. It helps to improve, combine and extend one's interest in English as a language and English literature. It teaches the students about the development of the English language and literature into modern society through drama, poetry, novel and plays. It helps to fine tune and hone the student's skill in linguistics and creative writing in a balanced manner. This programme enhances students' undergraduate qualification and transferable skill set. They will fine-tune their research, critical thinking and communication abilities and demonstrate to employers that they can challenge themselves and go the extra mile. Furthermore, while reading the translated texts, one learns the history of different places. Through this programme students can acquire in-depth knowledge about English that can be used in a variety of fields like media &amp; advertising, writing &amp; publishing, journalism, public relations, content writing &amp; blogging, creative writing, teaching and academia, mass communication, civil services, hospitality, communications, advertising, marketing among others.</p>	<p><b>Semester IV</b></p> <p><b>DSC-1DT</b></p> <p><b>Academic Writing and Composition</b></p> <p>This course help students understand the nature of Academic writing. This course also helps students develop their reading, analysis, and writing skills to develop complex written arguments based on careful evaluation and synthesis of information from research. Integration of ideas and applying proper citation is also a significant outcome of this course</p>
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**Semester IV**

**SEC-2: CREATIVE WRITING**

This course encourages students to exercise their creative minds and practice using their imaginations. It improves their ability to come up with alternatives. This broadens their thought processes, which can lead to success in many areas, including problem solving and analysis. Creative writing will also help to improve intellectual skills. Creative writing also develops creative thoughts, using their imaginations, suggesting alternatives, and broadening their thought process and problem-solving abilities. It also allows the learners to show their opinions and develop their voice.

				<p><b><u>SEMESTER V</u></b></p> <p><b><u>DSE-1AT: INDIAN LITERATURE IN TRANSLATION</u></b></p> <p>Modern Indian literature was dominated by the influence of the literary activity of the rulers. The art of translation also rendered a large number of Indian material into English in such a way that English-knowing Indian readers have found a lot to entertain and educate them. Translation is more than just changing the words from one language to another. Translation builds bridges between cultures. It allows the students to experience cultural phenomena that would otherwise be too foreign and remote to grasp through their own cultural lens. Here, the students will get literary texts like Rabindranath Tagore's <i>The Wife's Letter</i>, Mahasweta Devi's <i>Draupadi</i> and so on which will help the students to get a minute idea about the culture of them.</p>

				<p><b><u>GE 1T: ACADEMIC WRITING AND COMPOSITION</u></b></p> <p>This course is designed to develop the students' writing skills from basic to academic and research purposes. The aim of this course is to prepare students to succeed in complex academic tasks in writing along with an improvement in vocabulary and syntax. Academic writing is the formal writing style used in colleges and universities.</p>
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**SEC-3T: ENGLISH LANGUAGE TEACHING**

This course is very important as the English language plays an essential role in our lives as it helps in communication. It is the main language for studying any subject all over the world. English is important for students as it broadens their minds, develops emotional skills, and improves the quality of life by providing job opportunities. Knowing English increases their chances of getting a good job in a multinational company within your home country or for finding work abroad. It's also the language of international communication, the media and the internet, so learning English is important for socialising and entertainment as well as work. The course teaches and encourages respect for other peoples: it fosters an understanding of the interrelation of language and human nature. Foreign languages expand one's view of the world, liberalize one's experiences, and make one more flexible and tolerant.

				<p><b><u>Semester VI</u></b></p> <p><b><u>DSE-1BT: PARTITION LITERATURE</u></b></p> <p>Partition is commonly understood as the division of a state into two or more entities, where at least one successor state assumes continuity with the pre-divided whole. This course is relevant today because it's part of our country's history. Through the course students learned the tragic incidents of people. When India and Pakistan are divided , the most affected people are those who have to go to a new place to stay behind their loved and dear ones. Many literary exponents through their works immortalized the incidents of Partition. For example Sadat Hasan Manto's 'Toba Tek Singh', Jibananda Das' 'I Shall Return to This Bengal', This course is particularly significant as it helps students to understand and locate Indian literature in a very painful chapter of their national history and the struggles of patriotism.</p>
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				<p><b><u>GE-2T: ENVIRONMENT AND LITERATURE</u></b></p> <p>This course is essential as it is the study of literature and the environment from an interdisciplinary point of view, where literature scholars analyze texts that illustrate environmental concerns and examine the various ways literature treats the subject of nature. This course is the study of representations of nature in literary works and of the relationship between literature and the environment. As a separate movement or school of literary criticism, ecocriticism started developing in the 1990s. There is a close relation between ecocriticism and literature. Here, in this course the students will get various thought-provoking texts like Gordon J. L. Ramel's 'Daffodils No More', Mahasweta Devi's 'Pterodactyl' and Ruskin Bond's 'Dust on the Mountains'.</p>
				<p><b><u>SEC-4: BUSINESS COMMUNICATION</u></b></p> <p>A well-rounded business communication course can help students understand the power of visual communication, interpret business visuals, and make intelligent design choices in their own documents and presentations. Developing a compelling personal brand. The purpose of this course is to improve organizational practices and reduce errors. The importance of business communication also lies in: Presenting options/new business ideas. The purpose of studying business communication is to show the students how to communicate and to give them ample practice time. The business communication course can teach the vital skill of active listening and the specific modes of critical, content, and empathic listening.</p>





**Garhbeta College**  
**Department of English**

Course Outcome (CO)

Three Year Semester wise B.A. in English (Hons) under CBCS curriculum affiliated to Vidyasagar University

Name of the Programme	Year of Introduction	Status of implementation in CBCS Curriculum (YES/NO)	Programme Specific Outcome	Course Outcome
B.A. ENGLISH (Honours)	Session 2018-19	Yes	<p>The programme seeks to familiarize students with representative literary and cultural texts within a significant number of historical, geographical, and cultural contexts. It enables them to apply critical and theoretical approaches to the reading and analysis of literary and cultural texts in multiple genres. Students are then able to identify, analyze, interpret and describe the critical ideas, values, and themes that appear in literary and cultural texts and understand the way these ideas, values, and themes inform and impact culture and society, both now and in the past. They are encouraged to develop their writing &amp; analytics skills in a variety of formats, including essays, research papers, reflective writing, and critical reviews of secondary sources. They are taught to ethically gather, understand, evaluate and synthesize information from a variety of written and electronic sources. Finally the programme helps students to understand the process of communicating and interpreting human experiences through literary representation using historical contexts and disciplinary methodologies.</p>	<p><b><u>Semester I</u></b></p> <p><b>CC 1</b></p> <p><b>British Poetry and Drama: Beginning to 14<sup>th</sup> Century and History of English Language</b></p> <p>In this paper the students are introduced to the English literature from old english prose and poetry to Chaucer. This exposure makes them ready to face other challenges in the semesters to come. They will come to know about the features of epic poetry. They will be able to analyse an Old English epic in the light of their own socio-cultural milieu. This paper also acquaints students with the major developments in the evolution of the English language. Students will be able to distinguish the major influences on the English language and identify changes in its structure from the earliest written records to the present day.</p> <p>At the end of the course, students are expected to demonstrate a thorough understanding of diachronic changes in English from Old English to Present day English, and the ability to situate those in their socio-political contexts. An understanding of the Scandinavian, French and Classical influence</p>

				on present day English helps students to identify the etymological origins of words used on a daily basis.
			<ol style="list-style-type: none"> <li>1. On successful completion of the Programme, the students will be accurate both in oral and written communication as they will be strong in Grammar and its usage.</li> <li>2. They can express a thorough command of English and its linguistic structures.</li> <li>3. They can apply critical frameworks to analyze the linguistic, cultural and historical background of texts written in English.</li> <li>4. They will be familiar with the conventions of diverse textual genres including fiction, non-fiction, poetry, autobiography, biography, Journal, films, plays, editorials etc.</li> </ol>	<p><b>CC 2</b>  <b>British Poetry and Drama: Renaissance to 17th and 18th Centuries</b>  With a selection of iconic texts like John Milton's <i>Paradise Lost</i>, Alexander Pope's <i>The Rape of the Lock</i>, as well as significant texts like Marlowe's <i>Edward II</i> and Shakespeare's <i>Macbeth</i>, this course introduces the students to an area of British Literature that is very significant with respect to the development of English literature in the later phases of Renaissance, the period of decadence afterwards as well as the trend of Satire in the Eighteenth century. The students get a vast sense of history and how political and social conditions have influenced the literature of that period. <i>Edward II</i> helps them to understand the political dimensions power clash. <i>Macbeth</i> is one of the earliest examples of the Theatre of power.</p>

			<ol style="list-style-type: none"> <li>5. The course for an English Honours degree has evolved and developed over time, so that it is markedly different now from what it was about 15 years ago. Earlier, students were required to cover literature written primarily in the United Kingdom from the 13th century to the 20th century, with a little room made for literature produced in America. Today's syllabus covers literature in translation from India, as well as the works of writers from Australia, Africa, and South America.</li> </ol>	<p><b><u>GE 1: Academic Writing and Composition</u></b>  This course, offered to students from Departments other than English, helps students develop their reading, analysis, and writing skills to develop complex written arguments based on careful evaluation and synthesis of information from research. Integration of ideas and applying proper citation is also a significant outcome of this course.</p>
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			<p>6. In addition, the faculty now undertakes teaching papers in contemporary Media Studies, Popular Literature, and English Language teaching in terms of contemporary usage. The course in English Honours today is up to date and relevant.</p>	<p><b><u>AECC 1</u></b>  <b><u>Communicative English</u></b></p> <p>This course is offered to all students across all disciplines. At the end of the course, a student is expected to identify and correct sentence errors, read excerpts of fiction, creative non-fiction and essays, while analyzing the structural and sentence level arrangement of the writing and write in an effective manner that demonstrates an understanding of the basic concepts of grammar.</p>
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			<p>7. This Course enables students to seek jobs in the Academia as lecturers and teachers, as Journalists – both in Print and Electronic media, Copyrighters, Communication experts, Bloggers, Script writers, Content writers, Novelists, Poets and Dramatists.</p>	<p><b><u>Semester II</u></b></p> <p><b><u>CC III: British Literature (fiction and non-fiction): 18th Century</u></b></p> <p>With the advancement in print culture, literature of the 18th century developed greatly. The course familiarizes students with the form and structure of the restoration comedy of intrigue. They will be able to study the rise of the English novel in the light of social, political, and cultural contexts. They will also come to understand the 18<sup>th</sup> century social and political trends that prompted the development of English novel.</p>
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				<p><b><u>CC IV: British Romantic Literature (1798-1832)</u></b></p> <p>Students are acquainted with the historical and intellectual background of this period. They will be able to expose the social and intellectual trends of Romanticism in Britain. Emphasis is placed on the philosophical and theoretical concepts that inform Romantic poetry, as well as on the broad scope of literary forms through which the Romantic poetic imagination expressed itself. The course would help students situate authors like Blake and Wordsworth in their historical and social contexts to better understand their texts. Romantic fictions by Mary Shelley and Jane Austen provide a comprehensive understanding of the age across diverse genres.</p>
				<p><b><u>GE 2: Media and Communication Skills</u></b></p> <p>This course consists of Mass Communication, Advertisement, Media Writing and different types of Social Media. Students are expected to understand various forms of Mass Communication. They will be able to write pamphlets and posters for various purposes. Students are acquainted with the different types of advertisement and media writing. Apart from News reports and Editorials, the students are expected to have a brief understanding of social media and cyber media.</p>

				<p><b>Semester III</b></p> <p><b><u>CCV: British Literature: 19th Century (1832-1900)</u></b></p> <p>This paper enables students to identify the formal techniques and critical issues associated with Victorian poetry. Students will be able to understand the dominant features of dramatic monologue. Arnold's "Dover Beach" helps them to understand the rise of Industrial capitalism and the decline of Christmas belief. This course will introduce students to some significant texts and literary movements of the period, in the wider context of social transformation and emerging literary practices. The course aims to develop students' analytic and critical skills through a close reading of poets like Tennyson &amp; Browning and novelist like Charles Dickens.</p>
				<p><b><u>CC VI: British Literature: The Early 20th Century</u></b></p> <p>This paper familiarizes students with the social and the intellectual landscape of early 20th century England. This paper imparts a thorough knowledge of the major literary movements of the period. The poems of W. B. Yeats and T. S. Eliot have been included in this course to represent the major trends of modernism. The complex nature of human psyche can be proved in the short stories of Joseph Conrad and Katherine Mansfield. Students will be able to analyze the relationship between literary texts and social structures.</p>

				<p><b><u>CC VII: American Literature</u></b></p> <p>This course exposes the students to American literary, cultural and political history through a wide-ranging selection of texts from drama, novel, and poetry by the great masters like Whitman, Poe, Frost, Hughes, Twain, Williams etc. Students are introduced to the history and evolution of literature in the United States of America. They are able to locate the texts within the broader socio - cultural - political landscape of the country. They can also trace the development of different genres in American literature. This course is an exposition of the American thinking mind and their ways of life.</p>
				<p><b><u>SEC-1: Soft Skills</u></b></p> <p>Called a skill enhancement course, this course is aimed at teaching students the basics of Teamwork, Adaptability, Leadership, Problem Solving etc. It teaches them to express themselves succinctly and well in practical fields outside of the language of literature. Students are expected to write precis and essays after the completion of this course.</p>
				<p><b><u>GE 3: Contemporary India: Women and Empowerment</u></b></p> <p>This paper deals with social construction of gender, women and law, and women and environment. Students will be able to understand that sex is biological, but gender is social. Students are acquainted with the different articles of Indian Constitution for protection of women's rights. They are expected to understand various forms of domestic violence and sexual harassment.</p>

## **Semester IV**

### **CC VIII: European Classical Literature**

European literature dates back to ancient Greek and Roman times. Thereafter, much of the literature in different nations of Europe has continued to be influenced by these ancient classical texts. Homer is the source and origin of all great myth and legend, and The Iliad is the best introduction to the heroic world for students. Horace's Epistles are still considered unparalleled for refined and subtle logical thought. Ovid's 'Metamorphosis' is the source book for successive generations of writers, including Shakespeare in the sixteenth century and Kafka in the twentieth. Plautus's 'Pot of Gold' offers students an interesting insight into Roman society, following the tradition of Greek New Comedy with its intrigues and complex plot, and is the model for comedies in English literature upto modern times.

### **CC IX: Modern European Drama**

The plays selected for this course informs the students of the dramatic changes that took place in twentieth century European drama. The course looks at the ways in which traditional norms and conventional modes of thought were resisted and subverted by playwrights who wanted their plays to reflect the chaotic climate of the modern era. We will also endeavor to read the plays as being representative products of their milieu by juxtaposing these against their political and socio-cultural contexts. Henrik Ibsen, Bertolt Brecht and Samuel Beckett engage with three very different themes and stylistic innovations in their plays. The course is thus quite engaging and thought provoking, introducing students to concepts like absurdism and the alienation effect.

				<p><b><u>CC X: Popular Literature</u></b></p> <p>A course with text-selection based on popular literature of post independence voices in South Asian writings as well as American and European popular Culture including comic books, this course is an exercise in delight and instruction. With Sukumar Ray's nonsense verse in Abol Tabol and Lewis Carroll's text the students learn the basics of theory and practice in children's literature that gives them a renewed insight on popular literature as opposed to classical canonical literature.</p>
				<p><b><u>SEC-2: Creative Writing</u></b></p> <p>This course encourages students to exercise their creative minds and practice using their imaginations. It improves their ability to come up with alternatives. This broadens their thought processes, which can lead to success in many areas, including problem solving and analysis. Creative writing will also help to improve intellectual skills. Creative writing also develops creative thoughts, using their imaginations, suggesting alternatives, and broadening their thought process and problem-solving abilities. It also allows the learners to show their opinions and develop their voice.</p>



				<p><b><u>GE – 4: Environment &amp; Literature</u></b></p> <p>This course is essential as it is the study of literature and the environment from an interdisciplinary point of view, where literature scholars analyze texts that illustrate environmental concerns and examine the various ways literature treats the subject of nature. This course is the study of representations of nature in literary works and of the relationship between literature and the environment. As a separate movement or school of literary criticism, ecocriticism started developing in the 1990s. There is a close relation between ecocriticism and literature. Here, in this course the students will get various thought-provoking texts like Gordon J. L. Ramel's 'Daffodils No More', Mahasweta Devi's 'Pterodactyl' and Ruskin Bond's 'Dust on the Mountains'.</p>
				<p><b>Semester V</b></p> <p><b><u>CC XI: Postcolonial Literature</u></b></p> <p>In this course, students will read texts from previously colonized spaces like India, Australia and Latin America. Possess a coherent knowledge and a critical understanding of postcolonial literature and its key historical, cultural and theoretical developments. Post completion of the course, students should be able to compare, discuss and explain interconnections and functions of postcolonial literature and its contexts, including comparative and interdisciplinary issues. They will be able to critically evaluate arguments and assumptions about postcolonial literature, texts, and modes of interpretation.</p>

**CC XII: Women's Writing**

With authors as diverse as Emily Dickinson, Sylvia Plath, Eunice De Souza, Alice Walker, Indian poets and prose writers Rassundari Devi and Mahashweta Devi this gender based course introduces the students of other disciplines to a slice of English prose and poetry by women of various origins. It empowers them with the history of women's struggles in societies of different times and teaches them resilience as well as the need to rise up for their own sake in the face of discriminations in society. Apart from highlighting the many facets and discourses around women's problems and rights, the course also aims at gender sensitization and fostering social awareness among the students.

**DSE-1: Nineteenth Century European Realism**

With a selection of iconic texts like Wilkie Collins' *The Woman in White*, Arthur Conan Doyle's *The Hound of the Baskervilles*, Raymond Chandler's *The Big Sleep* this course introduces the student to an area of English Literature that is very significant with respect to the development of English literature. Literary realism is part of the realist art movement that started in nineteenth-century France and lasted until the early twentieth century. It began as a reaction to eighteenth-century Romanticism and the rise of the bourgeois in Europe. Realists rejected Romanticism, which had dominated French literature and art since the early 19th century. Realism revolted against the exotic subject matter and the exaggerated emotionalism and drama of the Romantic movement. The students get a vast sense of history and how political and social conditions during particular periods in English literature have given rise to certain genres of literature.

				<b>DSE-2: World Literatures</b>
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The paper explains the concept of World Literature and its evolution in relation to other related concepts e.g. national literature, general literature, comparative literature and Vishwa Sahitya. The paper analyzes the major writers and their works across the world. It demonstrates and differentiates variety of prose and also explains and delineates the different types of drama by major writers. The paper appreciates the connectedness and diversity of human experiences and literary responses to them in different parts of the world. It analyzes and appreciates literary texts from different parts of the world and receives them in the light of one's own literary traditions.

## Semester VI

### CC XIII: Indian Classical Literature

The paper explains the eco-socio-political-cultural context of the age that produced Indian classical literature from its early beginning till 1100 AD and also traces the evolution of literary culture(s) in India in its/their contexts, issues of genres, themes and critical cultures.

These texts are keys to enter into the treasure of Indian Classical literature. Kalidasa's "*Abhijnana Shakuntalam*", Vyasa's "*The Dicing*" and "*The Sequel to Dicing*" from *The Mahabharata* and Sudraka's "*Mricchakatika*" provide conceptual knowledge and facilitate critical thinking on Indian classical literature.

These masterpieces critically analyze the forms and conventions of classical genres such as epic, tragedy, and comedy. These writings help students understand the theories and characteristics of myths and identify their importance in Western culture and literature. These popular pieces evaluate and defend the motivation of reading Indian classical literature.

				<p><b><u>CC XIV: Indian Writing in English</u></b></p> <p>Students are introduced to the rich heritage of Indian writing since Derozio, Toru Dutt and Sarojini Naidu, as well as to the increasingly modernist trends used in by Nissim Ezekiel, Ramanujan, Kamala Das and others. Bankim Chandra's 'Rajmohan's Wife', the first novel written In English by an Indian, offers insight into the late 19<sup>th</sup> century ethos of Bengal and holds great historical value. Mahesh Dattani's play introduces students to the complexities of modern urban Indian society.</p> <p>Thus, students acquire a comprehensive idea of the evolution of Indian writing in English and its great variety, as well as its increasing importance in modern world literature.</p>
				<p><b>DSE-3: Science Fiction and Detective Literature</b></p> <p>This paper provides a clear understanding of Science Fiction, and Detective Literature and engages the students with the philosophical and psychological and social issues that are an intrinsic part to the two genres. It helps the students to acquire a sound knowledge of the social and historical construction of crime. Popular texts like Arthur Conan Doyle's <i>The Hound of the Baskervilles</i>, Wilkie Collins' <i>The Woman in White</i> help students to know about the key concepts including genre, implied audience, plot construction, linguistic texture, authorial identity, publication context, and socio-cultural context.</p>

#### **DSE - 4: Partition Literature**

Partition is commonly understood as the division of a state into two or more entities, where at least one successor state assumes continuity with the pre-divided whole. This course is relevant today because it's part of our country's history. Through the course students learned the tragic incidents of people. When India and Pakistan are divided , the most affected people are those who have to go to a new place to stay behind their loved and dear ones. Many literary exponents through their works immortalized the incidents of Partition. For example Sadat Hasan Manto's 'Toba Tek Singh', Jibananda Das' 'I Shall Return to This Bengal', This course is particularly significant as it helps students to understand and locate Indian literature in a very painful chapter of their national history and the struggles of patriotism.



**Department of Geography**  
**Garhbeta College**  
**Garbeta :: Paschim Medinipur :: 721127**  
**West Bengal**

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**PROGRAMME SPECIFIC OUTCOME**  
**Geography Honours Course ( CBCS and Part I+II+III System)**

Geography is interdisciplinary subject. This subject is mainly categorized by two broad sections. First one is physical Geography and the other second is Human related Geography. Thereafter, Physical Geography also subdivided into many physical sections like Earth interior structure, Morphology, Hydrology, Soil Science, Bio-geography etc. In the similar way, The Human related geography also subdivided into many sections like Urban Geography, Settlement Geography, Agriculture Geography, Population Geography etc. The given syllabus comprises both theory and practical. The Honours programme in geography is tailored to meet the students' specific educational and professional goals in mind. It focuses on spatial studies, qualitative as well as quantitative, and emphasizes on human-environment relationship. During the first year of the programme, the students are trained on advanced concepts of physical and human geography. The third year allows them to concentrate on specific areas of the subject, on which they complete their field reports. After completing the course, the students will be amply prepared for professional careers in geography and allied disciplines like GIS and Remote Sensing. They will also be able to pursue M.A. /M.Sc. Course in Geography.

**PSO1.Acquireing Knowledge of Physical Geography:**

Student will gain the knowledge of physical geography. Student will have a general understanding about the geomorphological and geotectonic process and formation. They will be able to correlate the knowledge of physical geography with the human geography

**PSO2.Acquireing Knowledge of Human Geography:**

They will be able to acquire the knowledge of Human Geography and will correlate it with their practical life.



**PSO3. Ability of Problem Analysis:**

Student will be able to analyze the problems of physical as well as cultural environments of both rural and urban areas. Moreover they will try to find out the possible measures to solve those problems.

**PSO4. Conduct Social Survey Project:**

They will be eligible for conducting social survey project which is needed for measuring the status of development of a particular group or section of the society.

**PSO5. Application of modern instruments:**

Students will be able to learn the application of various modern instruments and by these they will be able to collect primary data.

**PSO6. Application of GIS and modern Geographical Map Making Techniques:**

They will learn how to prepare map based on GIS by using the modern geographical map making techniques.

**PSO7. Development of Observation Power:**

As a student of Geography Honours Course they will be capable to develop their observation power through field experience and in future they will be able to identify the socio-environmental problems of a locality.

**PSO8. Development of Communication Skill and Interaction Power:**

After the completion of the project they will be efficient in their communication skill as well as power of social interaction. Some of the students are being able to

understand and write effective reports and design credentials, make effective demonstrations, and give and receive clear instructions.

**PSO9.Enhancement of the ability of Management:**

Demonstrate knowledge and understanding of the management principles and apply these to their own work, as a member and leader in a team, to manage projects. They will perform effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

**PSO10. Understand Environmental Ethics and Sustainability:**

Understand the impact of the acquired knowledge in societal and environmental contexts, and demonstrate the knowledge of need for sustainable development.

**PSO11.Life-long learning:**

Identify the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of societal and environmental change.

**Curriculum and Course Outcome for B.Sc. Honours in Geography under Choice Based Credit System (CBCS)**

SL.No	SUBJECT	NATURE	Description
01	Theory: Geotectonic and Geomorphology	Core-Course-1	The students of Geography will learn about the Interior Earth structure along with different details of the internal events that has been created through the long Era time span. Also they become know about the balance of the Earth surface and local scale earth events like earth quake, folding and faulting structure of the surface. They can identify the earth movements in different parts of the world by which they can understand the seismic zones already presents over the world. Some simple models are also present in our syllabus that may help them to

			<p>understand the actual configuration of the interior earth. One another topic also given in the honours syllabus such as Geomorphology. This portion mainly contains earth surface evolution process. Through the long time, all the assigned topographical features may change their magnitude, length, and width; it is also mention in this morphological portion. So it is necessary to know all the learners of Geography discipline to understand the earth surface structure.</p>
02	Cartographic Techniques	Core-Course-2	<p>All the learners of Geography subject already know about the shape of the mother earth, but if they study through this syllabus they become understand the Co-ordinate system of earth by Measuring the specific latitude and longitude. Distance measuring techniques for any linear real projectors like river, road, mountain range etc to be calculated by adopted the scale, projection and coordinate system. The map making and map reading is the compulsory academic advices, that are present in the given syllabus. In our daily life, we need to understand the areal concept of the piece Of land, that may own or others. If someone go through the Geography syllabus, they can easily adopt the measuring techniques of any area or portion which has already reflected in the Cadastral or Mouza map.</p>
03	Human Geography	Core Course-3	<p>Societal framework of the human society is very different from each others. Every</p>

			<p>individual society always built their infrastructure depending on their immediate surroundings. So, there is something different activities of human society are prominent over the world. The syllabus of the given topic is very interesting and specially built for every society in different regions like equatorial, tropical, sub tropical or cold region etc. Evolution of human Society and their types are described in this syllabus. Different types of population resource region models are given in the prescribed syllabus by which the learners will know about this topic.</p>
04	Cartography Practical and Mapping	Core-Course-4	<p>Cartography is one of the basic techniques that help the Geography learners to present the temporal or spatial data easily. The learners can present all kinds of Geographical attributes through these techniques. Traverse survey, leveling survey, proportional diagrams, thematic mapping are the basic ornaments of this paper.</p>
05	Climatology	Core-Course-5	<p>Climate is one of the complex science, comprises physical and non-physical components of the entire earth. Broad scale climatological cause and effect are the major concern in this paper. Besides this, the local scale weather condition measurement, physical phenomenon identification by using the Hygrometer analysis, Barometric pressure measurement, wind velocity, direction etc. measurements are the basic practice of this paper. This paper also helps the learners to understand the physical climatic knowledge through this paper. Weather map preparation depends on the basic characteristics of ambient region are</p>

			also important study in climatological science. Moreover, daily weather chart preparation may help the learners around their local surroundings.
06	Statistical methods in Geography	Core-Course-6	Statistic is one of the technical task and data handling discipline. The study of Geography always needs for any analysis and future simulation. With the help of statistical techniques and methods the bonafide student can analyze and present data that has comprises different Geographical dimensions, such as various socio-economic concern, demographic perspectives etc. Using different techniques, the students can develop interrelationship idea among different aspects.
07	Geography of India	Core-Course-7	Geography of India is one of the important parts of this syllabus. Mainly, the distribution of physical resources like natural forest coverage, extension of fertile land, minerals mining sites, extended part of the continental shelf of continental slope, river basin area etc. and non physical resource like human resource sectors, technological area; industrial sites etc. are intensively mentioned in the prescribed syllabus. It is also highlighted that, some special case studies are given in this syllabus like physiographic region of Darjeeling, Sundarban etc.
08	Skill Enhancement(SEC): <b>Coastal Management</b>	Course-1	Resource is always as a fund, so the local people use this in some restricted sense by applying modern technology. For the development of skill enhancement of the registered students, the local coastal management paper has been introduced in this syllabus. The learners primarily prepare a field work schedule for

			selecting some coastal aspects. Depending upon the local physical resources of local coast we help them to understand the management of these resources. Moreover, coastal embankment strength, bearing capacity, Dunes configuration, development, sea shore shifting and entire people participation balance is to be studied in this paper.
09	Regional planning and development	Core-Course-8	It helps to understand and identify regions as an integral part of geographical study. It appreciates the varied aspects of development and regional disparity, in order to formulate measures of balanced development. Students learn about the concept of regions and regionalization. It helps to gain knowledge about the growth and development strategies, disparity and diversity in development process in India.
10	Economic Geography	Core-Course-9	Subject content of Economic Geography helps to understand the concept of resource, economic activity, factors affecting location of economic activity. It helps to gain knowledge about different types of Economic activities.
11	Environmental Geography	Core-Course-10	The students will learn about environment and different environment related issues. This paper helps to understand the structure of eco system and the concept of holistic environment, pollution related facts of different environmental component and its management in local, regional and global level. It helps to gain knowledge about the different Environmental programmes, policies and laws of national and global level. This paper also has a practical portion. Students have to prepare a

			questionnaire for surveying the environmental problem related issues and they also have to prepare a check-list for environmental impact assessment of an urban/industrial project. They learn the process of soil quality assessment in lab. They have to find out the PH value and NPK value of soil by using the field kit.
12	Skill Enhancement(SEC): <b>Research Methods</b>	Course-2	This paper helps to provide the knowledge of research activity. Students learn about the research method. They learn about the process of data collection and data analysis. The students also gain the different stages of research work and the different part of report writing.
13	Field Work and Research Methodology	Core-Course-11	This paper has theory and practical part. In theory portion student learn about the research methodology and the different criteria of field work. In practical portion students has to prepare a field report based on physical and cultural component of a particular study area. It makes them expert in identification of area of study, applying methodology, quantitative and quantitative analysis, and to make the conclusion in research work. – fundamental to geographical research. It helps to develop skills in photography, mapping and video recording.
14	Remote sensing and GIS	Core-Course-12	Remote sensing and GIS is very important subject at present day. Knowledge of remote sensing and GIS helps students to understand the modern procedure of survey and mapping processes of Geographical studies. Students gain the knowledge of the principles of remote sensing, sensor resolutions and image referencing schemes from this topic. They also become learn to Interpret satellite

			imagery and they understand the preparation of false color composites from them. Students have to learn the use Geographic Information System (GIS) software for contemporary mapping skills in the practical portion of this paper.
15	Department Specific Elective Subject(DSE): <b>Hydrology and Oceanography</b>	Course-1	This paper brings the concepts of Hydrology and Oceanography. Students have to learn the significance of groundwater quality and its circulation, role of the global hydrological cycle etc. After studying the behavior and characteristics of the global oceans they can realize the importance of water conservation. It helps to gain the knowledge about marine resources and characteristics of ocean waters.
16	Department Specific Elective Subject (DSE): <b>Resource Geography</b>	Course-2	Subject content of this paper helps to understand the concept and classification of resources. Student can understand the approaches to resource utilization and also the problems of resource depletion with special references to forests, water and fossil fuels. This paper helps to understand the concept of Sustainable Resource development. Students gain the knowledge of distribution, utilization, problems and management of metallic and non-metallic mineral resources. It provides the concept of contemporary energy crisis and assess the future Scenario.
17	Evolution of Geographical Thought	Core-Course-13	Evolution of Geographical thought analyzes the development processes of Geography as a subject time by time. It appreciates students to think about the contribution of the scholars in Geography. It helps to gain the knowledge of different schools of geographical thought. Students can learn



			the concept of evolution of geographical thought from ancient to modern times. It analyzes the relationship of Geography with other modern and contemporary principles of Empiricism, Positivism, Structuralism, Human and Behavioral Approaches in Geography disciplines and man-environment relationships.
18	Disaster Managements	Core-Course-14	It helps to understand the nature of hazards and disasters. Students of Geography will learn about the nature, impact and management of major natural and man-made hazards affecting the Indian subcontinent. Also they become know about the climate change with reference to the geological time scale. They have to focus on different case study based on earthquake, landslide and fire related hazards. Students have to prepare a individual project on a specific topic of disaster management.
19	Department Specific Elective Subject (DSE): <b>Soil and Bio Geography</b>	Course-3	Students become know about the character and profile of different soil types. They understand the impact of man as an active agent of soil transformation, erosion and degradation. They also gain the knowledge of Pedological and Edaphological approaches to Soil Studies - Processes of soil formation, types of soil, and principles of soil and land classification; and management. Bio-Geography analyze about the various ecosystems and different classification of them. Students also become know about the significance of biogeochemical cycles and biodiversity. They understand the devastating impact of deforestation.
20	Department Specific Elective Subject (DSE):	Course-4	Agricultural Geography one of the important Department specific elective paper of Geography. The syllabus of this

	<b>Agricultural Geography</b>	<p>paper is very useful to that learner who is interested in agriculture. The subject content of this paper is related to progress of Agricultural Geography and agricultural concept. Students of Geography honours will learn about the role of agriculture on human society, different agricultural system of the world and about the different influencing factors of agriculture over the World. Also they become understand about the agricultural system of India and others south Asian countries and also the impact of Globalization on agriculture with special reference to India from the given syllabus of the paper. It is also highlighted on cropping pattern, crop combination, crop rotation etc. and also on land classification and Agricultural land use model of Von Thunen.</p>
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### **(I+I+I) EXAMINATION SYSTEM**

#### **COURSE OUTCOMES (Cos) OF THE COURSE B.A/B.SC HONOURS GEOGRAPHY**

##### **PART-III**

There are three separate papers in Geography honours course. One is the theory paper and rest two is practical paper. Students become know about the development of Geographical thought and the concept about the different regional part of India by the theory paper. It appreciates students to think about the contribution of the scholars in Geography. It helps to gain the knowledge of different schools of geographical thought. Students can learn the concept of evolution of geographical thought from ancient to modern times. It analyzes the relationship of Geography with other modern and contemporary principles of Empiricism, Positivism, Structuralism, Human and Behavioral Approaches in Geography disciplines and man-environment relationships. Students understand about the physical region, climatic region, soil region, natural vegetation region, agricultural region, different economic region, human resource distribution and the

drainage system all over India. From the practical paper they learn to study Topographical sheet. They learn to prepare Weather map, Geological map, use of excel data for preparing different chart and graph. Students also learn to analyze of statistical data representation. They have to taste soil PH by using soil kit and have to determine the atmospheric pressure and relative humidity by using Barometer and Hygrometer. They also gain the knowledge of remote sensing and GPS. They have to prepare a field report individually based on field survey by choosing a specific study area.

**GARHBETA COLLEGE**  
**DEPARTMENT OF HISTORY**  
**PROGRAMME OUTLET**

**Programme Specific Outcomes (PSOs)**  
**History (Hons.)**

History originated in Ancient Greece and later it flourished in Rome and then other countries of the world. In our India , study of History is not older. It is started in Nineteenth Century under the shadow of British Colonial Rule. But, now a day our study about history is parallel behind world historic notion. History taught us, How do we peltas a step for create civilization or state formation or notion of any creation of human society and natural varieties.

So, After completing of the course the students will gather the knowledge of History, sense of history of civilization. The students also attain the sense of how to explain Civilization and state polity. They can also achieve social, political, economic and religious life of Indian subcontinent and world also. Students also gather the knowledge of how did the state emerge, change time to time? Why and How did religion emerged? What was the economic life of the ancient people? A student of history will achieve the notion of Modern and Post-Modern theories of state formation and present status of the world.

After completion of the programme, the Graduates will be capable of-

PSO1. Studying the course the students posses an idea about the evaluation of Civilization in ancient period.

PSO2. History provides the students a idea of relations between another subject of social science.

POS3. Study of History provides the knowledge of the relationship between Man and Nature.

POS4. History widens the scope of comparative studies among History, Literature and different social science.

POS5.The idea of History has contributed to make civil society, structure of state, administration etc.

POS6. The students of History are taught how did make a Nation State, how did world threatened in the time of worldwide war.

## Course Outcome

### History (Hons.)

Semester I	
Title of the course	Greek and Roman Historiography
Paper Code	<b>CC-1</b>
Credit	06
Hours	06 Hours/Week

Reading the paper students can acquire knowledge of Idea of History Writings. This course (CC1) provides the students to achieve notion that explains in below-

History originated in Ancient Greece and later it flourished in Rome. Basically, History introduced by Greek Historian Herodotus. He also known as the father of History. After him Thucydides was another pioneer of history and historiography. He was known as father of Scientific History Writings. Sometime later Roman intelligence involved to written history. Greek and Roman Historians shows us how we can use written history to learn about the ancient world, even if our conclusions are not those its historians intended. So, Our first paper(CC-1) Greek and Roman Historiography more important to study history and make our notion about History and Historiography .

Semester I	
Title of the course	<b>Early Historic India (proto history to 6th century B.C)</b>
Paper Code	<b>CC-2</b>
Credit	06
Hours	06 Hours/Week

Reading the paper students can acquire knowledge of Early History of India.

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*PROGRAMME SPECIFIC OUTCOMES (PSOs) : HISTORY (PG) : GARHBETA COLLEGE*

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This course (CC2) provides the students to achieve notion that explains in below-

The study of ancient Indian history is important to those who want to understand the true nature of the past and also to those who seek to understand the nature of the obstacles that impede India's progress as a nation. In Indian subcontinent in this certain time period a massive civilization emerged named Harappa Civilization or Indus Valley Civilization. Proto historic period in India shows us peoples involvement in notion of History and their idea about civilization. This period learnt us different economic sector and state polity of ancient regime in India. So, this paper will help to our student to make idea of state polity and urbanisation of Ancient India.

Semester II	
Title of the course	<b>Mauryan and Gupta Empire</b>
Paper Code	<b>CC-3</b>
Credit	06
Hours	06 Hours/Week

Reading the paper students can acquire knowledge about History of **Mauryan and Gupta Empire in ancient India**.

This course (CC3) provides the students to achieve notion that explains in below-

Six century B.C.E. in India, there were complicated state polity like Janapada, Maha Janapada and each ruler involved to occupy others Janapada or Mahajanapada. For this, in this time we saw a new state polity that called Empire. This structure finished first time at Magadha in the time of Mauriya. Mauriya ruler from Chandragupta Mauriya to Brihadratha contains a different ruler stability and ideology. In certain time taught us notion of Empire, character of ruler class, liaison of different social and religious sect and also varieties of state economy or source of economic outcomes.

As a successor of Mauriya Empire, Gupta's made a massive empire in our India, basically northern part of India. In this period taught us notion of classics. Different classical works written in certain time . Gupta ruler from Srigupta to Vishnu Gupta were effeciant and made a powerful empire. This empire was glorify ancient Indian civilization. There had many new starting system viz.- Currency system, market policy, foreign trade, mining and handicraft . For this this paper will help to our Student to make the idea of different economic life,defferent classics, art, ancient language etc.

Semester II	
Title of the course	<b>Political History of Early Medieval India (600 AD to 1200 AD)</b>
Paper Code	<b>CC-4</b>
Credit	06
Hours	06 Hours/Week

Reading the paper students can acquire knowledge about History of **Political History of Early Medieval India (600 AD to 1200 AD)**

This course (CC4) provides the students to achieve notion that explains in below-

The start of the period is typically taken to be the slow collapse of the [Gupta Empire](#) from about 480 to 550, ending the "[classical](#)" period, as well as "ancient India", although both these terms may be used for periods with widely different dates, especially in specialized fields such as the history of art or religion. This period also taught about feudalism, feudal society and regional ruler class, military power and military settlement of ancient India. Early medieval India a productive period of Indian history meanwhile Historians deffer it from ancient period for it's different aspect of polity. Student taught from this paper many kingdom ,regional state and their defferent activity and rulling policy. There had religious perspective ,politics also included in its, for this, certain period important to study .

Semester III	
Title of the course	<b>Delhi Sultanate</b>
Paper Code	<b>CC-5</b>
Credit	06
Hours	06 Hours/Week

Reading the paper students can acquire knowledge about History of **Delhi Sultanate**.

This course (CC5) provides the students to achieve notion that explains in below-

The Delhi Sultanate was an Islamic empire based in Delhi that stretched over large parts of the Indian subcontinent for 320 years (1206–1526). Five dynasties ruled over the Delhi Sultanate sequentially: the Mamluk dynasty (1206–1290), the Khalji dynasty (1290–1320), the Tughlaq dynasty (1320–1414), the Sayyid dynasty (1414–1451), and the Lodi dynasty (1451–1526). It covered large swathes of territory in modern-day India, Pakistan, Bangladesh as well as some parts of southern Nepal.

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*PROGRAMME SPECIFIC OUTCOMES (PSOs) : HISTORY (PG) : GARHBETA COLLEGE*

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The sultanate is noted for its integration of the Indian subcontinent into a global cosmopolitan culture (as seen concretely in the development of the Hindustani language and Indo-Islamic architecture, being one of the few powers to repel attacks by the Mongols (from the Chagatai Khanate) and for enthroning one of the few female rulers in Islamic history, Razia Sultana, who reigned from 1236 to 1240.

It is also part of a longer trend predating the spread of Islam. Like other settled, agrarian societies in history, those in the Indian subcontinent have been attacked by nomadic tribes throughout its long history. In evaluating the impact of Islam on the subcontinent, one must note that the northwestern subcontinent was a frequent target of tribes raiding from Central Asia in the pre-Islamic era. In that sense, the Muslim intrusions and later Muslim invasions were not dissimilar to those of the earlier invasions during the 1st millennium. **This paper taught us about a new era of foreign ruler and administration.**

Semester III	
Title of the course	<b>The Feudal Society</b>
Paper Code	<b>CC-6</b>
Credit	06
Hours	06 Hours/Week

Reading the paper students can acquire knowledge about History and structure of **The Feudal Society**.

This course (CC6) provides the students to achieve notion that explains in below-

The most striking development was **the practice of making land grants to Brahmanas and Buddhist monks and later to officials for their military and administrative services**. These grants meant the transfer of all sources of revenue and surrender of police and administrative functions thus giving rise to feudalism. Feudalism in India was characterized by a **class of landlords** and by a class of subject peasantry, both living in a predominantly agrarian economy marked by a decline in trade and urbanism and by a drastic reduction in metal currency. Different ecological factors contributed to the nature of social structure and dynamics and hence the difference in European and post-Mauryan feudalism. From this chapter we taught about Feudalism- a new political structure of ancient India.



Semester III	
Title of the course	<b>Akbar and the Making of Mughal India</b>
Paper Code	<b>CC-7</b>
Credit	06
Hours	06 Hours/Week

Reading the paper students can acquire knowledge about History of the regime of **Akbar and the Making of Mughal India**

This course (CC7) provides the students to achieve notion that explains in below-

The greatest of **the Mughal** emperors of India. He reigned from 1556 to 1605 and extended Mughal power over most of the Indian subcontinent. In order to preserve the unity of his empire, Akbar adopted programs that won the loyalty of the non-Muslim populations of his realm. Akbar's reign significantly influenced the course of Indian history. During his rule, the Mughal Empire tripled in size and wealth. He **created a powerful military system and instituted effective political and social reforms**. Akbar was **Muslim** but took an active interest in the various religions of his realm, including Hinduism, Zoroastrianism, and Christianity, in his efforts to consolidate the diverse empire and to promulgate religious tolerance. This chapter helps us to know Akbar's time and prosperity of mughal India, that called a great time in medieval Indian history.

Semester III	
Title of the course	<b>Literature and History: Bengal</b>
Paper Code	<b>SEC - 1</b>
Credit	06
Hours	06 Hours/Week

Reading the paper students can acquire knowledge about relation between **Literature and History of Bengal**.

This course (SEC - 1) provides the students to achieve notion that explains in below-

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The main connection between literature and history is that **literature is used to report and represent history**. The two are, therefore, intertwined with one another. The biggest difference between literature and history is that the latter posits itself as fact, while the former is taken to be an artistic form. The twin ideas of fact and entertainment intertwine often within literature and history to produce historical **fiction** and narrative non-fiction. Literature takes many forms. They range from personal notes to poems and non-fiction articles. Literature can be presented in a number of mediums including online content, magazine and newspaper articles and in book form. For a work to be considered literary, it usually requires artistic merit and quality. What constitutes as literary is a subjective matter and rarely agreed upon. This paper taught us notion of relation with History and Literature preferably Bengali literature.

Semester IV	
Title of the course	<b>Renaissance and Reformation</b>
Paper Code	<b>CC-8</b>
Credit	06
Hours	06 Hours/Week

Reading the paper students can acquire knowledge about History and achievement of the **Renaissance and Reformation** .

This course (CC8) provides the students to achieve notion that explains in below-

It was an incredible time of beauty, blossoming with **creativity and curiosity**. The Renaissance era also witnessed the discovery and exploration of new continents, the growth of commerce, and the inventions of innovations such as paper, printing, the mariner's compass and gunpowder. The vibrant period of the European Renaissance era is famous worldwide. Most people will just think of the famed paintings of this era, but the Renaissance was much more than great art. Laying out the foundation for the European age of exploration, which lead to Europe's global power. Its big-name discoveries, masterpieces, developments have gone down in history as some of the greatest

creations on earth. The Renaissance teaches us **the power of looking to the past for insights and inspiration in dealing with today's issues**. By looking to the past for guidance today, not only can we find potential sources of answers, but also ways to address current challenges that previous societies have faced.

Semester IV	
Title of the course	<b>Renaissance and Reformation</b>
Paper Code	<b>CC-9</b>
Credit	06
Hours	06 Hours/Week

Reading the paper students can acquire knowledge about History and achievement of **The French Revolution & role of Napoleon Bonaparte** in French Democracy.

This course (CC9) provides the students to achieve notion that explains in below -

The French Revolution was one of the most startling, exciting, and terrifying periods in European History. But studying the French Revolution also helps us think **about how we talk about different groups in society**, and about how these discussions shape politics. France in 1789 was a deeply unequal country. The French Revolution was a period of major social upheaval that began in 1787 and ended in 1799. It sought **to completely change the relationship between the rulers and those they governed and to redefine the nature of political power**.

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Napoleon Bonaparte was a **French military general**, the first emperor of France and one of the world's greatest military leaders. Napoleon revolutionized military organization and training, sponsored the Napoleonic Code, reorganized education and established the long-lived Concordat with the papacy. In this chapter we taught A lot of things,

1. The women led the revolution but were denied the right to vote in the constitution drafted by the National assembly.
2. The rich and the educated hijacked the power to rule once it became successful. The poor became witnesses once revolution succeeded. They saw the national assembly's constitution totally denied voting rights to the poor. Only tax payers were allowed to vote.
3. When the poor got power, they established severe control in order to achieve certain goals and that ruthless governance led to the downfall.
4. Then came the directory but a tug of war for power again led to the downfall of the government.
5. Napoleon became an emperor coz of hero worship. later he became a dictator. Unquestioned 'Hero worships' obviously leads to dictatorship.

But democracy evolved into a better form of governance due to all the above mentioned mistakes made by France and other countries.

Semester IV	
Title of the course	<b>19th Century Revolutions in Europe</b>
Paper Code	<b>CC-10</b>
Credit	06
Hours	06 Hours/Week

Reading the paper students can acquire knowledge about History and achievement of the **19th Century Revolutions in Europe**.

This course (CC10) provides the students to achieve notion that explains in below –

The 19th century was a revolutionary period for European history and a **time of great transformation in all spheres of life**. Human and civil rights, democracy and nationalism, industrialization and free market systems, all ushered in a period of change and chance. The 19th century – an age of revolutions! Taking inspiration from the French Revolution of 1789, people across Europe challenged aristocratic ruling classes and fought for the development of civil and human rights, democracy and national independence. Nationalism emerged as a revolutionary claim promising citizens more involvement in democracy, but it was exclusive, imagining a world of national territories inhabited by ethnically similar people. Some visionary Europeans, however, hoped for the unity of the continent beyond national allegiances. Speed, dynamism and a belief in progress defined Europe at the end of the 19th century. Railways, electricity, cinema, photography

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and new theories in science and medicine affirmed Europe’s leading role in this technological coming of age. A time of optimism beckoned. The arrival of the age of railways demonstrated Europe’s advance as an assured technological world leader. Industrialization expanded and long-distance travel became possible across all social classes. This chapter taught us varieties of modern thought like, Nationalism, Democracy and Independence etc.

Semester IV	
Title of the course	<b>The Making of Indian Foreign Policy</b>
Paper Code	<b>SEC – 2</b>
Credit	06
Hours	06 Hours/Week

Reading the paper students can acquire knowledge about Origin and achievement of the **Indian Foreign Policy**.

This course (SEC - 2) provides the students to achieve notion that explains in below-

The main and first and foremost objective of India’s Foreign Policy –like that of any other country-is to secure its national interests. The scope of "national interests" is fairly wide. In our case it includes for instance: securing our borders to protect territorial integrity, countering cross-border terrorism, energy security, food security, cyber security, creation of world class infrastructure, non-discriminatory global trade practices, equitable global responsibility for the protection of environment, reform of institutions of global governance to reflect the contemporary realities, disarmament, regional stability, international peace and so on.

In order to sustain its growth trajectory, India needs substantial external inputs. To succeed, our on-going programmes such as Make in India, Skills India, Smart Cities, infrastructure development, Digital India, Clean India etc. need foreign partners , Foreign Direct Investments, financial assistance and transfer of technology. India’s foreign policy’s added focus on this aspect in recent years has resulted in Diplomacy For Development by integrating economic diplomacy with political diplomacy. This paper help us to understand Indian diplomacy and development issues.

Semester V	
Title of the course	<b>Select Themes in the Colonial Impact on Indian Economy and Society</b>
Paper Code	<b>CC-11</b>
Credit	06
Hours	06 Hours/Week

Reading the paper students can acquire knowledge about History of **the Colonial Impact on Indian Economy and Society**.

This course (CC11) provides the students to achieve notion that explains in below –

Colonialism was certainly a far more traumatising experience for colonial subjects than their colonisers. They suffered **poverty, malnutrition, disease, cultural upheaval, economic exploitation, political disadvantage, and systematic programmes** aimed at creating a sense of social and racial inferiority. British colonization **forced open the large Indian market to British goods**, which could be sold in India without any tariffs or duties, compared to local Indian producers who were heavily taxed. British economic policies gave them a monopoly over India's large market and raw materials such as cotton. The study of colonialism represents one of the most important **ways of understanding the roots of contemporary global political and economic processes**. It seeks to give students the tools both to understand the detailed histories of particular regions of the world as well to analyze broader international issues.

Semester V	
Title of the course	<b>Peasant and Tribal Uprisings in Colonial India in the 19th Century</b>
Paper Code	<b>CC-12</b>
Credit	06
Hours	06 Hours/Week

Reading the paper students can acquire knowledge about History of **Peasant and Tribal Uprisings in Colonial India in the 19th Century**.

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This course (CC12) provides the students to achieve notion that explains in below –

Examining influential conceptual frameworks and typologies of peasant struggles in colonial India and the reality they seek to comprehend, this chapter taught that it is more useful to study such movements as responses, based on economic, social and political grievances, of different categories of a heterogeneous peasantry divided on caste, class and status lines. Indian peasants have a long tradition of armed uprisings, reaching back at least to the initial British conquest and the last decades of Mughal government. For more than 200 years peasants in all the major regions have risen repeatedly against landlords, revenue agents and other bureaucrats, moneylenders, police and military forces. During this period there have been at least 77 revolts, the smallest of which probably engaged several thousand peasants in active support or in combat. About 30 of these revolts must have affected tens of thousands of peasants, and about 12, several hundreds of thousands. The uprisings were responses to deprivation of unusually severe character, always economic, and often also involving physical brutality or ethnic persecution. The political independence of India has not brought surcease from these distresses. Major uprisings under communist leadership since British rule not unnaturally show a continuity of tactics with earlier peasant revolts. Of these, the more successful have involved mass insurrections, initially against specific grievances, and the less successful, social banditry and terrorist vengeance. Both in the case of communist revolts and in that of earlier peasant uprisings, social banditry and terrorist vengeance, when they occurred, appear to have happened in the wake of repression of other forms of revolt. Although the revolts have been widespread, certain areas have an especially strong tradition of rebellion. Bengal has been a hotbed of revolt, both rural and urban, from the earliest days of British rule. Some districts in particular, such as Mymensingh, Dinajpur, Rangpur and Pabna in Bangladesh and the Santhal regions of Bihar and West Bengal, figured repeatedly in peasant struggles and continue to do so. The tribal areas of Andhra Pradesh and the state of Kerala also have long traditions of revolt. Hill regions where tribal or other minorities retain a certain independence, ethnic unity and tactical manoeuvrability, and where the terrain is suited to guerilla warfare, are of course especially favourable for peasant struggles, but these have also occurred in densely populated plain regions such as Thanjavur, where rackrenting, land hunger, landless labour and unemployment cause great suffering.

Semester V	
Title of the course	<b>Modern Transformation of China (1839-1949)</b>
Paper Code	<b>DSE - 1</b>
Credit	06
Hours	06 Hours/Week

Reading the paper students can acquire knowledge about History of **Modern Transformation of China (1839-1949)**.

This course (DSE - 1) provides the students to achieve notion that explains in below –

Pre modern China basically represented a feudal society. The Gentry were the ruling class in true sense of the term. Apart from Gentry, these were social classes like the peasantry, artisans and merchants. In about 1840, with the Opium War, the Western imperialist powers transformed China in an informal colony and China was turned into a semi colony. In the mid-19th Century the common people of China revolted against the monarchy and ruling classes. The Taiping revolution was the most important among the infringes. Then came the era of Tung Chi Restoration and a self-strengthening movement for strengthening the monarchical institutions. The Western Power introduced an ‘Open Door’ policy in China to tighten the grip of imperialism.

In the beginning of the 20th Century the Boxer Rebellion broke out, which was virtually an anti-foreigner movement. In 1911, a democratic republican revolution broke out in China, under the leadership of Sun Yat-sen, which saw the birth of a republic. However, republican experiments in China was a failure, and it was followed by the rise of warlordism.

After the First world War a student movement broke out in China on 4 May, 1919, popularly known as the May 4th Movement. The May 4th Movement lead to the emergence of Communist Party of China in 1920. The period was followed by bitter conflict between the Communists and the nationalists in China. The nationalists mobilized themselves in Kuomintang Party. The subsequent years saw fierce civil wars between the Kuomintang and the Communist Party. During the late 1930s China faced an aggression from its neighboring country Japan. The Communist Party of China, under, the able leadership of Mao Tsetung launched a two edged struggle – against Japanese imperialism, on one hand, and also against the nationalists, on the other. Finally the Communists came out victorious and the People’s Republic of China was founded on 1st October 1949.

Semester V	
Title of the course	<b>Modern Transformation of Japan</b>
Paper Code	<b>DSE - 2</b>
Credit	06
Hours	06 Hours/Week

Reading the paper students can acquire knowledge about History of **Modern Transformation of Japan** .

This course (DSE - 2) provides the students to achieve notion that explains in below –

This period was a time of social and economic change within the constitutional monarchy established in 1890. As the original architects of the Restoration died, the various branches of the government began competing for power. An oligarchy bound closely by its members' shared conception of national purpose was replaced by an aggregate of interest groups — the Parliament, civil bureaucracy, military, and Imperial Household — all vying for the ear of the Emperor in whose name they administered the government.



Japanese industry expanded, both in light export industries like textiles, which were necessary to pay for the raw materials needed from abroad, and also in heavy industries like steel and shipbuilding. Cities grew, as more Japanese moved from farming into jobs in factories and offices. In the countryside larger landlords came to own more and more land, and the number of poor tenants increased. Always dependent on foreign trade, Japan was hard hit by the world depression that began in 1929. The farmers who had grown the silk that was exported to the United States found no market for their product once the roaring twenties and the craze for silk stockings collapsed with the stock market crash. Japan's dramatic economic growth slowed, and social problems increased, especially in the countryside.

At the same time that the leaders of imperial Japan pursued modernization and economic growth, they continued to address the issue of Japan's unequal status in the international order. In 1894, more than forty years after Commodore Perry pried Japan open to the outside world, Japan finally succeeded in revising the unequal treaties so that it regained its legal parity with the Western powers. Japan fought a war against China in 1894-95 over the control of Korea and gained Taiwan, Japan's first colony. In 1902, Japan signed an alliance with Great Britain, which signified a dramatic increase in international status, and in 1904-5, Japan won a war against Russia, one of the major Western powers. In the process Japan expanded its empire, annexing Korea in 1910. Japan was allied with the United States and Britain in World War I, and expected territorial gains at the Versailles peace conference in 1919. Instead Japan met with strong opposition from the United States, and again learned the lesson that the West regarded imperialism very differently if it was the imperialism of an Asian rather than a European power. The failure of the Japanese to get a clause on racial equality inserted into the covenant of the League of Nations was an insult that was compounded in 1924 when the United States barred all Japanese from immigration.

Semester VI	
Title of the course	<b>International Relations after the Second World War</b>
Paper Code	<b>CC-13</b>
Credit	06
Hours	06 Hours/Week

Reading the paper students can acquire knowledge about History of **International Relations after the Second World War**.

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This course (CC13) provides the students to achieve notion that explains in below –

After the end of the Second World War, International relations **began developing a truly global character in which each nation began finding its national interests inseparably bound up with the interests of other nations** as well as with international interests of peace, security and development. Studying international relations is a **great way to gain a deeper understanding of global issues**. It's an intriguing and important subject which places great emphasis on economics, culture, education, and political science and examines the impact they have on society. This chapter taught us global socio-cultural-political interests and relation between many countries.

Semester VI	
Title of the course	<b>Modern Nationalism in India</b>
Paper Code	<b>CC-14</b>
Credit	06
Hours	06 Hours/Week

Reading the paper students can acquire knowledge about History of **growth and spread of Modern Nationalism in India**.

This course (CC14) provides the students to achieve notion that explains in below –

The Nationalism in India means a change in peoples understanding of their identity and sense of belonging. The growth of modern nationalism is intimately connected to the anti-colonial movement. People began discovering their unity in the process of their struggle with colonialism. The last decades of the 19th century saw the emergence of nationalism in India. The Indian National Congress was established in 1885 and it soon became the spearhead of the Indian Nationalist Movement. 19th century. It may also surprise you to learn that the roots (origins) of this idea do not lie in the Indian history but in the history of Modern Europe.

Semester VI	
Title of the course	<b>The Russian Revolution</b>
Paper Code	<b>DSE - 3</b>

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Credit	06
Hours	06 Hours/Week

Reading the paper students can acquire knowledge about History of **The Russian Revolution** .

This course (DSE-3) provides the students to achieve notion that explains in below –

The **Russian Revolution** was a period of political and social revolution that took place in the former Russian Empire and began during the First World War. Commencing in 1917 with the fall of the House of Romanov and concluding in 1923 with the Bolshevik establishment of the Soviet Union (at the end of the Russian Civil War), the Russian Revolution was a series of two revolutions: the first of which overthrew the imperial government and the second placed the Bolsheviks in power.

Beginning with the February Revolution in 1917, the first revolt focused in and around the then-capital Petrograd (now Saint Petersburg). After major military losses during the war, the Russian Army had reverted to mutiny. In response, members of Russia's parliament (called the Duma) assumed control of the country, and went on to form the Russian Provisional Government. This government was dominated by the interests of prominent capitalists, as well as the Russian nobility and aristocracy.

Semester VI	
Title of the course	<b>Environmental History of India (Early India and Medieval Period)</b>
Paper Code	<b>DSE - 4</b>
Credit	06
Hours	06 Hours/Week

Reading the paper students can acquire knowledge about History of **Environmental History of India (Early India and Medieval Period)**.

This course (DSE-4) provides the students to achieve notion that explains in below –

Environmental History deals with the history of human impacts on nature and the interactions between humans and nature. It asks how nature influences humans, how humans intervene in nature and how nature and humans interact. The principal goal of environmental history is to deepen our understanding of how humans has been affected by the natural environment in the past and also how they have affected that environment and with what results. Traditional historical analysis has over time extended its range of study from the activities and influence of a few significant people to a much broader social, political, economic, and cultural analysis. Environmental history further broadens the subject matter of conventional history.

## **HISTORY (POST GRADUATE)**

*Being a subject of social science, History has its own value in society and human life. It helps the students to develop their ethical and social value. They could gather knowledge about the heritage and tradition of their own country and the others.*

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*There is huge potentiality in future of a history student. Various options are opened to history students to choose their career. First of all, history is a subject from primary education level to higher study, so they can engage themselves in teaching profession in primary, secondary and higher secondary schools. History is also helpful for those who are preparing for IAS, UPSC, WBCS and SSC. A history student may choose his or her career in journalism or any other editorial board. They may get job in museum, archives and libraries. Beside those, in the field of research and archaeology they may also proceed.*

**PROGRAMME OUTCOME** : The department conducts a variety of courses with inputs on social and economic history, environmental history, history of science, history of gender, regional history and general, political, diplomatic and military history. This pedagogy equips students with knowledge and ability to teach these subjects in schools, colleges and universities, to handle responsibilities as administrators and to work in NGOs and the media. The courses also impart citizenship education, a general skill which enables individuals to understand social and economic systems, functioning of public institutions and political and social culture.

**PROGRAMME SPECIFIC OUTCOME** : After completion of the programme, the students will be capable of various activities.

1. Through completion of a combination of courses, students become familiar with the political processes and structures, society and culture, political ideas and institutions, historical thought and historiography, economy and society in India and the world.
2. Students will understand background of the religions, customs, institutions and administration and so on.
3. Study of history helps the students to impart moral and environmental education. History develops a feeling of patriotism in the hearts of the pupils.
4. By analysing relationship between the past and the present, students will understand the social, political, religious and economic conditions of the people. She/he will be capable of leading and participate in any discussion.
5. Students will develop interests in the study of history and activities relating to history.
6. Students will able to know the familiarity with multiple cultures and diversity.
7. Students have a clear understanding of evidence collected from historical sources.
8. Students will understand the skills that historians use in research.
9. Students will be aware of current historical debates.

## **COURSE OUTCOMES & COURSE SPECIFIC OUTCOMES :**

<b>Semester I</b>	
Title of the Course	State Formation in Ancient India
Paper Code	HIS 101
Credit	6
Full Marks	50
Total Lectures	60

The course intends to impart knowledge to students about how states are formed and how they evolve into large territorial entities like kingdoms or empires. These processes are explained in the context of the ancient period of history in India, and one of the emphases is to focus on the analysis of states in terms of their region – i.e. whether there could be alternatives to state like lineage, and whether states originate the generis or whether they originate from the remnants formations.

### **COURSE SPECIFIC OUTCOMES :**

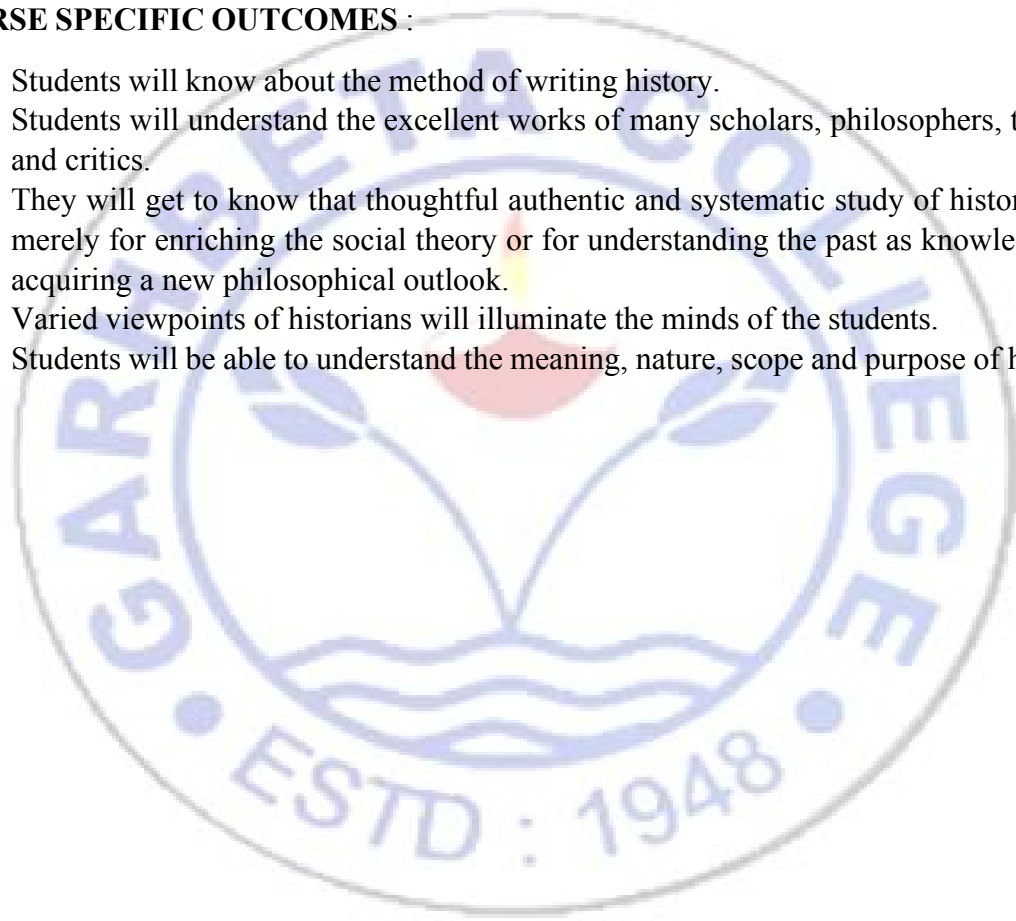
1. Students are expected to have knowledge of state origins, statelessness and sovereignty.
2. They will learn how the political ideas developed during the ancient period.
3. Students will know the difference between the monarchies and republics.
4. Students will understand the difference between northern political systems and southern political systems.
5. Students will explained about the local autonomy and imperial unity.

<b>Semester I</b>	
Title of the Course	History and Historiography
Paper Code	HIS 102
Credit	6
Full Marks	50
Total Lectures	60

The course enables students to improve the skills needed to become successful professional historians. It enlightens students to the various ways in which historians understand the development of the academic discipline of history and enrich them with the forms of writings that have been most prevalent in recent past. This course familiarizes students with recent historiographic trends and practices.

**COURSE SPECIFIC OUTCOMES :**

1. Students will know about the method of writing history.
2. Students will understand the excellent works of many scholars, philosophers, theorists and critics.
3. They will get to know that thoughtful authentic and systematic study of history is not merely for enriching the social theory or for understanding the past as knowledge, but acquiring a new philosophical outlook.
4. Varied viewpoints of historians will illuminate the minds of the students.
5. Students will be able to understand the meaning, nature, scope and purpose of history.



<b>Semester I</b>	
Title of the Course	History of Europe : From Revolution to world War (1789-1914)
Paper Code	HIS 103
Credit	6
Full Marks	50
Total Lectures	60

The course will cover such themes as industrialization, state and nation building, social upheavals and transformation, and emergence of liberalism, conservatism, and socialism as the predominant political ideologies. Though this course, students will have an understanding of the basic chronology and themes of nineteenth-century European history. They will demonstrate the ability to understand and analyses difficult primary sources within their historical context. This Course will prepare the students for different competitive examination.

This course surveys the realignment of Europe after the emergence of the new nation states of Germany and Italy. It examines domestic political developments of the major European states, international diplomacy, various facets of European imperialism, national self-determination movements in central and eastern Europe, and major cultural and intellectual developments. It ends with detailed discussion of the First World War and the background of it.

This course offers a perspective on the political, economic, social and cultural changes, which swept over Europe between 1789 and 1914. From the French Revolution to the emergence of Napoleon Bonaparte, from the Congress of Vienna to the revolutionary movements of 1830 and 1848, from the growth of democracy in Britain to the Liberalism in England, from the German Unification to the foreign policy of Kaiser William II, from the reign of Czars in Russia to revolution of 1905, from the late absolute monarchies to the devastations of the First World War, the period encases momentous changes, which changed the face of Europe.

#### **COURSE SPECIFIC OUTCOMES :**

1. Students will know how to define the various events of western Europe which brought new awakening to the world.
2. Students will analyses the causes, events and impact of French Revolution of 1789.
3. Students will understand and explain the basic concepts associated with the Modern World, e.g. Liberalism, Conservatism, Socialism etc.
4. Students will explain about the domestic political developments of the major European states, international diplomacy, various facets of European imperialism, national self-determination movements in central and eastern Europe, and major cultural and intellectual developments.
5. Students will remember the basic chronology and themes of nineteenth-century European history.

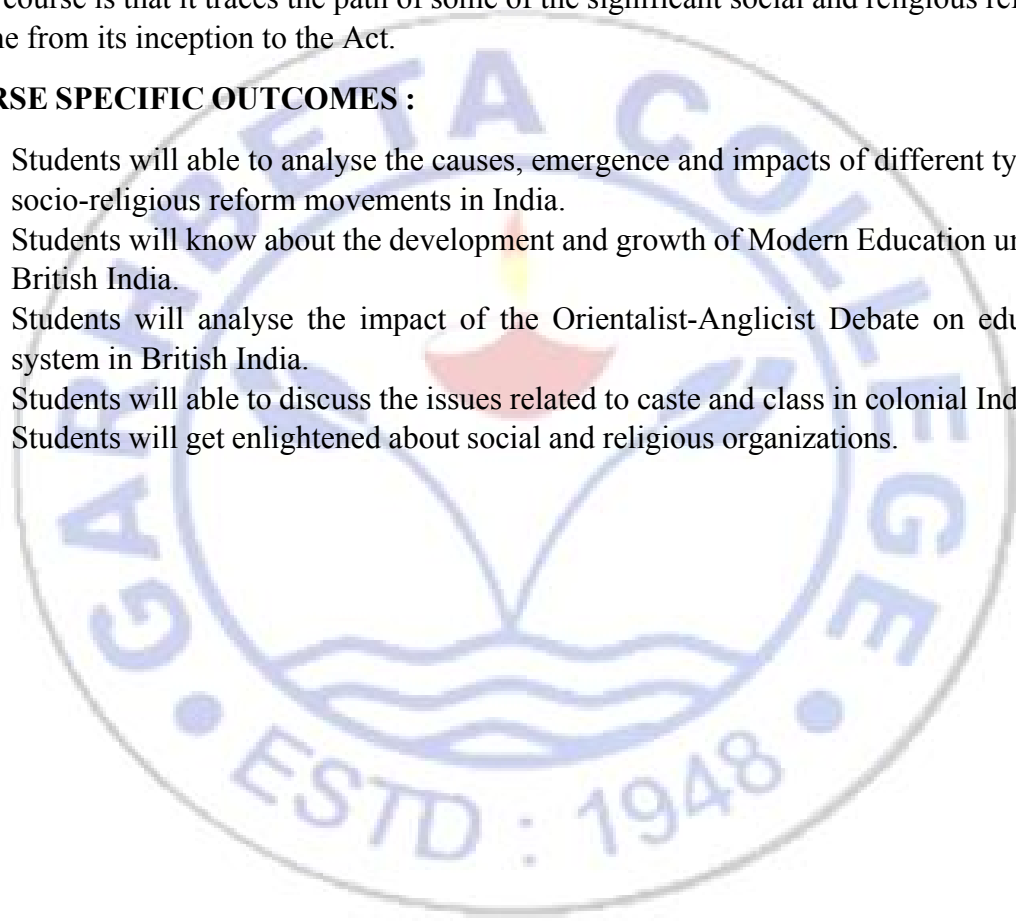


<b>Semester I</b>	
Title of the Course	Socio-Religious Reform Movements in Colonial India
Paper Code	HIS 104
Credit	6
Full Marks	50
Total Lectures	60

The course studies the background, causes, and emergence of different types of social and religious reform movements in India from the early nineteenth to the mid-twentieth centuries. It discusses the existence of different religions, issues related to caste, and class in colonial India. On one hand, it studies the revivalist and reformist outlooks among the Indian reforms, while on the other, it looks at the colonial intervention in issues of reforms. An important aspect of this course is that it traces the path of some of the significant social and religious reforms of the time from its inception to the Act.

**COURSE SPECIFIC OUTCOMES :**

1. Students will be able to analyse the causes, emergence and impacts of different types of socio-religious reform movements in India.
2. Students will know about the development and growth of Modern Education under the British India.
3. Students will analyse the impact of the Orientalist-Anglicist Debate on education system in British India.
4. Students will be able to discuss the issues related to caste and class in colonial India.
5. Students will get enlightened about social and religious organizations.



<b>Semester I</b>	
Title of the Course	Social History of Colonial India
Paper Code	HIS 105A
Credit	6
Full Marks	50
Total Lectures	60

The module on the social history of modern India is distinct from other takes on the history of modern India, not in terms of the spatial and temporal field that it covers, but in terms of the critical lenses it provides the student with when the latter seeks to take a fresh interrogating look at what she/he has conventionally studied as the history of colonial India.

Indeed the very project of studying the history of modern India from a specifically social history perspective constitutes the first critical dimension of our study. Social History, far from being the dregs that remain after the political and the economic have been taken out of history, is a radical historiographical agenda in itself. Developing upon the critical potential of social history as a mode of history-writing, this module will, even while studying modern India in terms of conventional but crucial interrelationship of colonialism and nationalism, open up for the students the exciting ways in which the study of this interrelationship has been complicated, variegated and nuanced by the input critical theories. Thus, this module will try to acquaint the student with the immensely rich dimensions, unexplored areas, and research possibilities that have recently opened up even within the domain of the familiar terrain of modern Indian history.

#### **COURSE SPECIFIC OUTCOMES :**

1. Students will discuss in detail certain crucial aspects of Indian society during the British Rule, i.e., caste, tribe, labour, family and urbanization and urbanism.
2. Students will acquire knowledge of various term, concept related to Indian society and caste system.
3. A reading of the course ought to the students to know the basic features of Indian society, the impact of colonial rule upon them, and how it continues to impinge upon contemporary life in India.
4. Students will able to understand the change and continuity of Indian society.
5. Students will be aware of historical debates in colonial India

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<b>Semester I</b>	
Title of the Course	India and the World : The making of a Foreign Policy
Paper Code	HIS 105B
Credit	6
Full Marks	50
Total Lectures	60

This course presents some important vignettes of a complex, highly diverse India that is also witnessing unprecedented changes since its formal independence in 1947 from Great Britain. It revolves around social dimensions of change, the continuing influence of ancient texts on contemporary India, political democracy, economic transition from the state to the market, gender relations, India's economic globalization and changing world view.

The purpose of this course is to generate knowledge among the students about continuity and changes in India's foreign policy since independence. This course studies India's foreign policy within the context of history and tries to understand and analyses its behavior. Through taking this course, students will gain an understanding of the history and India's policy with regard to our relations with important world powers as well as regional powers.

#### **COURSE SPECIFIC OUTCOMES :**

1. Students will be able to explain the various approaches to foreign policy.
2. Students will analyse and become familiar with India's diplomatic agenda and current engagements with important world powers as well as regional powers.
3. Students will be able to the principles, objectives and the evolution of India's foreign policy.
4. Students will explain India's association with the international nuclear regime.
5. Students will be able to analyse the relationship between India and SAARC countries.

<b>Semester II</b>	
Title of the Course	State and Economy in Colonial India
Paper Code	HIS 201
Credit	6
Full Marks	50
Total Lectures	60

The course deals with the structure and policies of British colonial rule in India; it especially focuses upon colonial polity and economy which replaced traditional Indian polity and economy in a relatively short span of time. The British tended to overlook society on the subcontinent, but they certainly meant to bring about crucial changes in the political and economic spheres to extract the maximum advantage of their rule in India. A reading of the course ought to enable students to gain a comprehensive knowledge of British colonial rule and economy; this is important because post-independence, India decided to continue with the structure of polity and economy introduced by the British, though the new policies taken were divested of the harmful intent of colonialism.

**COURSE SPECIFIC OUTCOMES :**

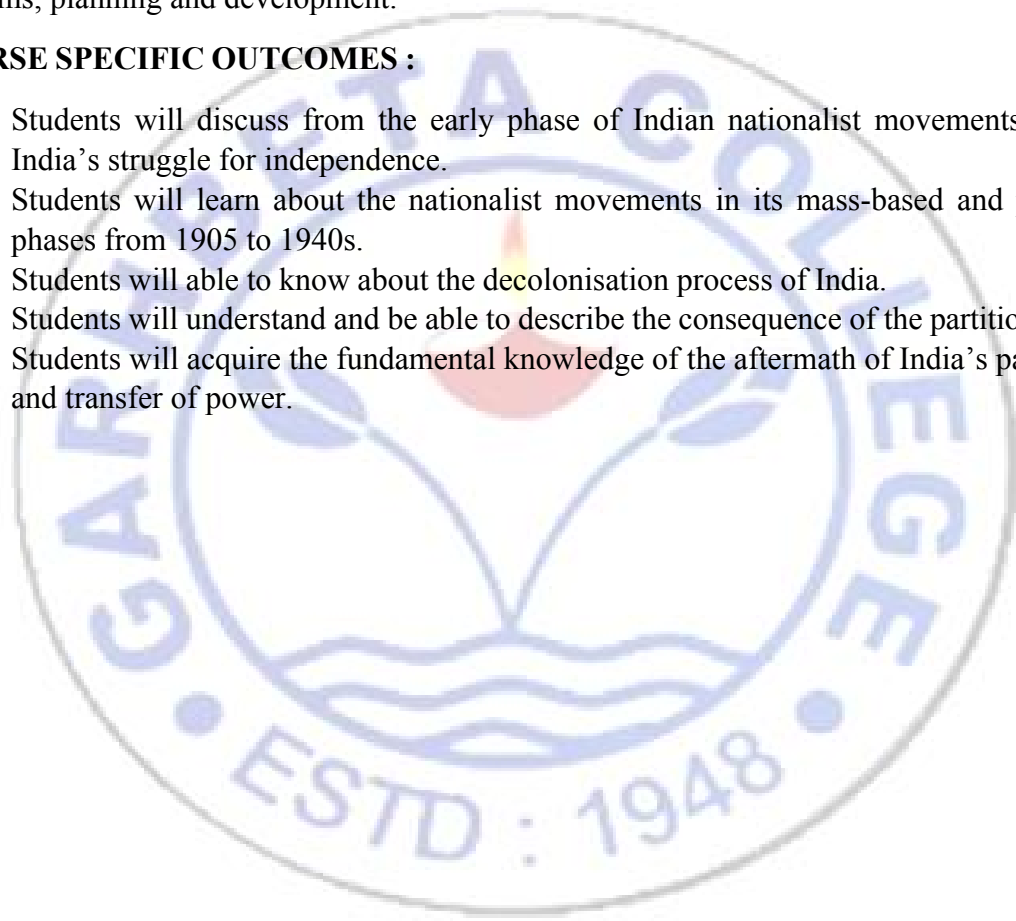
1. Students will understand and be able to explain the impact associated with English trade, land revenue and commercialisation of agriculture.
2. Students will analyse the impact of colonial economy in different sectors.
3. Students will be understand the factors that led to the underdevelopment and stagnation of the Indian economy.
4. Students will get to know the structure and impact of different socio-cultural policies taken by the British government.
5. Students will analyse the study of British administration.

<b>Semester II</b>	
Title of the Course	Anti-Colonial Resistance Decolonisation and After
Paper Code	HIS 202
Credit	6
Full Marks	50
Total Lectures	60

As a historical event anticolonial movements in India is the struggle against the British imperial rule which led to the independence in 1947. The course discusses in detail the problems, predicaments and possibilities envisaged in this struggle. De-colonisation in India stimulated further movements in other countries of Asia and also in the princely states of India. The approach of teaching this course is politico economic with emphasis on post partition refugee problems, planning and development.

**COURSE SPECIFIC OUTCOMES :**

1. Students will discuss from the early phase of Indian nationalist movements to the India's struggle for independence.
2. Students will learn about the nationalist movements in its mass-based and popular phases from 1905 to 1940s.
3. Students will able to know about the decolonisation process of India.
4. Students will understand and be able to describe the consequence of the partition.
5. Students will acquire the fundamental knowledge of the aftermath of India's partition and transfer of power.

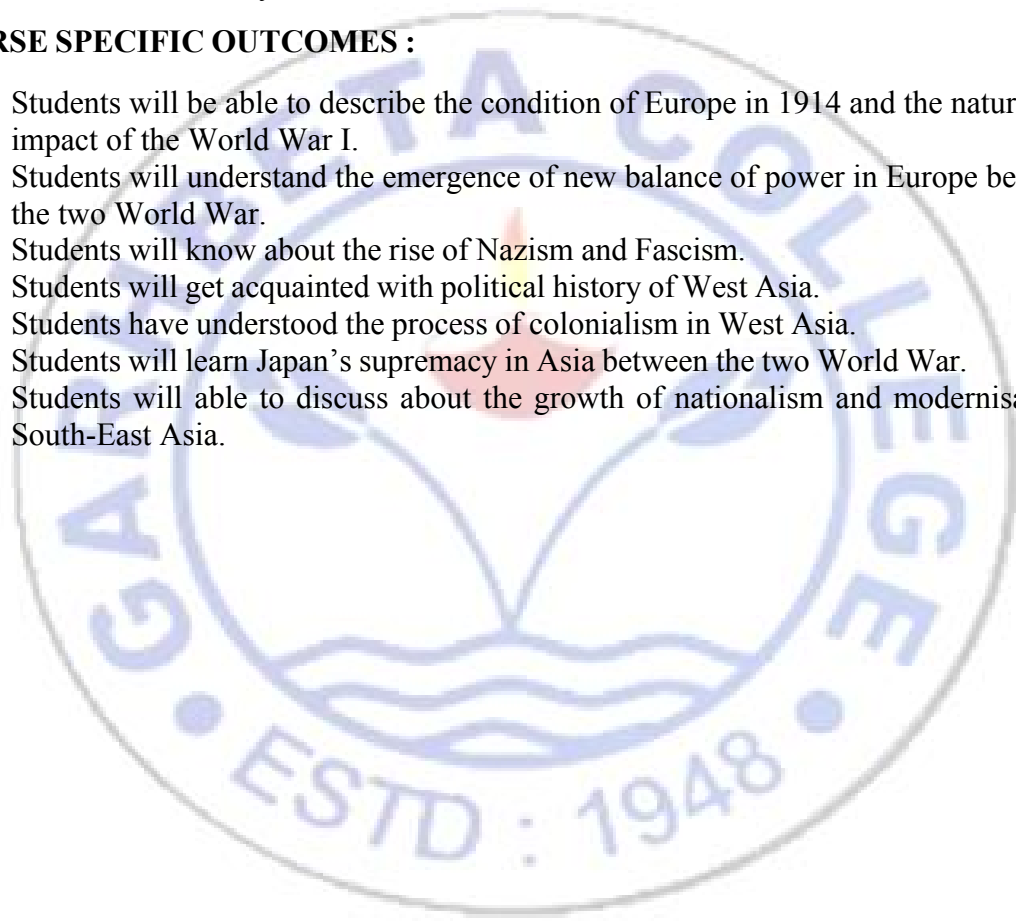


<b>Semester II</b>	
Title of the Course	History of Modern World : Select Themes
Paper Code	HIS 203
Credit	6
Full Marks	50
Total Lectures	60

The course introduced key themes in the history of modern world and also critically analyse the nature of the changing political relations among the different nations since the pre World War I period. The emphasis is laid on the study of rise of totalitarian ideologies such as Nazism, Fascism and Militarism and also the transformation of West Asia and Southeast Asia. Through this course, students will examine the political, diplomatic, intellectual, social and economic themes within world history.

**COURSE SPECIFIC OUTCOMES :**

1. Students will be able to describe the condition of Europe in 1914 and the nature and impact of the World War I.
2. Students will understand the emergence of new balance of power in Europe between the two World War.
3. Students will know about the rise of Nazism and Fascism.
4. Students will get acquainted with political history of West Asia.
5. Students have understood the process of colonialism in West Asia.
6. Students will learn Japan's supremacy in Asia between the two World War.
7. Students will able to discuss about the growth of nationalism and modernisation in South-East Asia.



<b>Semester II</b>	
Title of the Course	Contemporary World (CBCS)
Paper Code	HIS 204
Credit	6
Full Marks	50
Total Lectures	60

The course revolves around major subject areas like geo-politics, strategic studies, peace and conflict studies which helps the students to help the students to have a diverse range of knowledge on popular and critical international events which will make them updated too. It tries to analyse in critical way about the role of UNO in maintaining peace and harmony across the world. This will be helpful to pursue future courses on international law. The portion of black history in USA is to provide the students a survey of the time and incidents from Civil War to Civil rights movement. It covers abolition of slavery and the process of internalization of black citizens of USA. The Harlem Renaissance and the Civil rights movement, Black feminist movements are also taught here. This course also intends to familiarize the students with the concept, development and evolution of the Third World. It discusses India's (approach) engagement with the outside world and tries to analyse the nature of the foreign policy within the context of history. This course will help the students prepare for UPSC and any other Competitive Examinations.

#### **COURSE SPECIFIC OUTCOMES :**

1. Students will analyse the role of UNO in maintaining peace and harmony across the world.
2. Students will be able to know from the time of Civil War to Civil Rights Movements.
3. Students will discuss the historical context and emergence and the development of the Third World.
4. Students will interpret the terms Nationalism, Imperialism, Diplomacy and the significance of Balance of power.
5. Students will be able to know about the major conflicts after the dissolution of the USSR.
6. Students will acquire the knowledge of the principles, forces, processes and problems of the recent times.
7. Students will able to explain the various political movements and growth of nationalism in different parts of the world.

<b>Semester II</b>	
Title of the Course	Contemporary World : Select Themes
Paper Code	HIS 205B
Credit	6
Full Marks	50
Total Lectures	60

This course is designed to introduce students with an understanding of contemporary world scenario. It provides focus on multi-dimensional approach that integrates political, social, economic, technological and cultural perspectives and thus promotes an increasing awareness of the interconnectedness of the world. The course provides various phenomena and analysis of development, sustainability as well as tensions in contemporary world. It enables students to identify, define and consider world issues academically.

**COURSE SPECIFIC OUTCOMES :**

1. Students will examine the Cold War and its effects, ideological and political basis of it, establishment of NATO and its aims, establishment of UNO and the achievements of it.
2. Students will interpret the regional tensions especially in Asia.
3. Students will be able to explain the emergence of the Third World and its aims and achievements in the History of International Relations.
4. Students will be able to know about the major conflicts after the dissolution of the USSR.
5. Students will acquire the knowledge about International Terrorism, Talibanism and Globalisation.
6. Students will analyse the impact of the rise of Communist China in World politics.

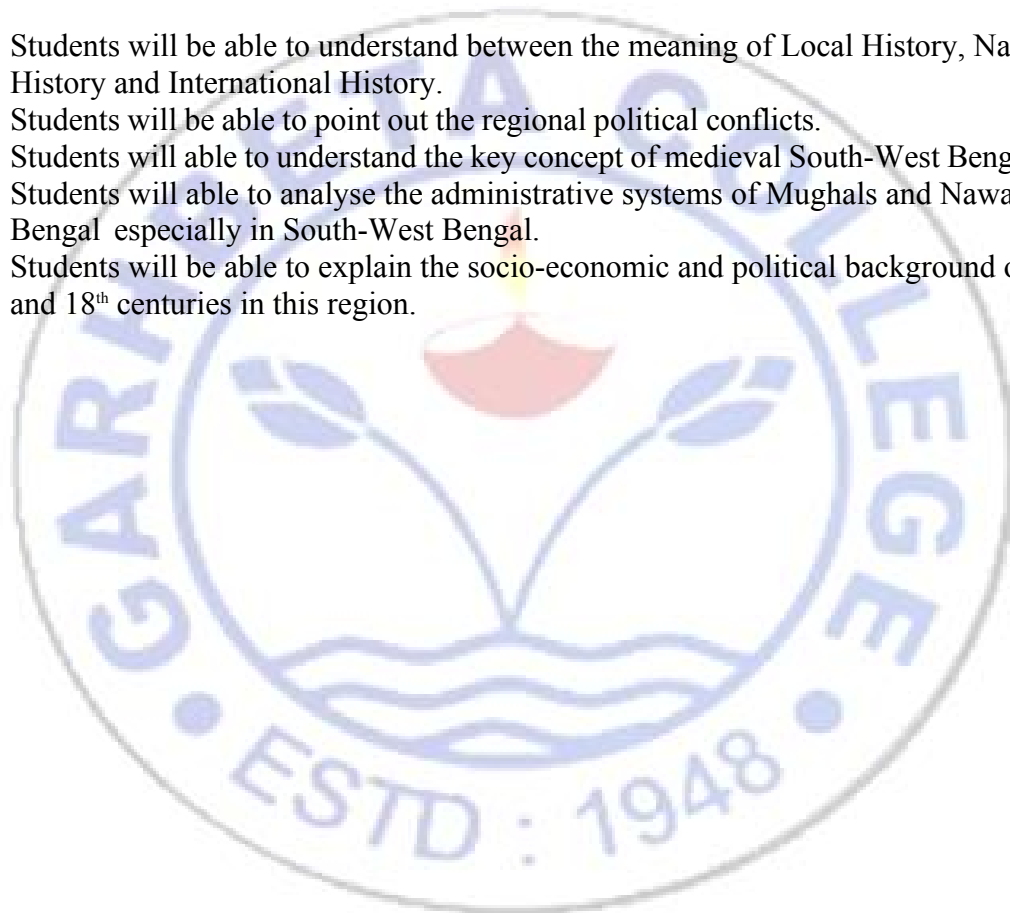


<b>Semester II</b>	
Title of the Course	South West Bengal (17 <sup>th</sup> and 18 <sup>th</sup> Centuries)
Paper Code	HIS 205D
Credit	6
Full Marks	50
Total Lectures	60

The course intends to prepare students for studying the region – home to many of them – where the University is located. An in-depth study is deemed necessary for students who wish to devote themselves to research in future. It is also necessary for those who wish to orient themselves with local knowledge and culture for future application in creative work as well as professional life.

**COURSE SPECIFIC OUTCOMES :**

1. Students will be able to understand between the meaning of Local History, National History and International History.
2. Students will be able to point out the regional political conflicts.
3. Students will be able to understand the key concept of medieval South-West Bengal.
4. Students will be able to analyse the administrative systems of Mughals and Nawabs in Bengal especially in South-West Bengal.
5. Students will be able to explain the socio-economic and political background of 17<sup>th</sup> and 18<sup>th</sup> centuries in this region.

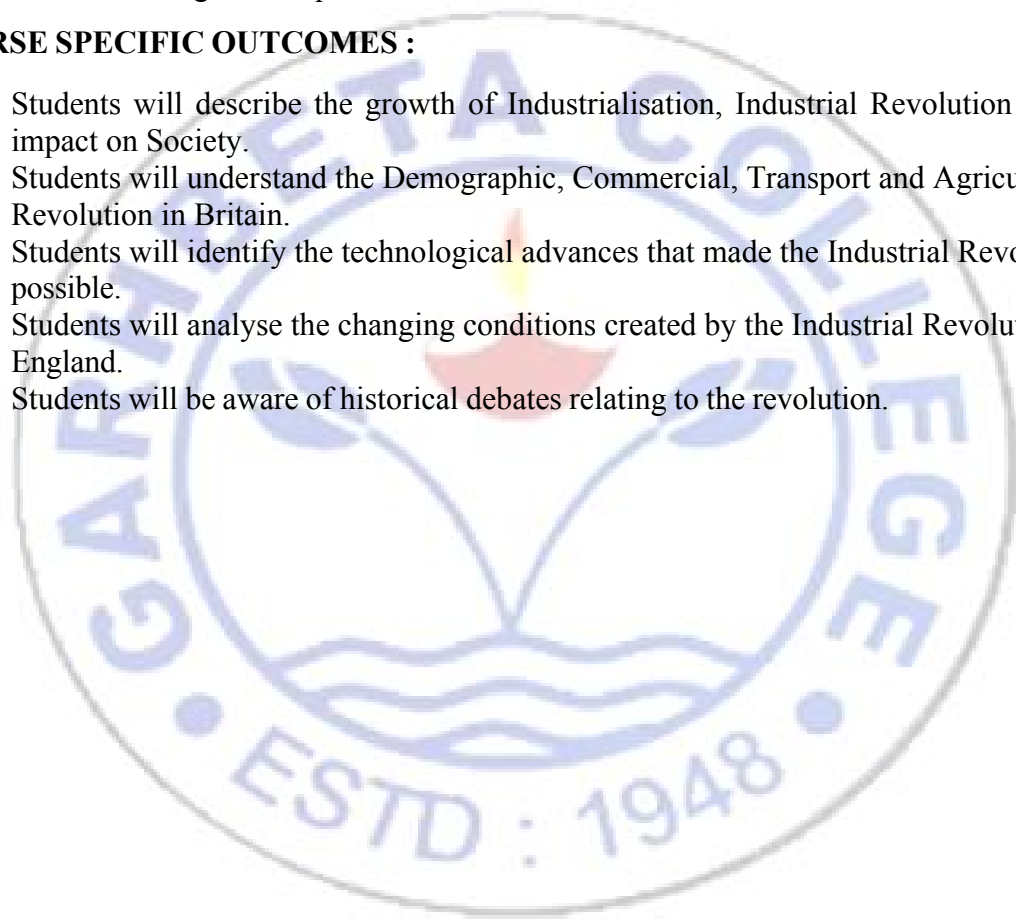


<b>Semester III</b>	
Title of the Course	Industrial Revolution I: The Nature of the Industrial Revolution & the English Experience
Paper Code	HIS 301
Credit	6
Full Marks	50
Total Lectures	60

The course details the nature of the First Industrial Revolution. It provides a strong knowledge of the historical debates relating to the revolution and evaluates the changes in the fields of socio-economic life, technology and government institutions. A reading of the Industrial Revolution is essential for students of world history, as well as for those seeking to know more about the global implications of the socio-economic events of modern times.

**COURSE SPECIFIC OUTCOMES :**

1. Students will describe the growth of Industrialisation, Industrial Revolution and its impact on Society.
2. Students will understand the Demographic, Commercial, Transport and Agricultural Revolution in Britain.
3. Students will identify the technological advances that made the Industrial Revolution possible.
4. Students will analyse the changing conditions created by the Industrial Revolution in England.
5. Students will be aware of historical debates relating to the revolution.



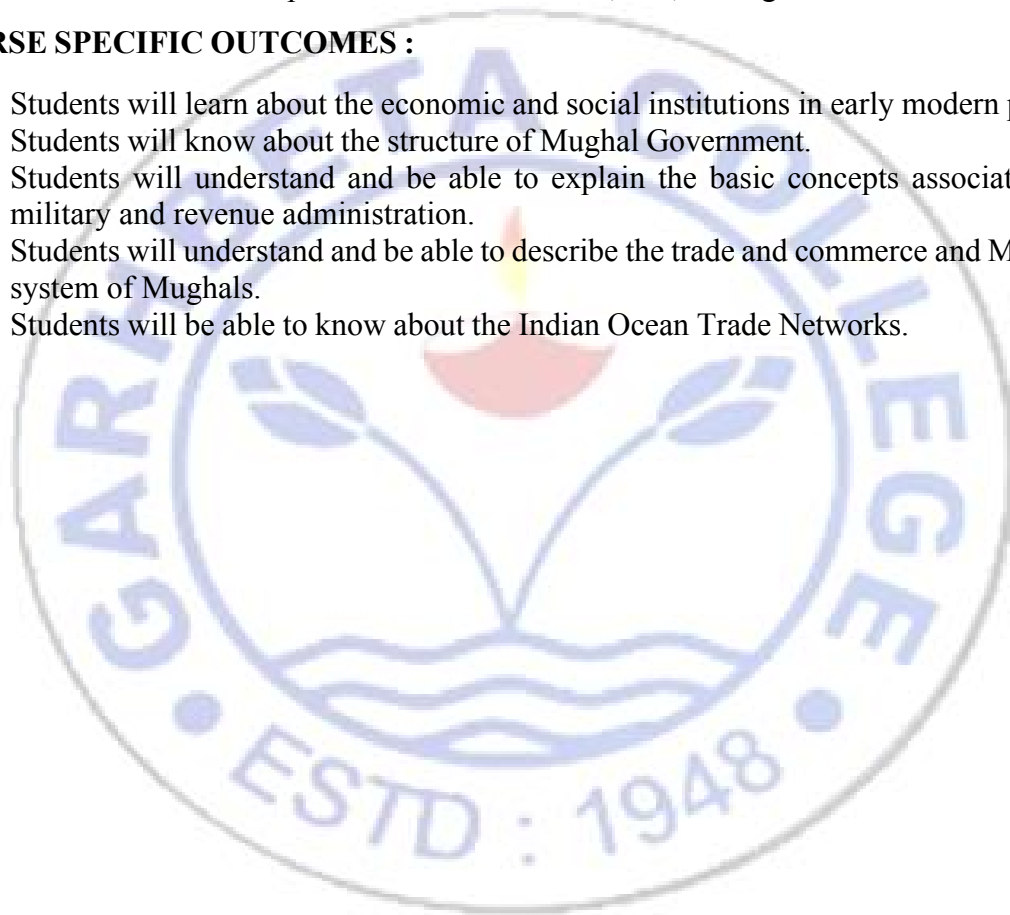
<b>Semester III</b>	
Title of the Course	State and Economy in Early Modern India
Paper Code	HIS 302
Credit	6
Full Marks	50
Total Lectures	60

One of the objectives is to demonstrate how state and economy interacts and whether centralisation of power is a necessary part of development of state. This is explained through a thorough study of four aspects of the economy and society – state as a fiscal machine, relation between the state and the social components of rural economy, trade and the economy of early modern period, and, institutions of the economy. Two aspects of administration are also studied

– organisation of central and provincial administration, and, the organisation of the military.

#### **COURSE SPECIFIC OUTCOMES :**

1. Students will learn about the economic and social institutions in early modern period.
2. Students will know about the structure of Mughal Government.
3. Students will understand and be able to explain the basic concepts associated with military and revenue administration.
4. Students will understand and be able to describe the trade and commerce and Monetary system of Mughals.
5. Students will be able to know about the Indian Ocean Trade Networks.

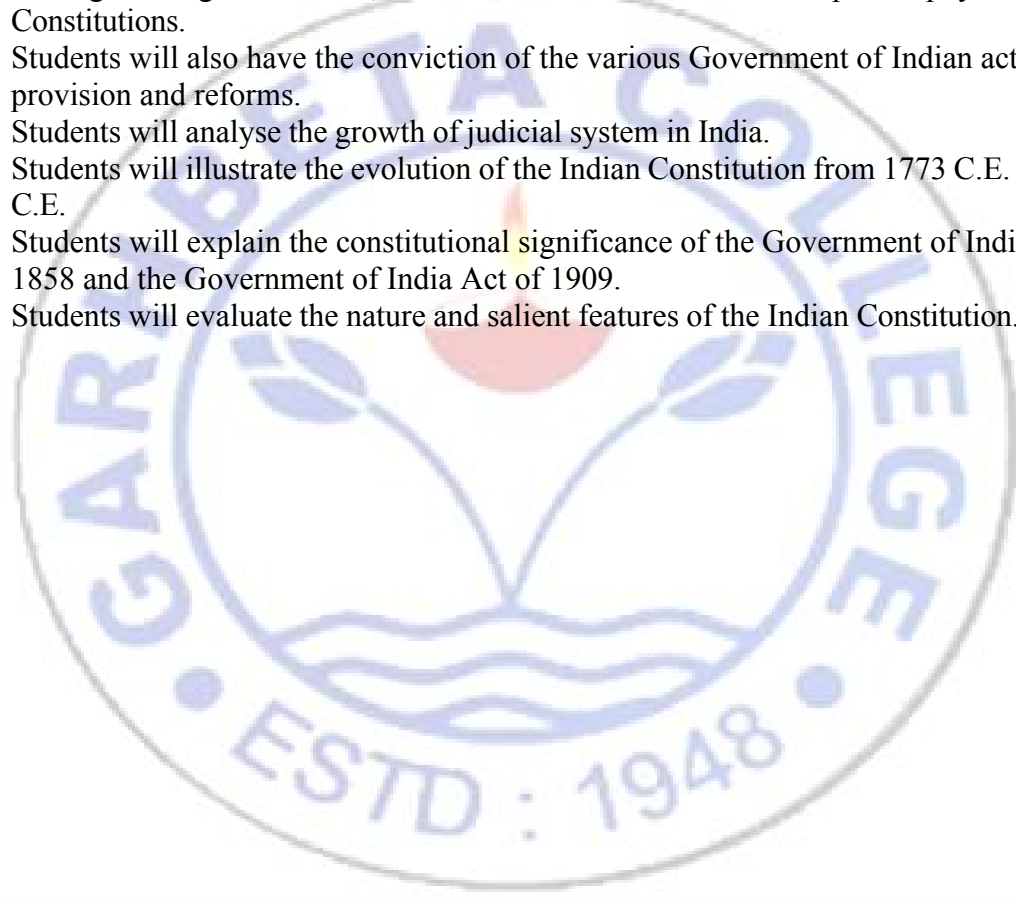


<b>Semester III</b>	
Title of the Course	History of Constitutional Development in Modern India
Paper Code	HIS 303
Credit	6
Full Marks	50
Total Lectures	60

The course will teach the evolution of the Indian constitution through the enactment of various acts. This course bears the tune 'Unity of Diversity', as promulgated by Indian Constitution. This course will be helpful to pursue future courses on law. This course will prepare the students for various competitive examinations.

**COURSE SPECIFIC OUTCOMES :**

1. Through taking this course, the students will understand the philosophy of Indian Constitutions.
2. Students will also have the conviction of the various Government of Indian acts, their provision and reforms.
3. Students will analyse the growth of judicial system in India.
4. Students will illustrate the evolution of the Indian Constitution from 1773 C.E. to 1947 C.E.
5. Students will explain the constitutional significance of the Government of India Act 1858 and the Government of India Act of 1909.
6. Students will evaluate the nature and salient features of the Indian Constitution.



<b>Semester III</b>	
Title of the Course	Contemporary India : Historical Underpinnings
Paper Code	HIS 304 (CBCS)
Credit	6
Full Marks	50
Total Lectures	60

The purpose of the course is to give an overview on some of the significant issues in history to students who belong to various disciplines from arts and science, other than history. It does not provide an analytical framework of the subject instead it intends to provide an overview of the subject. The purpose of this course is to create an interest in history among students by introducing them to new researches and debates in history and history writing. It will help the students from other discipline to understand what are different aspects and issues in history which are dealt with in higher studies and researches.

#### **COURSE SPECIFIC OUTCOMES :**

1. Students will able to describe the Overseas Indian Trade, Company Trade and Private Trade in medieval and British India.
2. Students will know the development and promotion of sport by the Indian state.
3. Students will able to know about the sport and gender in post-colonial Indian society.
4. Students will understand the basic factors affecting mass communication and mass media.
5. Students will able to gain knowledge growth of Indian Media and also the role of media in diffusion of culture and the public sphere.
6. Students will analyse the contemporary media scenario in association with socio-political environment in India.
7. Students will define the basic technical terms and evolution of Indian Music.
8. Students will understand the history of Indian theatre.

<b>Semester III</b>	
Title of the Course	South West Bengal – 19 <sup>th</sup> and 20 <sup>th</sup> Centuries
Paper Code	HIS 305A
Credit	6
Full Marks	50
Total Lectures	60

The course provides a basic understanding of regional history of South-West Bengal during the colonial period, especially of 19<sup>th</sup> and 20<sup>th</sup> centuries. Crucial aspects of this region with detail analysis are dealt with. It aims at developing comprehensive knowledge of regional political, economic, social, cultural and environmental aspects with varied local dimensions. Emphasis is laid on promoting critical approach among the students to the study of South-West Bengal, which also enables them to proceed towards further research works on this particular region.

Apart from analysing the dominant political features, which characterised undivided South-West Bengal's political culture during these centuries, the emergence of non-dominant resistance movements and opinions from below will also be treated. These were marginalised yet powerful articulations of the desire for social equality and emancipation from the rule of colonial capital as well as private property structures that had emerged under such a rule. The role of workers, peasants and a minority segment of the Bengal intelligentsia will be discussed in this context.

#### **COURSE SPECIFIC OUTCOMES :**

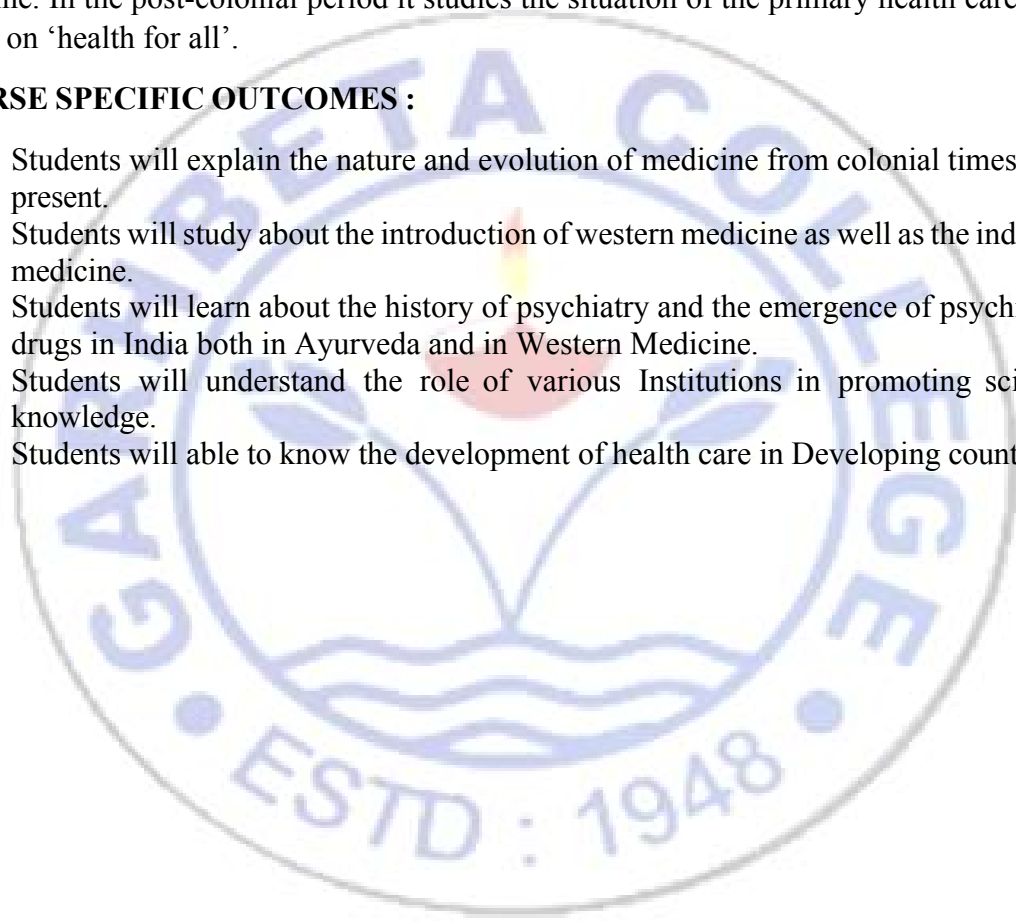
1. Students will be able to understand between the meaning of Local History, National History and International History.
2. Students will be able to point out the emergence of regional nationalism.
3. Students will be able to understand the social consequences in South-West Bengal.
4. Students will be able to analyse the revolutionary politics in Bengal especially in South-West Bengal.
5. Students will be able to explain the condition of women, tribes and castes of 19<sup>th</sup> and 20<sup>th</sup> centuries in this region.
6. They will explain the natural disasters such as the Famine of 1943 and its impact on local society.

<b>Semester III</b>	
Title of the Course	History of Medicine in India : Colonial Times to the Present
Paper Code	HIS 305D
Credit	6
Full Marks	50
Total Lectures	60

This course provides an intense study of history of medicine in India from the establishment of East India Company's rule to the present times. In doing so, it touches upon aspects including Company's medical experiences, establishment of western medical system, medical reforms and the emergence of public health in India. It focuses at length on the history of psychiatry and the emergence of psychiatric drugs in India both in Ayurveda and in western medicine. In the post-colonial period it studies the situation of the primary health care and the debate on 'health for all'.

**COURSE SPECIFIC OUTCOMES :**

1. Students will explain the nature and evolution of medicine from colonial times to the present.
2. Students will study about the introduction of western medicine as well as the indigenous medicine.
3. Students will learn about the history of psychiatry and the emergence of psychiatric drugs in India both in Ayurveda and in Western Medicine.
4. Students will understand the role of various Institutions in promoting scientific knowledge.
5. Students will be able to know the development of health care in Developing countries.



<b>Semester IV</b>	
Title of the Course	Social History of Science, Technology and Medicine in India : Colonial Period
Paper Code	HIS 401
Credit	6
Full Marks	50
Total Lectures	60

This course intend of emphasize on the spread of western science in colonial India with multi-dimensional aspects and endeavours. It enables the students to understand the nature of science-related explorations, science studies and research activities by government and non-governmental initiatives, which were going on in varied forms during this period. It ought to enable students to study the introduction of western medicine in colonial India and also about the indigenous system of medicine, which prevailed here since long before colonial period. New technological aspects and applications in colonial India are also dealt with special attention. This course wants to make the students realize the nature and evolution of science, technology and medicine in colonial India., which inspires them to further study and research on these new emerging fields of history.

#### **COURSE SPECIFIC OUTCOMES:**

1. Students will understand the nature and evolution of science, technology and medicine in colonial India.
2. Students will study about the introduction of western medicine and also about the indigenous system of medicine.
3. Students will able to learn about the new technological aspects and applications in colonial India.
4. Students will know about the fundamental research in India.
5. Students will explain the role of Institutions in promoting scientific knowledge.
6. Students will understand the scientific activities under the British rule and various historical debates.



<b>Semester IV</b>	
Title of the Course	Environmental History of Modern India
Paper Code	HIS 402
Credit	6
Full Marks	50
Total Lectures	60

This course will examine the various issues relating to the environmental history of modern India. An immensely variable region in terms of climate, topography and culture, the area constitutes a meaningful whole in terms of the collective history of its resource management over the last two centuries. This course will deal with the development of colonial discourses about nature, risk and the control of natural resources. It also gives the multiple pictures of the indigenous response to the changing patterns of environmental control, both under colonialism and in the post-colonial period.

The course is to introduce to the students the rich research literature on varying works on forest and forest policies, wildlife conservation and conflicts, tribal right and sustenance, the binary discourse of displacement and protests on one hand and development on the other, as also the debates on ecology and equity.

#### **COURSE SPECIFIC OUTCOMES :**

1. Students will examine the various issues relating to the environmental history of modern India.
2. Students will explain the development of colonial discourses about nature, risk and the control of natural resources.
3. Students will understand the multiple pictures of the indigenous response to the changing patterns of environmental control, both under colonialism and in the post-colonial period.
4. The students will be able to know the forest policies, wildlife conservation and conflicts, tribal right and sustenance, the binary discourse of displacement and protests on one hand and development on the other, as also the debates on ecology and equity.
5. Students will be aware of various historical debates and they will enrich themselves by reading the rich research literature relating to the environmental history in Modern India.

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<b>Semester IV</b>	
Title of the Course	Industrial Revolution II : The Continental Experience
Paper Code	HIS 403
Credit	6
Full Marks	50
Total Lectures	60

The course deals with the momentous phenomenon called the Industrial Revolution; while it occurred in the West, it could not but send out shockwaves to, and transform beyond recognition, all corners of the globe. India experienced a new phase with the coming of European trading companies and ensuring resultant colonial rule., both which were largely the outcome of the Industrial Revolution in Europe. Industrialisation has proved to be a lasting phenomenon, something that underpins contemporary politics, economy, and society in India and elsewhere.

#### **COURSE SPECIFIC OUTCOMES :**

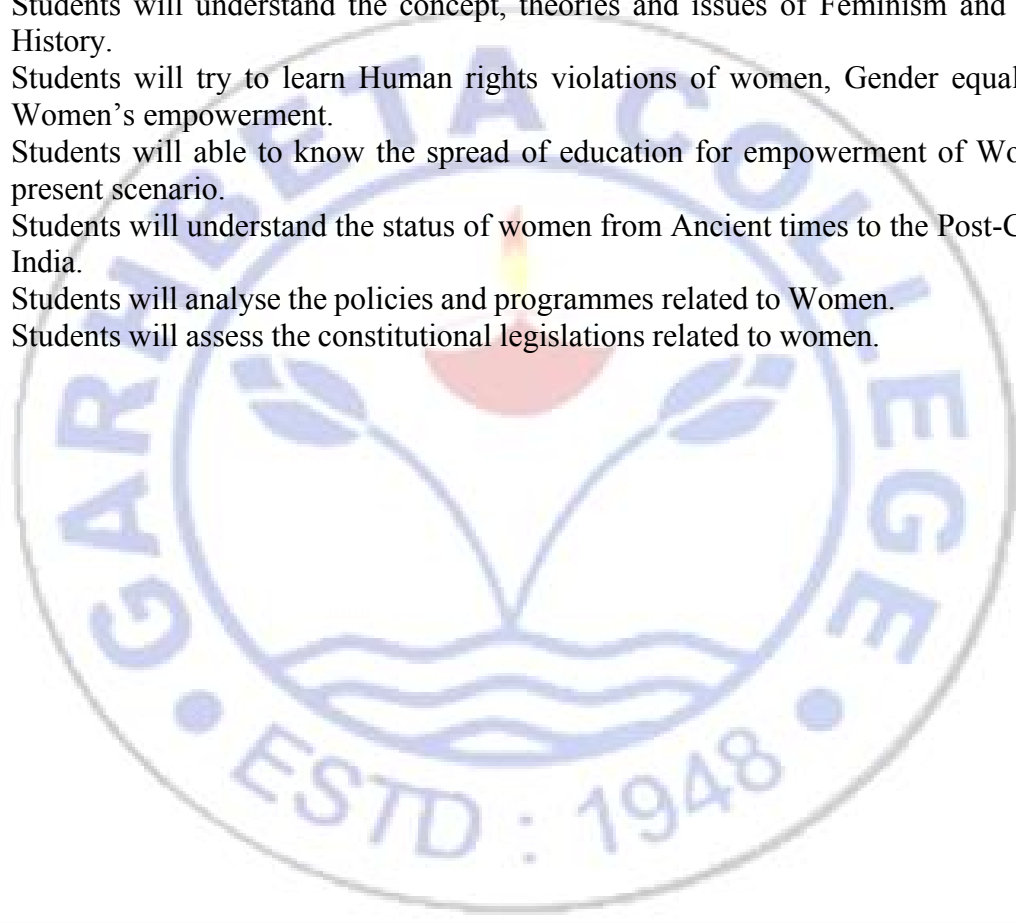
1. Students will describe the growth of Industrialisation, Proto-Industrialisation, Substitution Process Theory and its impact on Society.
2. Students will understand the condition of Europe before Industrialisation and the growth of it on other part of Europe.
3. Students will identify the technological advances that made the Industrial Revolution possible in continental Europe.
4. Students will analyse the changing conditions created by the Industrial Revolution in Europe.
5. A reading of the course ought to enable students to know about this impactful phenomenon, its many aspects, how the ‘classic’ case of England was both replicated and replaced in the European continent, and the lessons that this holds out for us.

<b>Semester IV</b>	
Title of the Course	Women and Society in Indian History
Paper Code	HIS 404
Credit	6
Full Marks	50
Total Lectures	60

The course briefly discusses on how women and issues related to women has been addressed in pre-colonial, colonial and in post-colonial India. It studies the different theories on women and gender in history. It questions the relevance of studying women as a separate 'category'.

**COURSE SPECIFIC OUTCOMES :**

1. Students will understand the concept, theories and issues of Feminism and Gender History.
2. Students will try to learn Human rights violations of women, Gender equality and Women's empowerment.
3. Students will able to know the spread of education for empowerment of Women in present scenario.
4. Students will understand the status of women from Ancient times to the Post-Colonial India.
5. Students will analyse the policies and programmes related to Women.
6. Students will assess the constitutional legislations related to women.

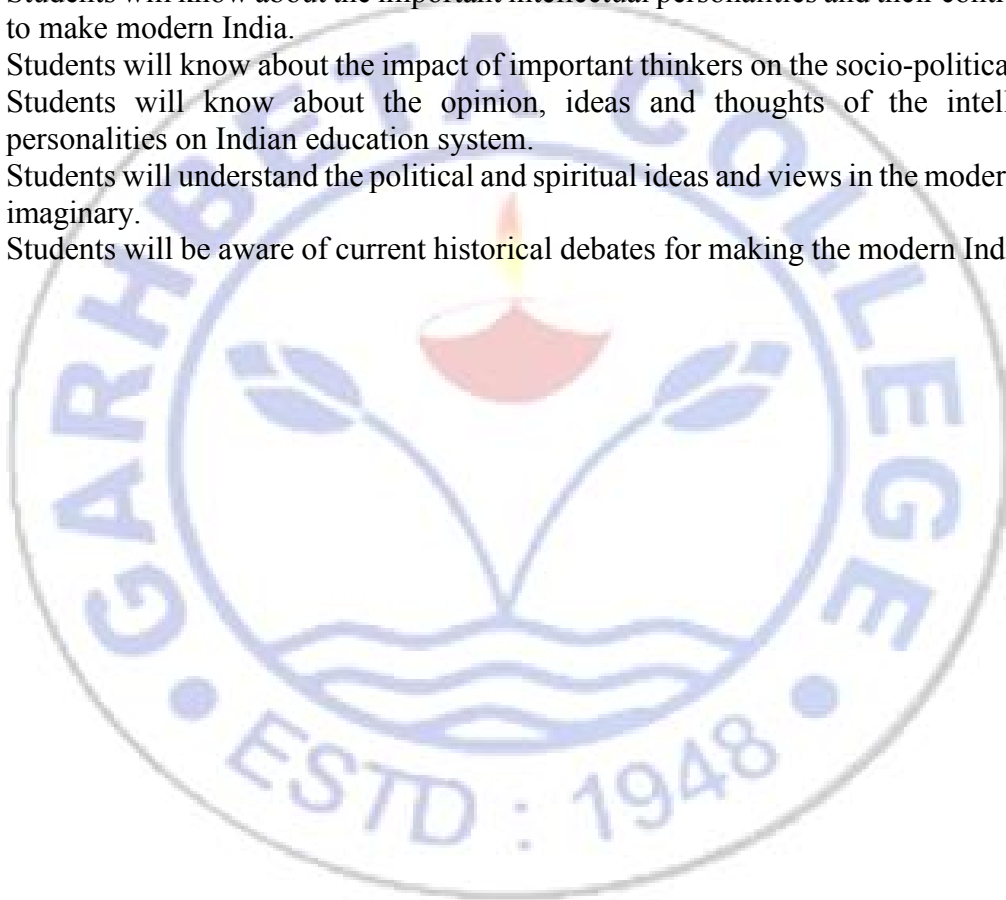


<b>Semester IV</b>	
Title of the Course	Ideas and Thoughts in Modern India : Select Themes & Personalities
Paper Code	HIS 405A
Credit	6
Full Marks	50
Total Lectures	60

The Course studies various intellectual personalities – as well as their contributions to make modern India. Through taking this course, students will understand the social, political and the spiritual ideas and thoughts in the modern Indian imaginary.

**COURSE SPECIFIC OUTCOMES :**

1. Students will know about the important intellectual personalities and their contributions to make modern India.
2. Students will know about the impact of important thinkers on the socio-political fields.
3. Students will know about the opinion, ideas and thoughts of the intellectual personalities on Indian education system.
4. Students will understand the political and spiritual ideas and views in the modern Indian imaginary.
5. Students will be aware of current historical debates for making the modern India.



<b>Semester IV</b>	
Title of the Course	Historical Method
Paper Code	HIS 405C
Credit	6
Full Marks	50
Total Lectures	60

The course aims to disseminate knowledge about different patterns of ideas involved in the writing of history or the historiography, and the methods involved in the practice of marshalling facts and selection of those.

Taking positivism and empiricism as the foundation of modern historical methodology the course proceeds to introduce to students strands of historiography which emphasised interpretation of facts and explanations based on them rather simple presentation of facts by way of narration and description. In this context study of Marxist history and Annales School is made showing the differences and similarities in approaches.

The course aims at providing the students knowledge about scientific basis of history.

**COURSE SPECIFIC OUTCOMES :**

1. Students will understand and explain the writings and approach of Karl Marx, Marc Bloch, Lucien Febvre.
2. Students will learn to deal with the various aspects of the widened scope of history.
3. Students by understanding the relationship of history with other disciplines will come to know that history is the central social science.
4. Students will develop an inter-disciplinary approach by applying analytical methods.
5. Students will write research papers and thesis by applying the mechanics of writings.



# GARHBETA COLLEGE

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## Department of Mathematics, Garhbeta College

### PROGRAM OUTCOME (PO) OF GRADUATION (with Mathematics in the subject combination)

PO	Summary	Description
PO1	<b>Introduction in Higher Mathematics</b>	<i>Familiarization with the wonderful direction in the understanding of Mathematics.</i>
PO2	<b>Realization of Mathematics in Communication</b>	<i>Ability in communication of mathematics in geometrical realization, numbers and proposition make effective presentation to develop other branches of sciences.</i>
PO3	<b>Innovative skill development</b>	<i>Capability of thinking the various field of mathematics, advances in those fields and clear concept about them so that appropriate questions are formed on related fields.</i>
PO4	<b>Confidence building on the subject</b>	<i>Critical thinking and self- directed learning aptitude grown up independently to study the subjects in its depth and apply thoughts for solving the problems in various field.</i>
PO5	<b>Applicability of Mathematics</b>	<i>Development of skills of applicability in planning, monitoring, optimization, resources, money and acquire a value in return.</i>
PO6	<b>Experimentation</b>	<i>Using mathematical tools or computers, students are able to identify problem and the reason in constructive to make viable arguments. It may make them eager to apply mathematics in real-life problems.</i>
PO7	<b>Employment and Carriers</b>	<i>Inculcate the ability to find jobs in intelligence analysis, optimization, statistical analysis, mathematical logic support, financial analysis, market research, management consultant, IT, software engineering, computer programming, teaching, banking, higher research in mathematics.</i>
PO8	<b>Journey to learn in life</b>	<i>Accomplish a nature of life-long learning to acquire the ability of grasping any scientific text in the broadest context of scientific development.</i>
PO9	<b>Moral and ethical</b>	<i>Moral and Ethical mindset to acquire the ability unbiased approach, trueness of action.</i>



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## **Department of Mathematics, Garhbeta College** **PROGRAMME SPECIFIC OUTCOME (PSO): B. SC. (HON.) IN** **MATHEMATICS (B. Sc.)**

<b>PSO</b>	<b>Description</b>
<b>PSO1</b>	<i>Adopted the methodology to think, assimilate and point to the concrete conclusion in every topic in a critical manner.</i>
<b>PSO2</b>	<i>In a crucial and critical environment, a student get ready to provide information about any problem in view of mathematical component, be able to identify, locate, evaluate and use that information effectively.</i>
<b>PSO3</b>	<i>Promote an inherent nature to formulate and develop every problem in unique theory and logic with mathematical reasoning.</i>
<b>PSO4</b>	<i>Accumulate a deep knowledge for the concatenation of mathematics, statistics and computer science and understanding the advanced areas of those subjects.</i>
<b>PSO5</b>	<i>Create awareness to become an enlightened citizen with commitment to deliver one's responsibilities with in the scope of bestowed rights &amp; privileges</i>
<b>PSO6</b>	<i>Boosts and carryover the use of quantitative models arising in social science, business and other contexts.</i>
<b>PSO7</b>	<i>Generate the knowledge of mathematics to explain the physical phenomena</i>
<b>PSO8</b>	<i>To manage a real-life problem and socio-economic hurdles, a student use his/her idea and experience of solving mathematical juggleries and riddles. In this context few mathematical topics like geometry, pure mathematics, computer programming etc. are best to overcome unexpected situation.</i>
<b>PSO9</b>	<i>Interaction with teachers, friends and co-learners broadened the vision humanity to a great extent label.</i>



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## Department of Mathematics, Garhbeta College

### COURSE OUTCOME (CO)

### NAME OF THE COURSE- B. Sc. (HONOURS) IN MATHEMATICS

### SUBJECT: MATHEMATICS

Semester	Paper code & Name	Outcomes
I	CC1- Calculus, Geometry &Differential Equation  (Generic Elective 1)	<ul style="list-style-type: none"><li>• Introduction to do higher order derivative by Leibnitz's rule and reduction formula for various type of integration.</li><li>• Knowledge about application of derivatives in other branches of science.</li><li>• Exposure to the concept of different curves and their pictorial representation.</li><li>• Enable to get idea of two-dimensional and three-dimensional shapes.</li><li>• To gain the knowledge of illustrations of graphing some standard quadratic surfaces.</li><li>• Enable to solve the various types of ordinary differential equations.</li></ul>
	CC2 – Algebra  (Generic Elective 2)	<ul style="list-style-type: none"><li>• To provide students with the knowledge of Complex number, theory of equations, inequalities and their applications.</li><li>• To know how to apply De Moivre's Theorem to solve various types of problems.</li><li>• Enable to get information of roots by observing the coefficients of algebraic equations.</li><li>• Understanding of the consistence and inconsistency of system of linear equations and their solution methods.</li><li>• To get idea of partition of a set, equivalence relation and divisibility.</li><li>• Enable to find rank of a matrix, eigen values, eigen vectors, inverse of a square matrix by using Cayley-Hamilton Theorem.</li></ul>
II	CC3-Real Analysis	<ul style="list-style-type: none"><li>• Getting the insight of countability, boundedness of sets of real line.</li><li>• To get a clear idea about various properties like completeness, density, Archimedean property of real numbers.</li><li>• Exposure to the concepts of the convergence and divergence of a sequence of real numbers along with the introduction of the notion of Cauchy sequence.</li><li>• To learn about various tests for checking convergence / divergence of an infinite series.</li></ul>
	CC4 – Differential Equations & Vector Calculus  (Generic Elective 3)	<ul style="list-style-type: none"><li>• To know about the classification of differential equations and various techniques of their general solutions.</li><li>• To get to know about the methods for solution of homogeneous and nonhomogeneous equations of higher order with constant coefficients.</li><li>• To learn about solution by method of power series and variation of parameters along with an interpretation of the phase plane.</li><li>• To learn about how to solve a system of linear differential equations.</li><li>• Knowledge about scalar triple product, limit, continuity, differentiation and integration of vector valued functions.</li></ul>





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## Department of Mathematics, Garhbeta College

Semester	Paper code & Name	Outcomes
<b>III</b>	<b>CC5-Theory of Real Functions &amp; Introduction to Metric Space</b>  <b>(Generic Elective 3)</b>	<ul style="list-style-type: none"> <li>• Getting the insight of limit, continuity, differentiability of real valued functions with single variable.</li> <li>• To get to know about Mean Value Theorems along with their applications in various fields.</li> <li>• To get to know about Taylor's Theorem along with its various forms of remainders and its applications to inequalities.</li> <li>• Acquiring basic knowledge on metric spaces.</li> </ul>
	<b>CC6 – Group Theory I</b>  <b>(Generic Elective 3)</b>	<ul style="list-style-type: none"> <li>• Getting the motivation to study group theory by observing its connection with geometry.</li> <li>• Acquiring the concepts of subgroups, cyclic groups, permutation groups, normal subgroups and their basic properties</li> <li>• Get to know about Lagranges's theorem and its applications.</li> <li>• Building up of knowledge base on group homomorphisms along with their applications.</li> </ul>
	<b>CC7T – Numerical Methods Theory</b>  <b>(Generic Elective 4)</b>	<ul style="list-style-type: none"> <li>• Learn to find the roots of algebraic and transcendental equations by numerical method such as, fixed point iteration, Newton-Raphson method and their rate of convergence.</li> <li>• Learn to find the solution of system of linear equations by Gauss Jacobi method, Gauss Seidel method along with their convergence analysis and study LU decomposition method.</li> <li>• Learn interpolation methods like Lagrange's method, forward and backward difference method.</li> <li>• To get to know how to compute numerical integration by Trapezoidal rule, Simpson's 1/3<sup>rd</sup> rule, Weddle's rule etc.</li> <li>• Knowledge about numerical solution of ordinary differential equations by Euler's method, Runge-Kutta methods.</li> </ul>
	<b>CC7P – Numerical Methods Practical</b>	<ul style="list-style-type: none"> <li>• Exposure to programming language C and C++.</li> <li>• Development of skill to write programs about string manipulation, statistical problems, etc.</li> <li>• To learn to design C programs for solving problems involving numerical methods.</li> </ul>
	<b>SEC1T- Logic &amp; Sets</b>	<ul style="list-style-type: none"> <li>• Basic knowledge of proposition and its properties, logical equivalences and quantifiers.</li> <li>• To get a clear idea about sets, its properties, countability, power set of a set and related concepts.</li> </ul>



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Semester	Paper code & Name	Outcomes
IV	<b>CC8 - Riemann Integration and Series of Functions</b>	<ul style="list-style-type: none"><li>• A vast knowledge of Riemann &amp; Darboux's approach for integration of various types of functions.</li><li>• Exposure to the Fundamental Theorem of Integral Calculus, Mean Value Theorems for integral calculus and their applications.</li><li>• To learn about the concept of improper integral and its applications in beta, Gamma functions.</li><li>• To get to know about pointwise and uniform convergence of sequence of functions.</li><li>• Learn how to test convergence of series of functions.</li><li>• Get accustomed to deal with Fourier series and Power series.</li></ul>
	<b>CC9 – Multivariate Calculus</b>	<ul style="list-style-type: none"><li>• Gateway to the arena of differential geometry.</li><li>• Introduction to the functions of several variables with their continuity, differentiability.</li><li>• Knowledge about the method of Lagrange multipliers to find optimum values of a function of two variables.</li><li>• Idea about how to do double and triple integration and to solve different types of problems by using Stoke's, Green's and Divergence theorems.</li></ul>
	<b>CC10 - Ring Theory and Linear Algebra I</b>	<ul style="list-style-type: none"><li>• A deeper insight of abstract algebra with the introduction of the concept of rings and its properties.</li><li>• Exposure to the concepts of integral domains, fields and various types of ideals like prime and maximal ideals.</li><li>• Detailed study of ring homomorphisms with First, Second and Third isomorphism theorems for rings and their applications.</li><li>• Get to know about the concepts of vector spaces, subspaces and their basis, dimension etc.</li><li>• To have a clear idea about linear transformation, its algebra and other properties, isomorphism theorems and connection with matrices.</li></ul>
	<b>SEC-2 – Graph Theory</b>	<ul style="list-style-type: none"><li>• Introduction to graph theory with basic definitions, examples and properties.</li><li>• Concept of matrix representation of graphs, Eulerian and Hamiltonian graphs with their properties.</li><li>• Solution of practical problems using graph theory in various algorithmic approach.</li></ul>



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## Department of Mathematics, Garhbeta College

Semester	Paper code & Name	Outcomes
V	CC11 - Partial Differential Equations & Applications	<ul style="list-style-type: none"><li>• Exposure to partial differential equation and its classification,</li><li>• To get to know about applications of partial differential equations in various physical phenomena such as derivation of heat equation, wave equation and Laplace equation.</li><li>• Learn about the method of separation of variables with its applications.</li><li>• Study of central force, constrained motion, varying mass. Kepler's law of planetary motion.</li></ul>
	CC12 – Group Theory II	<ul style="list-style-type: none"><li>• Knowledge about automorphisms and how to find automorphisms group of various groups.</li><li>• Learn about external &amp; internal direct product of groups and how to decompose finite abelian groups into cyclic groups.</li><li>• Various examples and properties of group action and its application in identifying a group by its class equation.</li><li>• Realization of Cauchy's theorem and Sylow's theorems as a solution towards the converse of Lagrange's theorem.</li></ul>
	DSE1 - Linear Programming	<ul style="list-style-type: none"><li>• Introduction of Linear Programming Problems (LPP) and various methods for its solutions.</li><li>• To gain idea about Game Theory: formulation of two persons zero sum games and its solutions.</li></ul>
	DSE1 – Point Set Topology	<ul style="list-style-type: none"><li>• Exposure to the concept of countability of sets, Cantor's theorem, axioms of Choice, Zorn's lemma, Well-ordered sets, cardinal and ordinal number.</li><li>• To acquire ideas about topological spaces and its various properties, homeomorphism, product topology, box topology, quotient topology and metric topology and related theorems.</li><li>• To be able to characterize connectedness and compactness of a topological spaces.</li></ul>
	DSE2 - Probability & Statistics	<ul style="list-style-type: none"><li>• Exposure to the concept of random variables and corresponding sample spaces, probability density function, expectation, moment.</li><li>• To learn about different distributions and how to measure their central tendency.</li><li>• Knowledge about joint probability functions, expectation of function of two random variables along with conditional expectations.</li><li>• Concept of convergence in probability with Chebyshev's inequality, central limit theorem, Markov chain.</li></ul>



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Semester	Paper code & Name	Outcomes
<b>VI</b>	<b>CC13 – Metric Spaces and Complex Analysis</b>	<ul style="list-style-type: none"> <li>Being able to test completeness of metric spaces.</li> <li>Knowledge about abstract visualization of metric spaces in light of continuous mappings, compactness and connectedness.</li> <li>Acquire knowledge about Heine-Borel property, contraction, Banach fixed point theorem related to Metric space and its applications.</li> <li>Knowledge about differentiability and analyticity of complex valued functions, formation of Cauchy- Reimann equation and its significance.</li> <li>To get idea about contour and contour integration and knowledge to apply theorems like Cauchy - Goursat theorem and Cauchy Integral formulae.</li> <li>To learn how to apply Liouville's theorem in fundamental theorem of algebra.</li> <li>To learn about Taylor series, Laurent Series and convergence of power series.</li> </ul>
	<b>CC14 – Ring Theory and Linear Algebra II</b>	<ul style="list-style-type: none"> <li>Realization of abstraction of divisibility by studying different types of integral domains.</li> <li>Knowledge about polynomial rings with a major focus on irreducibility of polynomial with different types of tests.</li> <li>Idea about algebraic dual spaces, dual basis.</li> <li>Exposure to the concept of canonical forms of linear operators by studying diagonalizability.</li> <li>Exposure to the concept of inner product space and its properties along with various types of operators on inner product space.</li> </ul>
	<b>DSE3 – Mechanics</b>	<ul style="list-style-type: none"> <li>To gather idea about virtual work, centre of gravity, equilibrium conditions of a particle on a rough curve, its stability.</li> <li>Understanding of different types of equation of motion like motion of projectile in resisting medium, under inverse square law, artificial satellite, motion on any surface of revolution etc.</li> <li>To gather idea about the concept of inertia, degree of freedom of rigid body and product of inertia, D'Alembert's principle.</li> <li>Learn about compound pendulum and impulsive forces, conservation of momentum and energy</li> </ul>
	<b>DSE3 – Number Theory</b>	<ul style="list-style-type: none"> <li>Learn about linear Diophantine equation, prime counting function, Goldbach conjecture, Chinese Remainder theorem, Fermat's little theorem.</li> <li>Exposure to the concept of number theoretic functions, Dirichlet's product, Mobius inversion formulae, Euler's phi-function and residues.</li> <li>Learn about integer modulo n, primitive roots, Legendre symbol, quadratic reciprocity, Fermat's last theorem.</li> </ul>
	<b>DSE4 - Mathematical Modelling</b>	<ul style="list-style-type: none"> <li>To gather idea of Legendre and Bessel's equation and find their power series solution.</li> <li>Learn about Laplace transform, inverse Laplace transform and its applications to second order PDE and ODE.</li> <li>Exposure to the concept of simulation used in Monte Carlo Simulation Modelling with examples.</li> <li>Overviewing optimization modelling, LPP model and use sensitivity analysis.</li> </ul>
	<b>DSE4 - Differential Geometry</b>	<ul style="list-style-type: none"> <li>Learn about space curve, planar curves, curvature, torsion, Serret-Frenet formula, evolutes and involutes of curves.</li> <li>Understand Parametric curves on surfaces, direction coefficients, principal and Gaussian curvatures, Geodesics curvature, Euler's theorem, Gauss bonnet theorem.</li> </ul>



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## Department of Mathematics, Garhbeta College

### PROGRAM OUTCOME (PO) OF GRADUATION (with Mathematics in the subject combination)

PO	Summary	Description
PO1	<b>Introduction in Higher Mathematics</b>	<i>Familiarization with the wonderful direction in the understanding of Mathematics.</i>
PO2	<b>Realization of Mathematics in Communication</b>	<i>Ability in communication of mathematics in geometrical realization, numbers and proposition make effective presentation to develop other branches of sciences.</i>
PO3	<b>Innovative skill development</b>	<i>Capability of thinking the various field of mathematics, advances in those fields and clear concept about them so that appropriate questions are formed on related fields.</i>
PO4	<b>Confidence building on the subject</b>	<i>Critical thinking and self- directed learning aptitude grown up independently to study the subjects in its depth and apply thoughts for solving the problems in various field.</i>
PO5	<b>Applicability of Mathematics</b>	<i>Development of skills of applicability in planning, monitoring, optimization, resources, money and acquire a value in return.</i>
PO6	<b>Experimentation</b>	<i>Using mathematical tools or computers, students are able to identify problem and the reason in constructive to make viable arguments. It may make them eager to apply mathematics in real-life problems.</i>
PO7	<b>Employment and Carriers</b>	<i>Inculcate the ability to find jobs in intelligence analysis, optimization, statistical analysis, mathematical logic support, financial analysis, market research, management consultant, IT, software engineering, computer programming, teaching, banking, higher research in mathematics.</i>
PO8	<b>Journey to learn in life</b>	<i>Accomplish a nature of life-long learning to acquire the ability of grasping any scientific text in the broadest context of scientific development.</i>
PO9	<b>Moral and ethical</b>	<i>Moral and Ethical mindset to acquire the ability unbiased approach, trueness of action.</i>

### PROGRAMME SPECIFIC OUTCOME (PSO): B. Sc. (GENERAL) IN PURE SCIENCE

PSO	Description
PSO1	<i>Adopted the methodology to think, assimilate and point to the concrete conclusion in every topic in a critical manner.</i>
PSO2	<i>Accumulate a basic knowledge for the concatenation of mathematics, statistics and computer science and understanding the advanced areas of those subjects.</i>
PSO3	<i>Create awareness to become an enlightened citizen with commitment to deliver one's responsibilities with in the scope of bestowed rights &amp; privileges.</i>
PSO4	<i>Boosts and carry over the use of quantitative models arising in social science, business and other contexts.</i>
PSO5	<i>Generate the knowledge of mathematics to explain the physical phenomena.</i>



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## Department of Mathematics, Garhbeta College

### COURSE OUTCOME (CO)

### NAME OF THE COURSE- B. Sc. (GENERAL) IN PURE SCIENCE

### SUBJECT: MATHEMATICS

Semester	Paper code & Name	Outcomes
I	DSC1AT – Differential Calculus	<ul style="list-style-type: none"><li>To understand limit, continuity of single valued function.</li><li>To visualize the concept of relative extrema, interior extremum theorem, Rolle’s theorem, Mean value theorem, intermediate value property of derivatives, Darboux’s theorem and their applications.</li><li>To acquire idea about metric spaces and their properties like openness, closedness etc.</li></ul>
II	DSC1BT – Differential Equations	Learn about <ul style="list-style-type: none"><li>Partial differential equations, its classification, construction and geometrical interpretation.</li><li>Derivation of heat equation, wave equation and Laplace equation.</li><li>Study of central force, constrained motion, varying mass. Kepler’s law of planetary motion.</li></ul>
III	DSC1CT – Real Analysis	<ul style="list-style-type: none"><li>Getting the insight of real analysis, set theory line and points, different type of sets of real line.</li><li>To get idea of the convergence and divergence of a sequence in of real numbers and to find their limit superior and limit inferior.</li><li>To learn about various tests for checking convergence and divergence of an infinite series of real numbers.</li></ul>
	SEC1T – Theory of Equations	<ul style="list-style-type: none"><li>Describe the relation between roots and coefficients.</li><li>Transform the equation through roots multiplied by a given number, increase the roots, decrease the roots, removal of terms.</li><li>Solve the reciprocal equations, binomial.</li><li>Learn about the working methods for solving any cubic and biquadratic equations.</li></ul>
	Or SEC1T – Logic & Sets	<ul style="list-style-type: none"><li>To learn about the concept of propositions, truth tables, propositional equivalence and quantifiers.</li><li>To get a clear idea about sets, its properties, countability, power set of a set.</li><li>To know the concepts of partition and equivalence relations with various example.</li></ul>
IV	DSC1DT – Algebra	<ul style="list-style-type: none"><li>Exposure to the concept of subgroups, cyclic groups, normal subgroup, quotient group, permutation group and their basic properties with various examples.</li><li>Exposure to the basic concept of ring, subring, integral domain, field with various examples.</li></ul>
	SEC2T – Graph Theory	<ul style="list-style-type: none"><li>Exposure to the concept of various notions of graphs with their properties and applications.</li><li>Knowledge of weighted graph and shortest path problem.</li><li>To study Travelling salesman’s problem, Dijkstra’s algorithm, Floyd-Warshall algorithm.</li></ul>



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Semester	Paper code & Name	Outcomes
V	<b>DSE1AT – Complex Analysis</b>	<ul style="list-style-type: none"> <li>Knowledge about various properties of complex numbers, differentiability and analyticity of complex valued functions, formation of Cauchy- Reimann equation and its significance.</li> <li>Clear idea about contour and contour Integral.</li> <li>To learn related theorems like Cauchy- Goursat theorem and Cauchy Integral formulae.</li> <li>To learn how to apply Liouville’s theorem in fundamental theorem of algebra.</li> <li>To learn Taylor series, Laurent Series and convergence of power series.</li> <li>Understanding various types of singularities and Cauchy Residue theorem.</li> </ul>
	<b>Or</b>	<ul style="list-style-type: none"> <li>Introduction of the concept of vector space and linear transformations.</li> <li>To find a basis of a vector space.</li> <li>Visualization of a linear transformation through matrices.</li> <li>To identify the isomorphic vector spaces.</li> </ul>
	<b>DSE1AT – Linear Algebra</b>	
	<b>Or</b>	<ul style="list-style-type: none"> <li>To study dot and cross product of vectors along with various differential operators.</li> <li>Enhancement of the knowledge to classify quadratic equations.</li> <li>To gain the knowledge of illustrations of graphing some standard quadratic surfaces.</li> </ul>
	<b>DSE1AT – Vector Calculus and Analytical Geometry</b>	
	<b>SEC3T – Number Theory</b>	<ul style="list-style-type: none"> <li>To learn about linear Diophantine equation, prime counting function, Goldbach conjecture, Chinese Remainder theorem.</li> <li>To know about the concept of Dirichlet’s Product, Mobius Inversion formulae, Euler phi function and residues.</li> </ul>
	<b>Or</b>	<ul style="list-style-type: none"> <li>To learn vividly about various applications of differential equations in physical phenomena like motion, resonance, electric circuit, traffic flow, vibrating string, vibrating membrane, conduction of heat etc.</li> </ul>
<b>SEC3T – Mathematical Modelling</b>		
VI	<b>DSE1BT – Linear Programming</b>	<ul style="list-style-type: none"> <li>To learn about Linear Programming Problems (LPP), its formation, various methods for its solutions with their applications.</li> </ul>
	<b>Or</b>	<ul style="list-style-type: none"> <li>Learn to find the roots of algebraic and transcendental equations by numerical method such as, fixed point iteration, Newton-Raphson method.</li> <li>Learn to find the solution of system of linear equations by Gauss Jacobi method, Gauss Seidel method along with their convergence analysis.</li> <li>Learn to find value of differentiation by various difference formulae and integration by Trapezoidal rule, Simpson’s 1/3<sup>rd</sup> rule etc.</li> <li>Knowledge about numerical solution of ordinary differential equations by Euler’s method, Runge-Kutta methods.</li> </ul>
	<b>DSE1BT – Numerical Methods</b>	
	<b>SEC4T – Probability and statistics</b>	<ul style="list-style-type: none"> <li>Exposure to the concept of random variables and corresponding sample spaces.</li> <li>Learn about different distributions and how to measure their central tendency.</li> <li>Knowledge about joint probability functions, expectation of function of two random variables along with conditional expectations.</li> </ul>



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### PROGRAM OUTCOME (CO) OF POST-GRADUATION IN

#### APPLIED MATHEMATICS WITH OCEANOLOGY AND COMPUTER PROGRAMMING

PO	Summary	Description
PO1	Mathematical Knowledge	<i>Apply the knowledge of mathematics to the solution of complex problems in academia and in real life.</i>
PO2	Problem analysis	<i>Identify, formulate, analyse / solve problems leading to conclusions using principles of mathematics.</i>
PO3	Design/development of solutions	<i>Design and develop methods and procedures for solutions of complex problems which meet the specified needs in industry, academia and real life.</i>
PO4	Conduct investigations of complex problems	<i>Use research-based knowledge and research methods including theory, experiment and computation; analysis and interpretation of data, and synthesis of the information to provide valid conclusions.</i>
PO5	Modern tool usage	<i>Create, select, and apply appropriate techniques, resources, and modern mathematical tools including prediction and modelling to complex mathematical activities with an understanding of the limitations.</i>
PO6	Individual and team work	<i>Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.</i>
PO7	Communication	<i>Communicate effectively on scientific activities with the scientific community and with the society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.</i>
PO8	Life-long learning	<i>Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of scientific &amp; technological change.</i>





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### COURSE OUTCOME (CO) FOR THE COURSE

#### M.Sc. in

#### Applied Mathematics with Oceanology and Computer Programming

Semester	Paper code & Name	Outcomes
I	<b>MTM-101 REAL ANALYSIS</b>	<ul style="list-style-type: none"><li>• To understand the compactness, completeness and connectedness of metric spaces.</li><li>• To verify whether a function is a function of bounded variation and get acquainted with the Riemann-Stieljes integral of a bounded function.</li><li>• To understand the fundamentals of measure theory and be acquainted with the proofs of the fundamental theorems underlying the theory of Lebesgue integration.</li><li>• To develop a perspective on the broader impact of measure theory and the ability to pursue further studies in this and related area.</li></ul>
	<b>MTM-102 COMPLEX ANALYSIS</b>	<ul style="list-style-type: none"><li>• To understand the fundamental concepts of complex analysis and their importance in modern mathematics and applied contexts.</li><li>• To learn accurate and efficient use of complex analysis techniques.</li><li>• Mathematical reasoning through analysing, proving and explaining concepts from complex analysis.</li><li>• To develop problem-solving ability using complex analysis techniques applied to diverse situations in physics, engineering and other mathematical contexts.</li></ul>
	<b>MTM-103 ORDINARY DIFFERENTIAL EQUATIONS AND SPECIAL FUNCTIONS</b>	<ul style="list-style-type: none"><li>• Many real-life problems are designed based on the ordinary differential equations where eigenvalues and eigen functions play major role. On solving the Sturm-Liouville problem, a broad idea can be gained on eigen value and eigen function that can help lot to solve real-life problems.</li><li>• To learn Green's function which is an effective technique for solving complex initial and boundary value problems involving differential equations.</li><li>• Nowadays complex real-life problems cannot be designed only single differential equation, so a system of linear differential equations is very much essential for modeling this type of problem.</li><li>• In this content, learners mainly achieve the solution procedure of special type differential equations which have many applications in engineering and many more related real-life complex problems.</li></ul>



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## Department of Mathematics, Garhbeta College

Semester	Paper code & Name	Outcomes
I	<b>MTM-104 ADVANCED PROGRAMMING IN C AND MATLAB</b>	<ul style="list-style-type: none"> <li>To get idea about features of numeric computation, advanced graphics and visualization using MATLAB.</li> <li>To use arrays and matrices to solve the various types of problems such as algebraic, differential, statistical, plotting etc using MATLAB.</li> <li>To use pointers in function, structure, union, dynamic memory management to construct linked list using C Language.</li> <li>To apply how to create a data file in which input data and output data can be stored and also able to achieve the concept of low level; programming using C language.</li> </ul>
	<b>MTM-105 CLASSICAL MECHANICS AND NON-LINEAR DYNAMICS</b>	<ul style="list-style-type: none"> <li>To use the Lagrangian formulation for analyzing problems in Mechanics and describing the dynamics of systems of particles, rigid bodies, and systems in non-inertial reference frames.</li> <li>To deconstruct complex problems into their building blocks. Translate physical problems into appropriate mathematical language and apply appropriate mathematical tools to analyze and solve the resulting equations.</li> <li>To demonstrate the ability to apply basic methods of classical mechanics towards solutions of various problems, including the problems of complicated oscillatory systems, the motion of rigid bodies, etc.</li> <li>To learn technique for solving mathematical problems using vibrational principle.</li> <li>To use Lorentz transformation for describing the physical situations in inertial frames of reference.</li> <li>To gain knowledge above special theory of relativity frames of reference using Lorentz transformation.</li> <li>To understand fundamental problems of non-linear dynamics.</li> </ul>
	<b>MTM-106 GRAPH THEORY</b>	<ul style="list-style-type: none"> <li>To understand and apply the fundamental concepts in graph theory.</li> <li>To describe and solve some real time problems using concepts of graph theory.</li> <li>To discuss the concept of graph, tree, Euler graph, cut set and Combinatorics.</li> <li>To apply graph theory-based tools in solving practical problems in science, business and industry.</li> </ul>
	<b>MTM-197 LAB-1: (COMPUTATIONAL METHODS: USING MATLAB)</b>	<ul style="list-style-type: none"> <li>An introduction to MATLAB and it is based on interactive examples and hands-on problem solving.</li> <li>The utility of basic MATLAB and its demonstration.</li> <li>Matrix manipulations, plotting of functions and data implementation of algorithms, the creation of user interfaces, and interfacing with programs written in other languages.</li> <li>Applications in various disciplines such as engineering science, and economics.</li> </ul>



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## Department of Mathematics, Garhbeta College

Semester	Paper code & Name	Outcomes
II	<b>MTM-201 FLUID MECHANICS</b>	<ul style="list-style-type: none"><li>To describe the motion of fluids and identify the derivation of basic governing equations of fluid mechanics and apply.</li><li>To make dimensional analysis and similitude.</li><li>To know boundary layer theory.</li><li>Finding the exact/analytical Solution of Navier-Stokes equation for some physical problems.</li><li>To know the preliminary computational techniques for the Navier-Stokes equation.</li></ul>
	<b>MTM-202 NUMERICAL ANALYSIS</b>	<ul style="list-style-type: none"><li>To learn about the numerical methods for interpolation (spline interpolation), function approximation by least square method and using orthogonal polynomials and Gaussian quadrature, the solution of ordinary differential equations (RK-methods, predictor-corrector method, finite difference method, finite element method), the solution of system of linear and non-linear equations and matrix inversion with pivoting.</li><li>To learn about computation of eigenvalues and eigenvectors of a matrix.</li><li>To solve partial differential equations (finite difference method) and analyse stability of the methods of solving ODEs and PDEs.</li><li>To learn some computer programs. The programming skill will increase after this course. Hence, they can write computer program of any mathematical and logical problems.</li></ul>
	<b>MTM-203 UNIT- I: ABSTRACT ALGEBRA UNIT-II: LINEAR ALGEBRA</b>	<p><b><u>UNIT-I</u></b></p> <ul style="list-style-type: none"><li>To learn to analyse and demonstrate examples of quotient groups, solvable groups and properties of them.</li><li>To learn how to use the concepts of isomorphism and homomorphism for groups and rings and related theorems.</li><li>To understand the importance of class equation, Cauchy's theorem, Sylow's theorem, Cayley's theorem and group action.</li><li>To learn to analyse and demonstrate examples of ideals, quotient rings and field extensions.</li></ul> <p><b><u>UNIT-II</u></b></p> <ul style="list-style-type: none"><li>To gain knowledge on advanced concept of Linear Transformation, Inner product space, Bilinear forms, Quadratic forms, Canonical forms, Minimal polynomial and Jordan Canonical forms.</li><li>To learn how to apply linear algebra for solving many problems on Applied Mathematics and several physics-oriented applied problems.</li><li>To gain more concepts on eigen values and eigen vectors which helps a lot for solving many real-life problems.</li></ul>



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## Department of Mathematics, Garhbeta College

Semester	Paper code & Name	Outcomes
II	<b>MTM-204B HISTORY OF MATHEMATICS</b>	<ul style="list-style-type: none"><li>• To gather a general idea of the evolution of some of the major concepts of modern mathematics.</li><li>• To understand basic, fundamental arguments that were developed centuries ago and are still of central importance today.</li><li>• To understand concepts from geometry (such as Euclid's constructions) and analysis (such as limit) should be understood.</li><li>• To learn to solve different problems to differentiate functions using various notions of infinitesimals.</li></ul>
	<b>MTM-205 GENERAL THEORY OF CONTINUUM MECHANICS</b>	<ul style="list-style-type: none"><li>• To learn about the concept of strain deformation of an object as a continuum which assumes that the substance of the object completely fills the space it occupies.</li><li>• The gain knowledge about stress vector which is applied on material points in an object.</li><li>• To realize the relationship between strain tensor and stress tensors in an elastic substance</li><li>• To learn fundamental physical laws such as the conservation of mass, the conservation of momentum, and the conservation of energy to be applied to such models to derive differential equations describing the behaviour of such objects, and some information about the particular material studied to be added through constitutive relations.</li></ul>
	<b>MTM-206 GENERAL TOPOLOGY</b>	<ul style="list-style-type: none"><li>• To know how the topology on a space is determined by the collection of open sets, by the collection of closed sets, or by a basis of neighbourhoods at each point.</li><li>• To learn subspace topology, order topology, product topology, metric topology and quotient topology.</li><li>• To realize the meaning of continuity of a function.</li><li>• To learn Urysohn lemma and the Tietze extension theorem, and how to characterize metrizable spaces.</li></ul>
	<b>MTM-297 LAB-2: (LANGUAGE: C- PROGRAMMING WITH NUMERICAL METHODS)</b>	<ul style="list-style-type: none"><li>• To get to learn about interactive examples and hands-on problem-solving environment.</li><li>• The course intends to demonstrate searching, sorting and strings manipulation problems.</li><li>• The course also intends to demonstrate numerical and statistical problems in C.</li><li>• To know applications in various disciplines such as engineering, science, and economics.</li></ul>



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Semester	Paper code & Name	Outcomes
<b>III</b>	<b>MTM-301</b>  <b>PARTIAL DIFFERENTIAL EQUATIONS AND GENERALIZED FUNCTIONS</b>	<ul style="list-style-type: none"> <li>• To learn to use the knowledge of first and second order partial differential equations (PDEs), the general structure of solutions, and analytic methods for solutions.</li> <li>• To know how to classify PDEs, apply analytical methods, and physically interpret the solutions.</li> <li>• To solve practical PDE problems (Wave, Heat &amp; Laplace equations) with the methods of separation of variables, and analyse the stability and convergence properties of this method.</li> <li>• To learn to find solution of Dirichlet's and Neumann's problem for some typical problems like a disc and a sphere.</li> </ul>
	<b>MTM-302</b>  <b>TRANSFORMS AND INTEGRAL EQUATIONS</b>	<ul style="list-style-type: none"> <li>• To get to know about Laplace and Fourier transforms as the powerful tools for solving realistic problems of ODE and PDE, particularly IVP or BVP. PDE is very difficult to solve directly but using these transforms, PDE is reduced to an ODE and then ODE is reduced to an algebraic equation, which is very easy to find the solution.</li> <li>• Wavelet transform is another transform technique with the special advantage that it provides more accurate solution which helps to determine the exact location of the solution. Specifically, scientist and engineers use the wavelet transform for determining the exact location of an area where the natural gases such as oil and various minerals exist.</li> <li>• Integral equation is an important concept in Applied Mathematics to find the unknown function within the integral sign. Many dynamical problems and applied based practical problems can be solved with the help of Integral equation.</li> </ul>
	<b>MTM-303</b>  <b>I. DYNAMICAL OCEANOLOGY &amp; METEOROLOGY</b> <b>II. OPERATIONS RESEARCH</b>	<p><b>UNIT-I:</b> To learn numerical modelling of ocean currents and transport, analytical models of physical processes in the ocean, as e.g., wave driven surface currents.</p> <ul style="list-style-type: none"> <li>• To get to know about field observations of currents, internal waves and optical conditions, optical models related to monitoring of water quality based on satellite data.</li> <li>• To learn about modelling and use of observations to understand processes in the atmospheric part of the climate system, atmospheric chemistry in relation to climate change and air pollution, cloud physics and relations between aerosols and clouds.</li> <li>• To gather knowledge about numerical weather forecasting and studies of processes governing weather at mid and high latitudes.</li> </ul> <p><b>UNIT-II:</b> To demonstrate and solve the different types of deterministic inventory related problems.</p> <ul style="list-style-type: none"> <li>• To learn to solve the problems involving queuing system.</li> <li>• To demonstrate single variable and multi variable optimization methods.</li> </ul>
	<b>MTM-304</b>  <b>DISCRETE MATHEMATICS</b>	<ul style="list-style-type: none"> <li>• To know how to simplify and evaluate basic logic statements including compound statements, implications, inverses, converses, and contrapositives using truth tables and the properties of logic, analyse the growth of elementary functions.</li> <li>• To learn to represent a graph using an adjacency list and an adjacency matrix and apply graph theory to application problems such as computer networks.</li> <li>• Determine if a graph is a binary tree, Euler or a Hamilton path or circuit, N-ary tree, or not a tree.</li> <li>• To learn to evaluate Boolean functions and simplify expression using the properties of Boolean algebra and use finite-state machines to model computer operations.</li> </ul>



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Semester	Paper code & Name	Outcomes
<b>III</b>	<b>305B</b>  <b>SPECIAL PAPER-OR: ADVANCED OPTIMIZATION AND OPERATIONS RESEARCH S</b>	<ul style="list-style-type: none"> <li>To identify and develop operational research models from the verbal description of the real system.</li> <li>To understand the mathematical tools that are needed to solve optimization problems.</li> <li>To learn to use of mathematical software to solve the proposed models.</li> <li>To develop a report that describes the model and the solving technique, analyse the results and propose recommendations in language understandable to the decision-making processes in Management Engineering.</li> </ul>
	<b>MTM-306B</b>  <b>SPECIAL PAPER-OR: OPERATIONAL RESEARCH MODELING-I</b>	<ul style="list-style-type: none"> <li>To formulate mathematical models for uncertain inventory control supply chain and replacement management problems, Network analysis, etc.</li> <li>To understand the techniques like dynamic programming, simulation process to solve a large number of optimization problems.</li> <li>To learn to solve linear and non-linear optimization problems.</li> <li>To gather knowledge about application of simulation to solve problems in inventory management system, queuing theory and others.</li> </ul>
Semester	Paper code & Name	Outcomes
<b>IV</b>	<b>MTM-401</b>  <b>FUNCTIONAL ANALYSIS</b>	<ul style="list-style-type: none"> <li>To understand how functional analysis uses and unifies ideas from vector spaces, the theory of metrics, and complex analysis.</li> <li>To get to know about applications of fundamental theorems from the theory of normed and Banach spaces, including the Hahn-Banach theorem, the open mapping theorem, the closed graph theorem, and the Uniform Boundedness principle.</li> <li>To learn to apply ideas from the theory of Hilbert spaces to other areas, including Fourier series, the theory of self-adjoint operators, normal operators, unitary operators and positive operators.</li> <li>To learn to apply Hilbert space theory, including Riesz representation theorem and weak convergence, and critically reflect over chosen strategies and methods in problem solving.</li> </ul>
	<b>MTM-402</b>  <b>I. FUZZY MATHEMATICS WITH APPLICATIONS &amp; II. SOFT COMPUTING</b>	<p><b><u>UNIT-I</u></b></p> <ul style="list-style-type: none"> <li>To get some fundamental knowledge of fuzzy sets, numbers, matrix, ordinary differential equation and programming, etc.</li> <li>To acquire knowledge of various operations on above fuzzy sets.</li> <li>To acquires skill for solving the fuzzy ordinary differential equation, fuzzy linear programming problems, and fuzzy multi-objective linear programming problems.</li> <li>To acquire some fundamental uncertain programming solving skill which occur almost all decision-making problems.</li> </ul> <p><b><u>UNIT-II</u></b></p> <ul style="list-style-type: none"> <li>Understanding the basic concepts of soft computing like how it resemble biological processes more closely than traditional techniques.</li> <li>Understanding the basic neural network models and illustrate with numerical examples.</li> <li>To understand the fuzzy logic and system control with help of fuzzy controller.</li> <li>To understand genetic algorithm and hands on solving optimization problems.</li> </ul>



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Semester	Paper code & Name	Outcomes
IV	<b>MTM-403</b>  <b>I. MAGNETO HYDRO- DYNAMICS</b> <b>II. STOCHASTIC PROCESS AND REGRESSION</b>	<p><b><u>UNIT-I</u></b></p> <ul style="list-style-type: none"> <li>To learn the basic concepts and the equations of flow of viscous fluids and the electromagnetic induction mechanism.</li> <li>To acquire ability to translate a magnetic hydrodynamic problem in an appropriate mathematical form and to interpret the solutions of the equations established in physical terms.</li> <li>To develop skills in analysis and synthesis; the application of knowledge and problem solving, critical thinking and independent learning.</li> <li>To get to know how system of equations can be applied to different astrophysical and laboratory phenomena.</li> </ul> <p><b><u>UNIT-II</u></b></p> <ul style="list-style-type: none"> <li>To learn basic concepts from the theory of Markov chains and present proofs for the most important theorems.</li> <li>To learn to compute probabilities of transition between states and return to the initial state after long time intervals in Markov chains.</li> <li>To learn how to derive differential equations for time continuous Markov processes with a discrete state space.</li> <li>To learn to formulate simple stochastic process models in the time domain and provide qualitative and quantitative analyses of such models.</li> <li>To acquire more detailed knowledge about Poisson processes and birth and death processes. The student also knows about Wiener Process and branching process.</li> <li>To derive the expression for three or more-dimensional curve fitting, including multiple and partial correlations for relevant practical systems.</li> </ul>
	<b>MTM-404B</b>  <b>SPECIAL PAPER- OR: NON-LINEAR OPTIMIZATION</b>	<ul style="list-style-type: none"> <li>To learn about several advanced concepts on Non-linear Optimization such as Geometric Programming, Quadratic Programming, Nash Equilibrium (John F. Nash got the Nobel prize in 1994 for this) of Bimatrix Game, Stochastic Programming, Multi-Objective Programming and the rest of these theoretical concepts on nonlinear programming.</li> <li>To help the learners for solving complex mathematical modeling of various real-life practical problems.</li> <li>To learn to use the geometric programming for solving Engineering design problems.</li> <li>To learn the tackling of random parameters in optimization problems through stochastic programming.</li> </ul>
	<b>MTM-405B</b>  <b>SPECIAL PAPER- OR: OPERATIONAL RESEARCH MODELING -II</b>	<ul style="list-style-type: none"> <li>To prepare and motivate future specialists to continue in their study by having an insightful overview of operations research.</li> <li>To understand the technique to solve the problem using Optimal Control theory &amp; also, to gather the knowledge of Pontryagin's principle and Bang-bang Controls to solve mechanical and other real-life problems.</li> <li>To gain thorough understanding of reliability of a component and a system of components.</li> <li>Understanding of information theory and sources and causes of uncertainty. Knowledge of memory less and passing of information through different channels.</li> <li>To come to know about entropy and its measurement and properties.</li> <li>To gain knowledge of Shannon-Fano Encoding procedure and necessary and sufficient condition for noiseless encoding.</li> </ul>



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Semester	Paper code & Name	Outcomes
IV	<b>MTM-406</b> <b>DISSERTATION PROJECT WORK</b>	<ul style="list-style-type: none"><li>• To identify key research questions within the field of Demography on which you will carry out independent research.</li><li>• To learn to demonstrate appropriate referencing and develop skills in other aspects of academic writing.</li><li>• Demonstration of knowledge and understanding of report writing.</li><li>• To learn to apply the demographic/statistical research training acquired in the taught element of the programme by designing an appropriate research strategy and research methodology to carry out your research.</li><li>• To learn to use and develop written and oral presentation skills.</li><li>• To learn to identify, summarise and critically evaluate relevant literature and write a literature review of the relevant field.</li><li>• To learn to identify, analyse and interpret suitable data to enable the research question to be answered.</li><li>• To understand and apply theoretical frameworks to the chosen area of study.</li><li>• To learn about carrying out independent research in written format and report your results and conclusions with reference to existing literature.</li><li>• To learn to analyse and synthesize research findings.</li></ul>
	<b>MTM-495B</b> <b>SPECIAL PAPER- OR: LAB. (OR METHODS USING MATLAB AND LINGO)</b>	<ul style="list-style-type: none"><li>• Collecting data from different sources for the real-life optimization problems. For collection of data, learners must visit one of the renowned laboratories and industry where such types of data are available.</li><li>• In a nutshell, the learners will handle the real-life application of optimization problems. This course will be useful as Data Science to the learners in future.</li></ul>





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Ref. No.GC / / /

Date- 00/00/0000

## Programme Specific Outcome

### Philosophy (honours)

The students of Philosophy (Hons) acquire knowledge about the different branches of Philosophy such as Epistemology, Metaphysics, Logic, Ethics, Philosophy of Mind, Social and Political Philosophy, Philosophy of Language, Contemporary Indian Philosophy, Applied Ethics. They will acquire the knowledge about evaluative knowledge of Reasoning and systematic argument formation ability. Develops the expressive and communicative power which in turn will help the students. So, the study of Philosophy shall build up confidence in students to preciously select a definite career path.

*After completion of the programme, the graduates will be capable of-*

PSO1: Understanding the basic concepts of philosophy related to the area of Epistemology, Metaphysics, Logic, Ethics etc in Indian and Western both.

PSO2: Understanding the application of philosophical knowledge in other inter disciplinary areas such as Political Science, Sociology etc.

PSO3: Developing the expressive and communicative power of logical reasoning.

PSO4: Recognizing different values including different moral dimension of one's decision and thereby increase the power of responsibility of concerned.

PSO5: Acquiring the knowledge to develop the defensive power and ability to establish their own views and challenging problems of philosophy.

PSO6: Increasing the power of evaluative skill and systematic argument construction ability.

PSO8: Attaining the capacity to select a particular path as career path in many related areas like Academic, Research, Counselling etc.



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Ref. No. / / /

Date: 00/00/0000

## Programme Specific Outcome

### Philosophy (General)

The students of Philosophy (General or DSC) will acquire the knowledge regarding different branches of Philosophy. They will be able to gain the skill of application of these subjective methods to other related areas. After completion of under graduate course most of the areas of this subject will help the students to be capable for appearing competitive examination of administrative job as well as any other job.

After completion of the programme, the graduates will be capable of: -

PSO1: Developing the capacity to analyse Concepts, Definitions, Arguments and Problems.

PSO2: Acquiring the capacity to develop new direction and new hypothesis and will be capable of further development.

PSO3: Developing to acquire ethical knowledge as well discharge one's responsibility towards the society.

PSO4: Increasing the power of skill in rational thinking.

PSO5: Developing the capacity of urge of quest for understanding the challenging problems of philosophy.

PSO6: Attaining the skill of application of philosophical knowledge and methodology to other inter disciplinary domain of learning.

PSO7: Developing the expressive and commutative power and systematic argument constructive skill.



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## Course Outcome

### Philosophy (Honours)

Semester	1
Title of Course	Indian Philosophy
Paper Code	C1
Credits	06
Hours	06 hours/week

*Indian Philosophy is the first systematic study of Indian thought. After going through this paper students can gain knowledge and comprehensive accounts of different ancient Philosophers and Philosophical schools.*

*After studying this paper, students can enrich themselves in the following manner:*

CO1. Knowledge about the definition and division of Orthodox school and Heterodox Schools of Indian Philosophy.

CO2. Description of Carvaka Philosophy and gain knowledge about the Epistemology, Metaphysics, Ethics and Materialism of Carvaka view.

CO3. Description of the different concepts of Jaina Philosophy as well as the theory of reality and seven forms of judgements.

CO4. Knowledge about the life and four noble truths as well as the various theories associated with Bouddha Philosophy.

CO5. Description, analysis of various concepts of Nyaya school, know the instruments, methodology and classification of perception, Anumiti, Vyapti, Upamana and Sabda.

CO6. Can gain knowledge about Vaisevika view of seven Padartha and the atomistic pluralism of this school. Description of the very idea of the cause and effect and the concept of Asatkaryabad.

<i>Semester</i>	<i>1</i>
<i>Title of Course</i>	<i>History of Western Philosophy</i>
<i>Paper Code</i>	<i>C2</i>
<i>Credits</i>	<i>06</i>
<i>Hours</i>	<i>06 hors / week</i>

*Classical western philosophy in ancient Greece. Greek philosophy is said to be divided three periods which are as follows. Pre-Socratic period marks the rise of Greek philosophy. This period includes the Ionics, Xenophanes, Pythagorean, Heraclitus, Eleatics and others. Sophists to Aristotle periods includes both the contemporary and predecessors of Socrates, Plato and Aristotle. Pre-Aristotelian period marks the decline of the national thought. The post Aristotelian period marks the end of golden age of decay and dissolution. This period includes the Stoics, the Epicureans and the Pyrrhonisms.*

*Students will know about the course: -*

CO1. Difference between various kinds of matter which are qualitative.

CO2. Air, which is constantly in motion, bring about the development of the universe.

CO3. All things are exchanged for fire and fire for all, according to Heraclitus.

CO4. The universe is a naturalistic and scientific principles, without the aid of myths and anthropomorphic God.

CO5. Identify and explain the key philosophical concepts as theory arise in the different historical periods, including knowledge, reality, reason, substance, identity, experience etc.

Semester	II
Title of Course	Indian Philosophy
Paper Code	C3
Credits	06
Hours	06 hours / week

The philosophy of India is the cream of its culture and civilization. The different schools of Indian Philosophy present diversity of views, although there are some similarities amongst them, we can discern even in them the common stamp of an Indian culture. We may briefly describe this unity as the unity of moral and spiritual outlook. To understand this, let us consider its main aspects and illustrate point of agreement among the different school.

By studying this paper students can come in acquaintance with the following concept related to Indian Philosophy.

CO1. Description of Samkhya theory of cause and explanation of the dualistic view of Prakriti and Purusa.

CO2. Knowledge about the different Samadhi or meditation, as well as the eightfold path of discipline, Astanga Yoga which generates certain supra-normal power.

CO3. Able to know through explanation of the Prabhakara and Bhatta school and the theories associated with this school.

CO4. Description of Samkara's Vedanta school and the analysis of the concept of Brahma as the ultimate reality and the knowledge of Satta.

CO5. Knowledge about the Ramanujacharya's attempt to harmonize the absolute and the personal theism and also the detail view of Brahman which is Jiva and Jagat.

Semester	II
Title of Course	History of Western Philosophy
Paper Code	C4
Credits	06
Hours	06hours / week

After studying this paper students will be able to realize the western thoughts as well as they can apply these thoughts in their day-to-day life.

The students will be able to get a broader concept of the following matters: -

CO1. LOCKE: Ideas will be increased i.e., innate ideas, the origin and formation of ideas, simple and complex ideas, substance, modes and relations, knowledge and its degrees, limits of knowledge, primary and secondary qualities, representative realism etc.

CO2. BERKELEY: Concept of abstract ideas. Criticism of Locke's distinction between primary and secondary qualities, Immaterialism, esse-est-percipi, role of God and also Differential thoughts between two philosophers.

CO3. KANT: Know the cohesion of rationalism and empiricism, Conception of critical Philosophy, distinction between a priori and a-posteriori judgement, distinction between analytic and synthetic judgements. Synthetic a priori judgements, General problem of the Critique, Copernican Revolution in Philosophy, Transcendental Aesthetic: Space & time - Metaphysical & Transcendental expositions of the ideas of space & time.

CO4. HUME: Concept of ideas, causality and Scepticism. Impression and ideas, association of ideas, distinction between judgements concerning relations of ideas and judgements concerning matters of fact, and personal identity.

Semester	III
Title of Course	Philosophy of Mind
Paper Code	C5
Credits	06
Hours	06 hours / week

Philosophy of Mind is the study of mind. It is the Knowledge of mind or soul. This subject describes various aspects of human being, like sensation, perception emotion, learning, intelligence, personality, psychological methods etc.

By studying this paper students can come in acquaintance with the following concepts related to our mind which are as follows: -

CO1. Description of the nature and also the scope of psychology. As a growing science the purpose of this paper is to build up a general principle.

CO2. Understand to explanation of the different methods associated with psychology and also their acceptability.

CO3. Knowledge building towards analysis of the different concepts like sensation, perception and their co-relation with different theories associated with perception.

CO4. Imparting the knowledge towards the idea of learning as well as the explanation of different theories associated with Learning.

CO5. Knowledge about the different philosophical theories regarding the relation between mind and body, and the influences of bodily conditions on mental processes which are the matter of common observation.

Semester	III
Title of Course	Social and Political Philosophy
Paper Code	C6
Credits	06
Hours	06 hours/ week

Social Philosophy is of great value for the clarification of Political thought.

After studying this paper students can enrich themselves and able to know the followings: -

CO1. Acquaintance with the true nature of society also the relation between social and political philosophy.

CO2. Knowledge about the primary concepts like society, community, social group, various customs and laws of society, distinction between Institution, Association and habits.

CO3. Importance, necessity and utility of the idea of family as well as the role of family as best source of self-culture for the parents.

CO4. Knowledge about the concept of social gradation, social class and caste system of ancient varnashrama Dharma, the social status as well as the inequalities in our society.

CO5. Understand the meaning of human life, relation between society and individual and different theories regarding the relation between the two.

CO6. Acquaintance with the description of the manifold diversities in race, religion, language as well as the unity and the knowledge about the Political Philosophy, the meaning and nature of Secularism as well as the nature of Secularism in India.

CO6. Understand the true nature and relation of social progress or development as well as the Marxist and Gandhian interpretation and theories of social change and progress or development.



Semester	III
religions Title of Course	Philosophy of Religion
Paper Code	C7
Credits	06
Hours	06 hours / week

Religion is a special aspect of human experience and therefore needs a philosophical explanation. The function of Philosophy of Religion is to determine the significance and value of human experience of religion. Philosophy of Religion is self-establishment of religious experience with the following concepts related to Philosophy of Religion.

By studying this paper, students can come in acquaintance with the following concepts related to Philosophy of Religion: -

- CO1. Description about the nature as well as scope of Philosophy of Religion.
- CO2. Enable them to analyse different doctrine of karma, rebirth or Janmantarabada and the theory of liberation.
- CO3. Understand the meaning and concept of the Philosophical teachings of the Holy 'Quran'.
- CO4. Knowledge about the different features of religion and can know the basic tenets of Christianity.
- CO5. Gather knowledge about the concept of religious pluralism and the concept of universal religion.
- CO6. Explanation of ground for disbelief in God and Peculiarity of Religious Language.

Semester	III
Title of Course	Philosophy of Human Rights
Paper Code	SEC1
Credits	02
Hours	02 hours / week

Human Right is a vast field of study covering issues related to the basic freedom and rights to which every person is entitled. Many topics fall under the realm of human rights and there are many different career paths which student can chose after studying this paper. Human Rights can be rewarding ang challenging field of study leading to a fulfilling career.

Taking this course students will enable to the followings: -

CO1. Identify and evaluate the historical, philosophical, political and cultural developments establishing human rights as a set of global norms, agreement and procedures.

CO2. Understand the importance of the Human Rights Act1998.

CO3. Explore global human rights institution, law, and processes and assess the impact of their interaction with national and local cultural, practices and norms.

CO4. Critically examine the impact of diverse Geographic, cultural and theoretical contexts on the social acceptance and practical application of human rights norms.

CO5. Reflectively evaluate the effectiveness of human rights practice on local, national or international humanitarian efforts.

Semester	IV
Title of Course	Western Logic
Paper Code	C8
Credits	06
Hours	06 hours / week

Western Philosophy is based on conscious thought where unconscious thought is central to spiritual awakening and development processes of the brain being for more extensive and unfettered by logic create for more original and dynamic thinking.

Students will know from this course: -

CO1. Identify arguments in ordinary language, distinguish premises from conclusion, differentiate deductive arguments from inductive arguments and construct arguments of their own.

CO2. Detect mistake in reason, including both formal and informal fallacies.

CO3. Translate sentence from ordinary language into standard form of categorical proposition.

CO4. Translate ordinary language arguments into standard form categorical syllogism, evaluate immediate inference and syllogism using the traditional square of opposition and Venn diagrams.

Semester	IV
Title of Course	Western Logic - II
Paper Code	C9
Credits	06
Hours	06 hours / week

After studying this paper students will be able to uplift their understanding level in mathematical perspectives.

The students will be able to get a broader concept of the following matters: -

CO1. Symbolic Logic: value of symbols, Truth-Functions, Dagger and stroke functions; inter-definability of truth functors. Tautologous, Contradictory and Contingent Statement-Forms; The Paradoxes of Material Implication; The three Laws of Thought.

CO2. Testing Argument Form and Argument for validity by i) The Method of Truth-table. ii) The Method of Resolution (Fell swoop & Full Sweep)

CO3. Formal Proof of Validity: Difference between Implicational Rules and the Rules of Replacement; Construction of Formal Proof of Validity by using nineteen rules; Proof of invalidity by assignment of truth-values.

CO4. Quantification Theory: Concept of Quantifications and its need.

<u>Semester</u>	IV
<u>Title of Course</u>	<u>Epistemology and Metaphysics - Western</u>
<u>Paper Code</u>	C10
<u>Credits</u>	06
<u>Hours</u>	<u>06 hours /week</u>

Epistemology: Philosophy is the search for knowledge. This search is critical. Hence, the first problem which arises before a philosopher is about the nature of knowledge and its limitation. Therefore, epistemology is the most fundamental branch of philosophy. It discusses philosophically truth and falsehood, validity of knowledge limits and nature of knowledge, knower and known etc. Metaphysics: Metaphysics is the main branch of philosophy. It is the science of reality. Its main problems are what is reality? Is the world one or many? What is space? What is the purpose of creation? Is there a God? In brief metaphysics discuss the three aspects of reality.

Studying this course students will enable to: -

- CO1. Learn about different theories of justification and how they are different.
- CO2. Describe significant aspect of one or more of the major epistemological tradition.
- CO3. Increase their understanding about drawbacks of the famous theories of justification and experimental -based naturalistic approaches to epistemological issues.
- CO4. Investigate the foundations for knowledge, the scope of knowledge, meaning of how much can we know and how deep can we dig into our knowledge.

Semester	IV
Title of Course	Value Education
Paper Code	SEC2
Credits	02
Hours	02 hours / week

After studying this paper awareness regarding different moral values of life will be developed among the students and they will nurture their good habits and spread their knowledge as well as responsibility towards the society.

This paper of this course (SEC2) provides the students with: -

CO1. Students will be benefitted by the nurturing their good habits.

CO2. Students will develop their personality by the nurturing truthfulness, righteous conduct etc.

CO3. The fundamental human values such as peace, non-violence etc help the students to be a real man who can creates a real Society.

CO4. By the studying this subjects' students will be able to make understand the society people that human values such as truth, right conduct, peace, love, non-violence etc. are the basis for any practical life within society.

CO5. After finishing this course students will make responsible themselves as well as society.

Semester	V
Title of Course	Nyaya Logic and Epistemology-1
Paper Code	C11
Credits	06
Hours	06 hours / week

After studying this paper students will be able to get a broader concept of the following cognition areas: -

CO1. Definition of buddhi or jñāna (cognition), its kinds; Definition of smṛti; Two kinds of smṛti (memory);

CO2. Definition of anubhava, its division into veridical (yathārtha) and non-veridical (ayathārtha);

CO3. Three kinds of non-veridical anubhava;

CO4. Definitions clarified in Tarkasaṃgraha Dīpikā.

CO5. Four-fold division of pramā and pramāṇa.

CO6. Definition of “Kāraṇa” (special causal condition) and “kāraṇa” (general causal condition).

CO7. The concept of anyathāsiddhi (irrelevance) and its varieties. The definition of kārya (effect). Kinds of cause: samavāyī, a-samavāyī and nimitta kāraṇa (definitions and analysis).

CO8. Definition of pratyakṣa and its two-fold division: nirvikalpaka and savikalpaka jñāna. Evidence for the actuality of nirvikalpaka

CO9. Sannikarsa and its six varieties.

CO10. Problem of transmission of sound; the claim of “anupalabdhi” as a distinctive pramāṇa examined.

Semester	V
Title of Course	Ethics (Indian)
Paper Code	C12
Credits	06
Hours	06 hours/ week

After studying this paper students can establish ethical knowledge as well as their responsibilities towards the society in their practical life.

The students will be able to get a vast concept of the following matters.

CO1. Gain acknowledgement power, Presuppositions, Concept of Sthitaprañjna,

CO2. Karmayoga: Aware their root duty, (Gīta) Puruṣārthas and their inter-relations.

CO3. Meaning of Dharma, Concept of ṛṇa and ṛta.

CO4. Classification of Dharma: sādharmaṇadharmā and Asadharmā  
Dharma, Varnasrama Dharma

CO5. Vidhi and Niṣedha, what can be done or not?

CO6. Buddhist Ethics: Able to realize Buddhist Ethics i.e., Pancaśīla, Brahmavihārabhāvanā (Buddha) Anubrata, Mahābrata, Ahimsā.

CO7. Jaina Ethics: After knowing Jaina Ethics, they can relate it in day-to-day life. Also, the concepts of anubrata, mahābrata

CO8. Mimāṃsā Ethics: Know the different type of karma. nitya naimittika karma and kāmya karma, the imperative in kāmya karmas and in kāmya karmas involving hiṃsā.



Semester	V
Title of Course	Philosophy of Language
Paper Code	DSE1
Credits	06
Hours	06 hours/ week

Nabya Nyayakika Annambhatta has arranged the topics under discussion in the Tarkasamgraha text by following the specific text commentary of the wide foot. He first showed their division by mentioning these seven substances. In the discussion of evidence, he has mostly followed Ganges Upadhyay, the founder of 'Nabya Nvava'.

By studying this paper students can come in acquaintance with the following concepts related to 'Tarkasangraha'.

CO1. Definition and classification of Pada.

CO2. Description of different type of Laksana.

CO3. Explanation of Sabdabodh or Verbal testimony).

CO4. Analysis Introduction of Concept of Asatti, YogyataTatparya, and Akamsa.

CO5. Explanation of Anvitabhidhanvada and Abhihanvayavada.

Semester	V
Title of Course	Ethics (Applied Ethics)
Paper Code	DSE2
Credits	06
Hours	06 hours/ week

After studying this paper students can enhance their ethical knowledge and establish their responsibilities towards the society.

The students will be able to get a broader concept of the following matters:

CO1. Know their responsibility, Nature and scope of applied ethics.

CO2. Realize the nature of life.

CO3. Killing: Suicide, Euthanasia, Animal killing.

CO4. Poverty, Affluence and Morality.

CO5. War and Violence: Terrorism.

CO6. Right: Nature and Value of Human Rights – Discrimination on the basis of race, caste and religion.

CO7. Regarding Care ethics, Deep Ecology, concept of Kinship ethics etc.

CO8. Ecological Concern in Indian thoughts: Jaina and Bauddha views.

Semester	
Title of Course	Nyaya Logic and Epistemology-II
Paper Code	C13
Credits	06
Hour	06 hours/ week

Nyaya, (in Sanskrit "Rule" or "Method") is one of the six systems of Indian philosophy, important for its analysis of logic and epistemology. The major contribution of the Nyaya system is its working out in profound detail the means of knowledge known as inference or anumana. Like the other systems, Nyaya is both philosophical and religious. Its ultimate concern is to bring an end to human suffering, which results from ignorance of reality. Liberation is brought about through right knowledge. Nyaya is thus concerned with the means of right knowledge. In its metaphysics, Nyaya is allied to the Vaisheshika system, and the school were often combined from about the 10<sup>th</sup> century. Its principal text is the Nyaya-Sutra, ascribed to Gautama (C.2<sup>ND</sup> Century BCE). The Nyaya system from Gautama through his important early commentator, Vatsyayana until Udayancharya became qualified as the old Nyaya in the 11<sup>th</sup> century, when a new school of Nyaya arose in Bengal. The best-known philosopher of the Navya Nyaya, and the founder of the modern school of Indian Logic, was Gangesha. Taking this course will enable the

Students will be able to engage with philosophical reasoning and arguments presented this paper.

CO1. Students will develop the ability to relate Indian methods of argumentation to their own fields of study.

CO2. Students will improve their ability to interact with philosophical ideas, both in active participation during class.

CO3. Students will gain basic familiarity with the historical background out of which Indian philosophical debates arose.

CO4. Understand how validity of knowledge can be achieved.

CO5. Learn how to validate justified true belief

Semester	VI
Title of Course	Ethics (Western)
Paper Code	C14
Credits	06
Hours	06 hours / week

The study of ethics makes the students less biased and more comprehensive in their outlook. The study of ethics engenders a firm conviction in the normal ideal. The chief value of ethics is not the guidance, it gives in particular cases, but in the development of a wider outlook and seriousness of purpose in dealing with

The study of ethics enriches the students in following manners: -

CO1. Students able to know the exact nature of the subject, subject matter for discussion, as well as its classification.

CO2. They Can Gain knowledge about moral and non-moral actions and also Can know the object of moral in judgements.

CO3. They able to know regarding description of the moral theories of eminent philosophers like Plato and Aristotle which explain the moral relation between individual and Society and also the science of morality.

CO4. Able to know the concept and Justification of the very idea of 'punishment 'we know that punishment shrinks the personality of the wrong Doer. It makes a wrong doer conscious of the social ideal. It brings consciousness in the mind of a wrong doer about the necessity of punishment into our society.

CO5. It enables the students to get an idea about the clarification of the nature of environmental Ethics. It is a study of ethical principles that guide human interaction with nature, can know the Anthropocentric and non-anthropocentric view as well as Biocentric view, protection and preservation of wilderness for future generation.

Semester	VI
Title of Course	An Enquiry Concerning Human Understanding - D. Hume
Paper Code	DSE-3
Credits	06
Hours	06 hours / week

According to Hume there are two kinds of contents of the mind namely impression and ideas. He says that only perception composes the human mind. Impression and idea are divided into simple and complex. No separation or distinction is admitted by all ideas or impression. Complex ideas or impressions are composed of simple parts. Impression is further divided into sensation and reflection. Sensation arises from unknown causes whereas the reflection derives over ideas. Reflection is regarded as secondary, whereas sensations are regarded as original facts.

Students will be able to know the following matters: -

CO1. The mind is a kind of theatre several perceptions successive make their appearance.

CO2. All the objects of human reason or enquiry may naturally be relation of ideas and matters of fact.

CO3. There is properly no simplicity in it at one time, nor identity in difference. Whatever natural propension we may have to imagine that is simplicity and identity.

CO4. According to Hume, a substance means a collection of simple ideas and these collections are united by imagination only.

Semester	VI
Title of Course	M. K. Gandhi
Paper Code	DSE4
Credits	06
Hours	06 hours / week

The main objective of this unit is to introduce the students to socio-political significance of Gandhian concept of ahimsa and satyagraha. It would also enable one to know how to apply these principles in one's social and political intervention. Along with these, it is intended to evaluate and compare adequately by present-day political system with Gandhian vision. Ahimsa and satyagraha imply great significance in the life and philosophy of Mahatma Gandhi.

Students will know the following: -

CO1. Two socio-political weapons used in achieving the various goals, that is Ahimsa and satyagraha which are not new ideal but the eternal principles of Gandhi's life.

CO2. The great adventure of Gandhi that he reinterpreted and rested these fundamental principles of human behaviour in new ways and showed their universality. He made several experiments with them and with great zeal applied them in an original way practically in every aspect of human life especially in the social and political fields.

CO3. Able to know the Gandhian main concepts like truth, ahimsa, satyagraha, Sarvodaya, etc., are not individual and independent concepts but they are interrelated. Satyagraha is nothing but the implementation of truth and ahimsa in the different walks of life.

CO4. Ahimsa is the foundation of satyagraha, the irreducible minimum to which satyagraha adheres to. The ideal and practice of satyagraha constitute the heart and soul of Gandhi's belief in non-violence.

CO5. Know the history of Indian culture in the history of evolution.



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Ref. No. / / /

Date: 00/00/0000

## Course Outcome

## Philosophy (GE)

Semester	I
Title of Course	Western Logic
Paper Code	GE1
Credits	06
Hours	06 hour/ week

Western philosophy is based on conscious thought where unconscious thought is central to spiritual awakening development processes of the brain being for more extensive and unfettered by logic create for more original and dynamic thinking.

Students will know from this course: -

CO1. Identify arguments in ordinary language, distinguish premises from conclusion, differentiate deductive arguments from inductive arguments and construct arguments of their own.

CO2. Detect mistake in reason, including both formal and informal fallacies.

CO3. Translate sentence from ordinary language into standard form of categorical proposition.

CO4. Translate ordinary language arguments into standard form categorical syllogism, evaluate immediate inference and syllogism using the traditional square of opposition and Venn diagrams.

Semester	II
Title of Course	Philosophy of Mind (H)
Paper Code	GE2
Credits	06
Hours	06 hours / week

Philosophy of Mind is the study of mind. It is the Knowledge of mind or soul. This subject describes various aspects of human being, like sensation, perception emotion, learning, intelligence, personality, psychological methods etc.

By studying this paper students can come in acquaintance with the following concepts related to our mind which are as follows: -

CO1. Description of the nature and also the scope of psychology. As a growing science the purpose of this paper is to build up a general principle.

CO2. Understand to explanation of the different methods associated with psychology and also their acceptability.

CO3. Knowledge building towards analysis of the different concepts like sensation, perception and their co-relation with different theories associated with perception.

CO4. Imparting the knowledge towards the idea of learning as well as the explanation of different theories associated with Learning.



Semester	III
Title of Course	Theory of Inference
Paper Code	GE3
Credits	06
Hours	06 hours / week

The second knowledge of Anubhaba is anumana or inferential or rational and its name is called anumana or inference. It is defined as that cognition which presupposes some other cognition. It is mediate or indirect arises through a 'mark', the middle term (linga or hetu) which is invariably connected with the maior term (sadhva). It is knowledgē (mana) which arises after (anu) another

By studying this paper students can come in acquaintance with the following concept related to theory of inference in Nyaya system.

CO. 1 Definition and classification of Anumiti.

CO2. Description the different type of inference such as Swartha (for oneself) and paratha (for others).

CO3. Description of Pancabayabinaya such as Pratijna, hetu, udaharana, upanaya, nigamana.

CO4. Importance of Pancabayabinaya.

CO5. Definition and classification of Svarthanumana.

Semester	IV
Title of Course	Termination of Life and Ethics
Paper Code	GE4
Credits	06
Hours	06 hours / week

Ethics is said to be the system of moral principles which affect how people make decisions and lead their lives. Ethics is concerned with what is good for individuals and society. It is also described as Moral Philosophy. The term ethics is derived from the Greek word 'ethos' which means custom, habit, character or disposition. Applied ethics deals with the controversial topic like Abortion, Euthanasia, animal rights, capital punishment etc.

By studying this paper students can come in acquaintance with the following concept related to Termination of life and ethics.

CO1. Student will be able to know the "euthanasia" has had different meanings depending on usage. The first apparent usage of the term "euthanasia" belongs to the historian Suetonius, who described how the Emperor Augustus, "dying quickly and without suffering in the arms of his wife, Livia, experienced the 'euthanasia' he had wished for. The word "euthanasia" was first used in a medical context by Francis Bacon in the 17th century, to refer to an easy, painless, happy death, during which it was a "physician's responsibility to alleviate the 'physical sufferings' of the body." Bacon referred to an "outward euthanasia" – the term "outward" he used to distinguish from a spiritual concept – the euthanasia "which regards the preparation of the soul.

CO2. Abortion is the ending of a pregnancy by removal or expulsion of an embryo or fetus an abortion that occurs without intervention is known as a miscarriage or "spontaneous abortion" and occurs in approximately 30% to 40% of pregnancies. When deliberate steps are taken to end a pregnancy, it is called an induced abortion, or less frequently "induced miscarriage". The unmodified word abortion generally refers to an induced abortion.



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## Course Outcome

### Philosophy (DSC)

Semester	I
Title of Course	Indian Philosophy
Paper Code	DSC1A
Credits	06
Hours	06 hours / week

The achievements of the Indians in the field of philosophy are but important. It is impossible for a man to live without a philosophy. Indian philosophy has been, intensely spiritual and has always emphasized the need of practical realisation of truth. 'See the self' is the keynote of all schools of Indian philosophy. By studying this paper students can gain the knowledge and understanding of the various comprehensive accounts of different Indian school.

The study of Indian Philosophy enrich the students in following manner.

CO1. Students can get the fundamental historical introduction outlying the sources of philosophical thought. Gain the common characteristic of Indian philosophy - such as - the idea of theory and practice, pessimistic outlook, belief in an eternal moral order, idea of law of Karma and Rebirth.

CO.2 Knowledge about the Materialism in Indian thought, which has never been a force, know the origin of carvaka school and theory of pratyaksa or perception as the only source of knowledge. Know the fact of how to refute Anumana and sabda as well as the Dehatmavada Vada.

CO3. Understand the Jaina theory of Reality which is realistic and relativistic pluralism, theory of sevenfold judgement or Jaina Logic that distinguishes seven forms of judgements.

CO4. Able to know the Buddha's life and philosophy, which comprises of four Noble Truths and the different theories i.e. theory of Impermanence, Nairatmavada as well as

the theory of Dependent Origination which is the foundation of all the teaching of Buddha.

CO.5 Description of Nyaya school which is allied to the Vaishesika system. Know the concepts of perception, inference, comparison or analogy and verbal testimony as the four kinds of Veda knowledge. Get the idea of Saptapadartha or seven categories.

CO6. Understand the concept of Cause in Samkhya philosophy, which is dualistic in nature, able to know the theory of Casualty and theory of evolution associated with the idea of Cause'.

CO7. Gain knowledge about the Yoga School of Indian thought which is allied to Samkhya, the concept of Chittavrittis and modification of the Chitta through meditation, the Astanga Yoga or eight-fold means.

CO8. Description of the two concepts of Mimamsa school, i.e., arthapatti and anupalabdhi or non-apprehension as a source of knowledge.

CO9. Able to know the Advaita Vedanta concepts of Brahman, Jiva and Jagat.

Semester	II
Title of Course	Western Philosophy
Paper Code	DSC1B
Credits	06
Hours	06 hours / week

Western Philosophy has remains more or less true to the etymological meaning of 'Philosophy', in being essentially an intellectual quest for truth. Both eastern and western philosophy is nothing but the history of philosophical ideas.

After studying this paper students can know the following matters: -

CO1. Able to know the concept of Metaphysics, which is the knowledge of things as they are in themselves i.e. of super sensuous. Gather knowledge about the impossibility of Metaphysics, the nature of metaphysics.

CO2. Description of the concept of realism which explain the fact that there is a world of real thought and persons, with qualities and relations which are as real as the things. Acquire knowledge regarding different theories associated with this topic i.e like scientific realism or Representative realism.

CO3. Knowledge about Idealism which is the doctrine of epistemological dualism as it believes in two world's – the World of mind, the world of external substance, as well as know the subjective idealism of Berkely and Objective Idealism.

CO4. Description of the very idea of Kant's critical theory. We know that Kant's theory is an attempt at avoiding the Solipism of Hume. Kant accepts an independent external reality as the ground.

CO5. Acquire knowledge about theories of causality. We know Cause is the agent which actively produces the effect and gain knowledge about the theories associated with the idea of cause.

CO6. Knowledge about the concept of substance which is a permanent thing that remains same throughout its changing steps and qualities, Get the overall idea of Descartes, Spinoza, lock and Berkeley. Locke and Berkeley admitted the concept of substance whereas Spinoza admits God as substance.

CO7. Able to know the exact relation between mind and body. And the different theories associated with this concept, such as Interactionism of Descartes and Parallelism of Spinoza.

Semester	III
Title of Course	Western Logic
Paper Code	DSC 1C
Credits	06
Hours	06 hours / week

Western Logic is based on conscious thought where unconscious thought is central to spiritual awakening and development processes of the brain being for more extensive and unfettered by logic create for more original and dynamic thinking.

Students will know from this course: -

CO1. Identify arguments in ordinary language, distinguish premises from conclusion, differentiate deductive arguments from inductive arguments and construct arguments of their own.

CO2. Detect mistake in reason, including both formal and informal fallacies.

CO3. Translate sentence from ordinary language into standard form of categorical proposition.

CO4. Translate ordinary language arguments into standard form categorical syllogism, evaluate immediate inference and syllogism using the traditional square of opposition and Venn diagrams

Semester	III
Title of Course	Philosophy of Human Rights
Paper Code	SEC1
Credits	02
Hours	02 hours / week

Human Right is a vast field of study covering issues related to the basic freedom and rights to which every person is entitled. Many topics fall under the realm of human rights and there are many different career paths which student can chose after studying this paper. Human Rights can be rewarding ang challenging field of study leading to a fulfilling career.

Taking this course students will enable to the followings: -

CO1. Identify and evaluate the historical, philosophical, political and cultural developments establishing human rights as a set of global norms, agreement and procedures.

CO2. Understand the importance of the Human Rights Act1998.

CO3. Explore global human rights institution, law, and processes and assess the impact of their interaction with national and local cultural, practices and norms.

CO4. Critically examine the impact of diverse Geographic, cultural and theoretical contexts on the social acceptance and practical application of human rights norms.

CO5. Reflectively evaluate the effectiveness of human rights practice on local, national or international humanitarian efforts.

Semester	IV
Title of Course	Contemporary Indian Philosophy
Paper Code	DSC 1D
Credits	06
Hours	06 hours / week

After studying this paper students can realize spiritual concept: -

CO1. The students will be able to get a broader concept on Nature of man and infinite aspect of man where man realizes his infinite capabilities. of Rabindranath Tagore.

CO2. Nature of Religion, Problem of Evil, Surplus in man. Fecundity.

CO3. Swami Vivekananda Practical Vedanta, Universal Religion, Yoga.

CO4. Sri Aurobindo Nature of Reality, Human Evolution- its different stages, Integral Yoga.

CO5. S. Radhakrishnan nature of Man, Nature of Religious Experience, Nature of Intuitive Apprehension.

CO6. Mahatma Gandhi's God and Truth, Ahimsa, Trusteeship.

CO7. Md. Iqbal's Nature of the Self, Nature of the World, Nature of God.



Semester	IV
Title of Course	Value Education
Paper Code	SEC2
Credits	02
Hours	02hours / week

After studying this paper awareness regarding different moral values of life will be developed among the students and they will nurture their good habits and spread their knowledge as well as responsibility towards the society.

This paper of this course (SEC2) provides the students with: -

CO1. Students will be benefitted by the nurturing their good habits.

CO2. Students will develop their personality by the nurturing truthfulness, righteous conduct etc.

CO3. The fundamental human values such as peace, non-violence etc help the students to be a real man who can creates a real Society.

CO4. By the studying this subjects' students will be able to make understand the society people that human values such as truth, right conduct, peace, love, non-violence etc. are the basis for any practical life within society.

CO5. After finishing this course students will make responsible themselves as well as society.

Semester	V
Title of Course	Philosophy of Religion
Paper Code	DSE 1A
Credits	06
Hours	06 hours / week

Religion is a special aspect of human experience and therefore needs a philosophical explanation. The function of Philosophy of Religion is to determine the significance and value of human experience of religion. Philosophy of Religion is self-establishment of religious experience with the following concepts related to Philosophy of Religion

By studying this paper, students can come in acquaintance with the following concepts related to Philosophy of Religion: -

- CO1. Description about the nature as well as scope of Philosophy of Religion.
- CO2. Enable them to analyse different doctrine of karma, rebirth or Janmantarabada and the theory of liberation.
- CO3. Understand the meaning and concept of the Philosophical teachings of the Holy 'Quran'.
- CO4. Knowledge about the different features of religion and can know the basic tenets of Christianity.
- CO5. Gather knowledge about the concept of religious pluralism and the concept of universal religion.

Semester	V
Title of Course	Western Philosophy
Paper Code	GE1
Credits	06
Hours	06 hours / week

Western Philosophy has more or less true to the etymological meaning of 'Philosophy', in being essentially an intellectual quest for truth. Both eastern and western philosophy is nothing but the history of philosophical ideas.

After going through this paper students can know the following matters: -

CO1. Able to know the concept of Metaphysics, which is the knowledge of things as they are in themselves i.e. of super sensuous. Gather knowledge about the impossibility of Metaphysics, the nature of metaphysics.

CO2. Description of the concept of realism which explain the fact that there is a world of real thought and persons, with qualities and relations which are as real as the things. Acquire knowledge regarding different theories associated with this topic i.e like scientific realism or Representative realism.

CO3. Knowledge about Idealism which is the doctrine of epistemological dualism as it believes in two world's - the World of mind, the world of external substance, as well as know the subjective idealism of Berkely and Objective Idealism.

CO4. Description of the very idea of Kant's critical theory. We know that Kant's theory is an attempt at avoiding the Solipsism of Hume. Kant accepts an independent external reality as the ground.

CO5. Acquire knowledge about theories of causality. We know Cause is the agent which actively produces the effect and gain knowledge about the theories associated with the idea of cause.

CO6. Knowledge about the concept of substance which is a permanent thing that remains same throughout its changing steps and qualities, Get the overall idea of Descartes, Spinoza, lock and Berkeley. Locke and Berkeley admitted the concept of substance whereas Spinoza admits God as substance.

Semester	V
Title of Course	Western Philosophy
Paper Code	SEC3
Credits	02
Hours	02 hours / week

Education is the key to raise inner self of the individuals. It is uniting the nations bringing human beings closely together. Now a day we are living in the digital era and many parts of the world civil society suffers because of situation of violent conflicts and war. It is important to inoculate and recognize the crucial role of education in contributing to building a culture of peace. A culture of peace and non-violence goes to the substance of fundamental human rights of the present era.

After learning this unit students will know: -

CO1: Understand the importance of peace.

CO2: Describe the nature of peace education.

CO3: Know the different approaches to peace.

CO4: Know the role of different institution in peace.

Semester	VI
Title of Course	Tarkasangraha Dipika
Paper Code	DSE1B
Credits	06
Hours	06 hours / week

The Vaishesika system is regarded as conducive to the study of all system. Its main business is to deal with the categories and to unfold its atomistic pluralism. A category is called padartha and the entire universe is reduced to six or seven padarthas. The seven padarthas are substance, guna, karma, samanya, vishes samavaya and abhaba.

After studying this unit students will know: -

CO1: Students will get knowledge about ultimate reality.

CO2: Students will get a clear picture Nyaya-Vaisesika philosophy.

CO3: Students will understand the similarities and dissimilarities between Nyaya and Vaisesika philosophy.

CO4: Students can understand and materialistic world is not their desting.s.

Semester	VI
Title of Course	Philosophy of Mind (G)
Paper Code	GE2
Credits	06
Hours	06 hours / week

Philosophy of Mind is the study of mind. It is the Knowledge of mind or soul. This subject describes various aspects of human being, like sensation, perception, emotion, learning, intelligence, personality, psychological methods etc.

By studying this paper students can come in acquaintance with the following concepts related to our mind which are as follows: -

CO1. Description of the nature and also the scope of psychology. As a growing science the purpose of this paper is to build up a general principle.

CO2. Understand to explanation of the different methods associated with psychology and also their acceptability.

CO3. Knowledge building towards analysis of the different concepts like sensation, perception and their co-relation with different theories associated with perception.

CO4. Imparting the knowledge towards the idea of learning as well as the explanation of different theories associated with Learning.

CO5. Knowledge about the different philosophical theories regarding the relation between mind and body, and the influences of bodily conditions on mental processes which are the matter of common observation.

Semester	VI
Title of Course	Logical Reasoning and Application
Paper Code	SEC4
Credits	02
Hours	02 hour / week

Through this paper students can realize their institutional knowledge.

The students will be able to get a broader concept about the main objective of logical reasoning: -

- CO1. Definitions: For example, Paksa ,Sadhya, Hetu, Sapaksha, and Vipaksa.
- CO2. Construction kevalanvyi anumiti,kevalavytireki anumiti,anvayvytireki anumiti.
- CO3. Concept of Hetwabhasa and its different kinds.And also detection of hetvabhasa.
- CO4. Reasonig in practice: Fallacy of relevance , ambiguity,and weak induction and also avoiding fallacies.
- CO5. Inductive reasoning in law – The method of Inquiry in law.
- CO6. Causation in reasoning.
- CO7. Legal argument.
- CO8. The correct rule of Law.
- CO9. Identifying, formulating, and applying rule of law.

## Department of Physics

### Garhbeta College

Garhbeta :: PaschimMedinipur :: 721127 West Bengal

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### Programme Outcome (PO) For B.Sc. Hons in Physics

P	O	D	e	s	c	r	i	p	t	i	o	n
P	O	1	Demonstrate knowledge and understanding of the fundamental concepts in all areas of science									
P	O	2	Demonstrate critical thinking analytical reasoning and judgment in identifying and solving specific problems with intellectual independence									
P	O	3	Design and carry out scientific experiments as well as accurately record and analyze the result of the experiments									
P	O	4	Demonstrate communication skills to present a clear, coherent and independent expression of knowledge and ideas									
P	O	5	Develop the ability to communicate scientific information and research results in written and oral formats									
P	O	6	Demonstrate understanding of the interconnections of knowledge within and across disciplines									
P	O	7	Apply knowledge, theories methods and practices in their chosen field of study to address real-world challenges and opportunities									
P	O	8	Inculcate the ability to find jobs in different fields like teaching, banking, industry and also in different fields of higher study and research									
P	O	9	Accomplish a nature of lifelong learning to acquire the ability of grasping any scientific text in the broadest context of scientific development									
P	O	10	Demonstrate sensitivity and readiness to share their knowledge, experience and capabilities with the marginalized and oppressed in their communities									

### Programme Specific Outcome (PSO) For B.Sc. Hons. In Physics

P	S	O	D	e	s	c	r	i	p	t	i	o	n
P	S	O	1	Create the skill to operate the various electronics and physical instruments, apparatus and equipments.									



<b>P S O 2</b>	Demonstrate knowledge and fundamental concepts in all areas of Physics
<b>P S O 3</b>	Demonstrate knowledge to give clear concept about various incidents of our daily life related to Physics
<b>P S O 4</b>	Gain the ability to solve different mathematical problem related to Physics
<b>P S O 5</b>	Gain the ability to formulate, conduct, analyze experiments in Physics
<b>P S O 6</b>	Produce scope to shine in academics and in research area
<b>P S O 7</b>	Have information about fundamental Physics and basic mechanics principle
<b>P S O 8</b>	Demonstrate knowledge for betterment of Environment
<b>P S O 9</b>	Demonstrate knowledge about renewable energy to save energy for our future life
<b>P S O 10</b>	Demonstrate knowledge for betterment of our daily life

## **COURSE OUTCOME (CO) FOR THE ACADEMIC YEAR 2018-2019**

**Name of the Course: B.Sc. Honours. In Physics**

**Core Course: Physics**

**Semester - I**

Paper Code & Name	O	u	t	c	o	m	e	s
CCI (Mathematical Physics) C1T1	CO 1	Understanding of function & its limit continuity, differential equation, calculus of function more than one variable.						
	CO 2	Recapitulation of vectors, & its properties, Vector Differentiation, Integration						
	CO 3	Introduction of orthogonal curvilinear coordinate system like Spherical and Cylindrical Coordinate Systems.						
	CO 4	Introduction to probability & its distribution function; binomial, Gaussian, and Poisson.						
	CO 5	Brief description of Dirac delta function and its properties.						
C1P1	CO 1	Basics of scientific computing, Errors and error Analysis, plotting graphs with Gnuplot, programming in python, program and random no generation.						
	CO 2	Numerical method; Bisection, Newton Raphson and Secant methods. Forward and Backward difference formula, Solution of Ordinary Differential Equations.						
CC2 (Mechanics) C2T2	CO 1	Understand fundamental of dynamics: reference frames & its transformation, description of motion with respect to it.						
	CO 2	Understand work & energy, different kind of forces and equilibrium.						
	CO 3	Inelastic and elastic collision of particle & center of mass in lab frame.						
	CO 4	Know the concept of rotational dynamics of a particle and system.						
	CO 5	B r i e f d e s c r i p t i o n o f e l a s t i c i t y						
	CO 6	D e s c r i p t i o n o f K i n e m a t i c s o f M o v i n g F l u i d s						
	CO 7	K n o w i n g a b o u t m o t i o n u n d e r c e n t r a l f o r c e .						
	CO 8	Non inertial frame and introduction of different fictitious forces like Centrifugal force, Coriolis force and its application.						
	CO 9	Understand the concept of Special Theory of Relativity.						
C 2 P 2	CO1	D i s c u s s i o n o n r a n d o m e r r o r s i n o b s e r v a t i o n s .						

## Semester - II

Paper Code & Name	O	u	t	c	o	m	e	s
CC3 (Electricity & magnetism) C3T	CO 1	Basic understanding of the electric field and electric potential						
	CO 2	S t u d y o f d i e l e c t r i c p r o p e r t i e s o f m a t t e r .						
	CO 3	Understand magnetic field, magnetic dipole, vector potential.						

	<b>CO 4</b>	Study of magnetic properties of matter.
	<b>CO 5</b>	Understand of electromagnetic induction and electrical circuit, network theorem.
<b>C3P</b>	<b>CO 1</b>	Use a Multimeter for measuring (a) Resistances, (b) AC and DC Voltages, (c) DC Current, (d) Capacitances, and (e) Checking electrical fuses.
<b>CC4</b> (Waves and Optics)	<b>CO 1</b>	Knowing about Superposition of Collinear & two perpendicular Harmonic oscillations
	<b>CO 2</b>	Concept of wave motion as well introduction of electromagnetic nature of light.
	<b>CO 3</b>	Discussion regarding interference and experimental study of it by Interferometer.
	<b>CO 4</b>	Study of different kind of diffraction like Fraunhofer, Fresnel Diffraction.
	<b>CO 5</b>	Study of holography.
<b>C4P</b>	<b>CO 1</b>	Experimental study of interference & diffraction.
	<b>CO 2</b>	Determine the wavelength of sodium light by using Michelson's interferometer, Fresnel Biprism, Newton's Rings also using plane diffraction grating.

### Semester - III

Paper Code & Name	O	u	t	c	o	m	e	s														
<b>CC5</b> (Mathematical Physics)	<b>CO 1</b>	Know	about	Fourier	series	and	study	of its properties														
	<b>CO 2</b>	Understand	Frobenius	Method	and	Special	Functions															
	<b>CO 3</b>	Know	about	concept	of	Some	Special	Integrals														
	<b>CO 4</b>	Introduction	to	Variational	calculus	in	physics															
	<b>CO 5</b>	Partial	Differential	Equations	for	different	method	& symmetry.														
<b>C5P</b>	<b>CO 1</b>	Introduction	to	Numerical	computation	using	numpy	and	scipy													
	<b>CO 2</b>	Basic	study	of	Curve	fitting,	Least	square	fit,	Goodness	of	fit,	standard	deviation								
	<b>CO 3</b>	Solution	of	Linear	system	of	equations	by	Gauss	elimination	method	and	Gauss	Seidal	method.							
	<b>CO 4</b>	Generation	of	Special	functions	using	User	defined	functions													
	<b>CO 5</b>	Solution	of	ODE	First	order	Differential	equation	Euler,	modified	Euler	and	RungeKutta	second	order	methods	Second	order	differential	equation	Fixed	difference

<b>CC6</b> <b>(Thermal Physics)</b>	<b>C6T</b>	<b>CO1</b>	Introduction to Thermodynamics & its several laws and application. Concept of temperature, entropy & absolute zero.
		<b>CO2</b>	Thermodynamics potential. Know about the concept of free energy & phase transition of thermo-dynamical system.
		<b>CO3</b>	M a x w e l l ' s T h e r m o d y n a m i c R e l a t i o n s
		<b>CO4</b>	Study of Kinetic theory of gases & different distribution law of ideal gases. Also know about the behavior of real gas.
<b>C6P</b>		<b>CO1</b>	Determine the Coefficient of Thermal Conductivity by Searle's Apparatus, Angstrom's Method, Lee and Charlton's disc method.
		<b>CO2</b>	Determine the Temperature Coefficient of Resistance by Platinum Resistance Thermometer (PRT),
		<b>CO3</b>	Study of Thermo-Emf of a Thermocouple and measure temperature in a specified Range.
<b>C C 7</b> <b>(Digital Systems and</b>	<b>C7T</b>	<b>CO1</b>	Basic idea of SSI, MSI, LSI and VLSI, Classification of ICs. Examples of Linear and Digital ICs.
		<b>CO2</b>	Learning about digital circuits & different logic gates also solve it by Boolean algebra.
		<b>CO3</b>	Concept of different integrated circuit like Timers, Shiftregisters, Counters (4 bits),
		<b>CO4</b>	Know about the concept of memory storage, RAM, ROM etc.
<b>C7P</b>		<b>CO1</b>	Learning the use of CRO & design the different gates.
		<b>CO2</b>	Use of adder and subtractor, counter, shift register , 555 Timer.
<b>SEC-1</b> <b>(Electrical Circuits</b>	<b>SEC1T</b>	<b>CO1</b>	Understand basic electricity Principles, ohm's law.
		<b>CO2</b>	U n d e r s t a n d i n g E l e c t r i c a l C i r c u i t s .
		<b>CO3</b>	Know the concept of Generators and Transformers.
		<b>CO4</b>	Knowledge about electric motors, solid state device & wirings.

## Semester - IV

Paper Code & Name	O u t c o m e s		
<b>C C 8</b> <b>(Mathematical Physics)</b>	<b>C8T</b>	<b>CO1</b>	Study of Complex analysis of complex number.
		<b>CO2</b>	Introduction of fourier transform & application in case of differential equations.
		<b>CO3</b>	Know about concept of Matrices & its several properties.
		<b>CO4</b>	C o n c e p t o f e i g e n v a l u e & e i g e n v e c t o r .
<b>C8P</b>		<b>CO1</b>	S o l v e d i f f e r e n t i a l e q u a t i o n s .
		<b>CO2</b>	Frobenius method & Plot of special functions.
		<b>CO3</b>	Calculation of least square fitting manually and error analysis.

<b>CC9</b> <b>(Elements of Mod</b>  <b>C9T</b>	<b>CO1</b>	Concept of quantization through plank law & black body radiation also a brief study of wave particle duality.
	<b>CO2</b>	Study of Heisenberg uncertainty via two slit interference experiment with photons, atoms and particles.
	<b>CO3</b>	Study of rigid box- energy eigenvalues and eigenfunctions.
	<b>CO4</b>	Study of radioactivity, fusion & fission method.
<b>C9P</b>	<b>CO1</b>	Determination of plank constant, work function, wavelength of H-alpha emission line of Hydrogen atom, absorption lines in the rotational spectrum of Iodine vapour.
	<b>CO2</b>	Determination of the wavelength of laser source using diffraction of single slits & double slit experiment.
<b>C C 1 0</b> <b>(Analog Systems a</b>  <b>C10T</b>	<b>CO1</b>	Study of semiconductor diodes and know the Conductivity and Mobility,
	<b>CO2</b>	Two-terminal Devices and their Applications
	<b>CO3</b>	Understand Bipolar Junction transistors, Field Effect transistors.
	<b>CO4</b>	Basic principle amplifier.
<b>C10P</b>	<b>CO1</b>	V-I characteristics of PN junction diode, and Light emitting diode, Zener diode, solar cells.
	<b>CO2</b>	Judge the quality of commercial product
<b>SEC2</b> <b>(Computational p</b>  <b>SEC2T</b>	<b>CO1</b>	Importance of computers in Physics, paradigm for solving physics problems for solution.
	<b>CO2</b>	Basic idea of Scientific Programming.
	<b>CO3</b>	Scientific word processing: Introduction to LaTeX& visualization.
<b>SEC2P</b>	<b>CO1</b>	Exercises on syntax on usage of FORTRAN; To print out all natural even/ odd numbers between given limits, To find maximum, minimum and range of a given set of numbers.
	<b>CO2</b>	Usage of GUI Windows, Linux Commands, familiarity with DOS commands
<b>SEC-2</b> <b>(Basic Instrumenta</b>	<b>CO1</b>	Idea about Basic of Measurement.
	<b>CO2</b>	Introduction of Electronic Voltmeter, Cathode Ray Oscilloscope, Signal Generators and Analysis Instruments, Impedance Bridges & Q-Meters, Digital Instruments, Digital Multimeter.
<b>S E C - 2 P</b>	<b>CO1</b>	Use of an oscilloscope, CRO, Digital multimeter/VTVM for measuring voltages, Balancing of bridges, Winding a coil / transformer.
	<b>CO2</b>	Circuit tracing of Laboratory electronic equipment & Trouble shooting a circuit.

## Semester - V

Paper Code & Name	O	u	t	c	o	m	e	s
<b>CC11</b> <b>(Quantum Mechar</b>  <b>C11T</b>	<b>CO1</b>	Discussion about time dependent and independent Schrodinger equation.						
	<b>CO2</b>	General discussion of bound states in an arbitrary potential						
	<b>CO3</b>	Solution of Hydrogen atom & wave function by Frobenius method ;						
	<b>CO4</b>	Study of Atoms in Electric & Magnetic Fields ie, Paschen Back and Stark Effect, Normal and Anomalous Zeeman Effect.						
	<b>CO5</b>	Study of Spin-orbit coupling in atoms - L- S and J-J couplings also discussed about pauli exclusion principle, Hunds rule.						
<b>C11P</b>	<b>CO1</b>	Solve the s-wave Schrodinger equation for the ground state and the first excited state of the hydrogen atom.						
	<b>CO2</b>	Solve the s-wave radial Schrodinger equation for an atom.						
<b>CC12</b> <b>(Solid State Physic</b>  <b>C12T</b>	<b>CO1</b>	B a s i c i d e a a b o u t c r y s t a l s t r u c t u r e						
	<b>CO2</b>	Elementary Lattice Dynamics ie, vibration & concepts of phonons.						
	<b>CO3</b>	Understand the magnetic properties of matter.						
	<b>CO4</b>	Know the concept of Dielectric Properties of Materials.						
	<b>CO5</b>	Discussion about Ferro electric Properties of Materials						
	<b>CO6</b>	Discussion about elementary band theory and Superconductivity.						
<b>C12P</b>	<b>CO1</b>	To measure the Magnetic susceptibility of Solids, the Dielectric Constant of a dielectric Materials with frequency, the resistivity of a semiconductor (Ge) with temperature by four-probe method (room temperature to 150 o C) and to determine its band gap.						
	<b>CO2</b>	To determine the Hall coefficient of a semiconductor sample.						
<b>D S E - 1</b> <b>(Classical Dynamic</b>  <b>DSE1T</b>	<b>CO1</b>	Know the concept of Classical Mechanics of Point Particles, Recap of Lagrangian and Hamiltonian mechanics.						
	<b>CO2</b>	S t u d y o f S m a l l A m p l i t u d e O s c i l l a t i o n s .						
	<b>CO3</b>	U n d e r s t a n d i n g o f S p e c i a l T h e o r y o f R e l a t i v i t y .						
	<b>CO4</b>	A s t u d y o n F l u i d D y n a m i c s						
<b>DSE - 2</b> <b>(Nuclear and Parti</b>  <b>DSE2T</b>	<b>CO1</b>	Understand the General Properties of Nuclei and nuclei model.						
	<b>CO2</b>	Know the concept of Radioactivity decay & nuclear reaction.						
	<b>CO3</b>	Interaction of Nuclear Radiation with matter & different detector to measure it.						
	<b>CO4</b>	Introduction to particle physics & particle accelerator.						

## Semester - VI

Paper Code & Name	O	u	t	c	o	m	e	s
<b>CC13</b> (Electromagnetic T  <b>C13T</b>	<b>CO1</b>	S	t	u	d	y	o	f
	<b>CO2</b>	S	t	u	d	y	o	f
	<b>CO3</b>	U	n	d	e	r	s	t
	<b>CO4</b>	S	t	u	d	y	w	a
<b>C13P</b>	<b>CO1</b>	T	o	v	e	r	i	f
	<b>CO2</b>	T	o	d	e	r	m	i
<b>CC14</b> (Statistical Mecha  <b>C14T</b>	<b>CO1</b>	K	n	o	w	t	h	e
	<b>CO2</b>	U	n	d	e	r	s	t
	<b>CO3</b>	S	t	u	d	y	a	b
<b>C124P</b>	<b>CO1</b>	V	e	r	i	f	y	B
	<b>CO2</b>	D	e	t	e	r	m	i
DSE-3 (Communicatio-n electronics)  <b>DSE3T</b>	<b>CO1</b>	I	n	t	r	o	d	u
	<b>CO2</b>	K	n	o	w	t	h	e
	<b>CO3</b>	K	n	o	w	t	h	e
	<b>CO4</b>	K	n	o	w	t	h	e
	<b>CO5</b>	U	n	d	e	r	s	t
<b>DSE3P</b>	<b>CO1</b>	T	o	d	e	s	i	g
	<b>CO2</b>	T	o	s	t	u	d	y
<b>DSE3P</b>	<b>CO3</b>	T	o	s	t	u	d	y
	<b>CO4</b>	T	o	s	t	u	d	y
<b>DSE – 4</b> (Experimental te  <b>DSE4T</b>	<b>CO1</b>	K	n	o	w	t	h	e
	<b>CO2</b>	K	n	o	w	i	n	g
	<b>CO3</b>	U	n	d	e	r	s	t
	<b>CO4</b>	D	i	g	i	t	a	l
	<b>CO5</b>	U	n	d	e	r	s	t

<b>DSE4P</b>	<b>CO1</b>	Determine output characteristics of a LVDT & measure displacement using LVDT
	<b>CO2</b>	M e a s u r e m e n t o f S t r a i n u s i n g S t r a i n G a u g e



## Department of Physiology

### Garhbeta College

Garhbeta:PaschimMedinipur :: 721127 West Bengal

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#### Programme Outcome (PO) For B.Sc. Hons.

PO	Description
PO1	Demonstrate knowledge and understanding of the fundamental concepts in all areas of science
PO2	Demonstrate critical thinking analytical reasoning and judgment in identifying and solving specific problems with intellectual independence
PO3	Design and carry out scientific experiments as well as accurately record and analyse the result of the experiments
PO4	Demonstrate communication skills to present a clear, coherent and independent expression of knowledge and ideas
PO5	Develop the ability to communicate scientific information and research results in written and oral formats
PO6	Demonstrate understanding of the interconnections of knowledge within and across disciplines
PO7	Apply knowledge, theories methods and practices in their chosen field of study to address real-world challenges and opportunities
PO8	Inculcate the ability to find jobs in different fields like teaching, banking, industry and also in different fields of higher study and research
PO9	Accomplish a nature of lifelong learning to acquire the ability of grasping any scientific text in the broadest context of scientific development
PO10	Demonstrate sensitivity and readiness to share their knowledge, experience and capabilities with the marginalized and oppressed in their communities

## Programme Specific Outcome (PSO) For B.Sc. Hons.in Physiology

PSO	Description
PSO1	Students will study and acquire complete knowledge of disciplinary as well as allied biological sciences
PSO2	Helps students to be more equipped to learn and know about physiological systems, their coordination and control as well as structure and function
PSO3	They are able to correctly use biological instrumentation and proper laboratory techniques
PSO4	Students will be able to qualitatively and quantitatively analyse physiological parameters using various statistical and computational tools used in modern sciences
PSO5	Students will be able to communicate biological knowledge in oral and written form.
PSO6	Learn to maintain healthy working environment in laboratory
PSO7	Students will be able to identify the relationship or synchronization between structure and function at all levels: molecular, cellular, and organismal.
PSO8	Students will be able to apply the scientific method to questions in biology by formulating testable hypotheses, gathering data that address these hypotheses, and analyzing those data to assess the degree to which their scientific work supports their hypotheses.
PSO9	Acquired skills in diagnostic testing, hematology, histopathology, staining procedures etc. used in clinical and research laboratories will provide them opportunity to work in diagnostic or research laboratory.
PSO10	Demonstrate knowledge for betterment of our daily life

## COURSE OUTCOME (CO) FOR THE ACADEMIC YEAR 2021-2022

**Name of the Course: B.Sc. Honours. In Physiology**

**Core Course: Physiology**

**Semester - I**

Paper Code & Name	Outcomes	
<b>CCI (Cellular Basis of Physiology)  C1T</b>	<b>CO1</b>	Know the basic of structure and function of prokaryotic & eukaryotic cells: Structure of plasma membrane –Bio-chemical components, arrangement & Functions
	<b>CO2</b>	Understands the structure and function of different cellular organelles
	<b>CO3</b>	Know the structure, classification, distribution and functions of different tissues
	<b>CO4</b>	Understand Development and organization of different organs and systems
	<b>CO5</b>	Understand basic principle and use of different microscopes and spectrophotometer
<b>C1P (Histology)</b>	<b>CO1</b>	Study and Identify Stained Sections of different Mammalian Tissue and Organs.
<b>CC2 (Biological Physics and Enzymes)  C2T</b>	<b>CO1</b>	Understand the units for measuring concentration of solute. Bonds and Forces in Bio-molecules.
	<b>CO2</b>	Understand biophysical and biochemical principles, electro kinetic properties, buffers and laws of thermodynamics
	<b>CO3</b>	Understand Nanoparticles and its application in Physiology; Laminar and Streamline flow
	<b>CO4</b>	Know the concepts of enzyme kinetics, structure, regulation & clinical diagnosis
	<b>CO5</b>	Understand flow and pressure and ultracentrifugation
<b>C2P</b>	<b>CO1</b>	Understand oncotic pressure of colloidal solutions
	<b>CO2</b>	Determination of Systolic, Diastolic, Pulse and Mean Blood Pressure
	<b>CO3</b>	Determination of enzyme actions
<b>CC1 (DSC1A)</b>	<b>CO1</b>	Learn about Cellular Physiology and Biophysical Principles

<b>C1T</b> (Cellular Physiology, Biophysical Principles, Biochemistry, Digestive system & Metabolism )		
	<b>CO2</b>	Understand about Biochemistry and Metabolism; Study about digestive system
<b>C1P</b>	<b>CO1</b>	Learn about Examination & staining of fresh tissue
	<b>CO2</b>	Learn about the Identification of permanent slides

## Semester - II

<b>Paper Code &amp; Name</b>	<b>Outcomes</b>	
<b>CC3</b> (Physiology of Nerve & Muscle Cells)	<b>CO1</b>	Understand nerve Cells, Properties, electrical events within the nerve cells; Nerve Fiber Types & Function
	<b>CO2</b>	Understand Skeletal muscle , cardiac muscle, smooth muscle; properties, morphology, Electrical Properties, Mechanical Properties, energy source & Metabolism
<b>C3T</b>	<b>CO3</b>	Study Synaptic & Junctional Transmission; neuromuscular junctions
	<b>CO4</b>	Study about the Initiation of Impulses in Sense Organs& receptors
<b>C3P</b> (Histological Study, Experiment of Nerve and Muscle)	<b>CO1</b>	Isolation and Staining of nerve fibers & muscle fibers
	<b>CO2</b>	Study of Kymograph; Kymographic recording of mechanical responses, effects of variations of temperature and load of gastrocnemius muscle

	<b>CO3</b>	Calculation of work done by the muscle. Determination of nerve conduction velocity
<b>CC4 (Chemistry of Bio-molecules) C4T</b>	<b>CO1</b>	Know about the classification, structure, Properties and Functions of Carbohydrates, Proteins and lipids
	<b>CO2</b>	Understand Structure, types and Function of DNAs and RNAs
<b>C4P (Biological Chemistry)</b>	<b>CO</b>	Qualitative tests for the identification of physiologically important substances
<b>CC4 (DSC1B)  DSC1BT  (Blood, body fluid and immune System, Cardiovascular System and Respiratory System)</b>	<b>CO1</b>	Learning about Blood & Body fluids; immune system
	<b>CO2</b>	Gaining knowledge about the cardiovascular system and respiratory system
<b>DSC1BP</b>	<b>CO1</b>	Acquiring practical knowledge about the hematological experiments
	<b>CO2</b>	Developing practical skills in human experiments

## Semester - III

Paper Code & Name	Outcomes	
<b>CC5</b> <b>(Physical Chemistry)</b>  <b>C5T</b>	<b>CO1</b>	Study about blood ,bone marrow, blood Cells, Immune mechanisms, Blood Types, Plasma, hemostasis & Lymph
	<b>CO2</b>	Understanding about the clinical implications associated with body fluids
<b>C5P</b> <b>(Hematological Experiments)</b>	<b>CO1</b>	Preparation and staining of blood film with Leishman’s stain. Identification of the blood corpuscles
	<b>CO2</b>	Differential count & Total count of RBC and WBC. Determination of Bleeding time and clotting time
	<b>CO3</b>	Hemoglobin estimation. Preparation of haemin crystal, Preparation and staining of bone marrow, Blood group determination.
<b>CC6</b> <b>(Circulation)</b>  <b>C6T</b>	<b>CO1</b>	Study about the Origin of the Heartbeat & the Electrical Activity of the heart; cardiac & systemic diseases
	<b>CO2</b>	Study about the Mechanical Events of the Cardiac Cycle& Cardiac Output
	<b>CO3</b>	Understanding about the Dynamics of Blood & Lymph Flow
	<b>CO4</b>	Understanding Cardiovascular regulatory Mechanisms&Circulation Through special Regions
	<b>CO5</b>	Study role of Cardiovascular Homeostasis in Health & Disease
<b>C6P</b> <b>( Cardiovascular Physiology Experimental)</b>	<b>CO1</b>	Preparation of Amphibian Ringer solution; Kymographic recording of the movements of perfused heart of toad
	<b>CO2</b>	Study of the effects of changes in perfusion fluid pressure, temperature, excess calcium and potassium ion concentration, acetylcholine, adrenaline on the on the movement of heart.
<b>CC7</b> <b>(Functions of the Nervous System)</b>	<b>CO1</b>	Study about the Reflexes; Cutaneous, Deep & Visceral Sensation
	<b>CO2</b>	Learning about theArousal Mechanisms, Sleep, & the Electrical Activity of the Brain
	<b>CO3</b>	Understanding about the functions of the various parts of the brain in Control of Posture & Movement

<b>C7T</b>	<b>CO4</b>	Learning about The Autonomic Nervous System&Central Regulation of Visceral Function
	<b>CO5</b>	Understanding about the Neural Basis of Instinctual Behavior & Emotions; “ Higher Functions of the Nervous System”: Conditioned Reflexes , Learning, & Related Phenomena
<b>C7P (Neurological Experimental)</b>	<b>CO1</b>	Experiments on superficial and deep reflex ;Measurement of grip strength
	<b>CO2</b>	Determination of Reaction time; Short term memory test & Two point discrimination test
<b>SEC-1 (Clinical Biochemistry)</b>	<b>CO1</b>	Photo-colorimetric estimation of blood constituents.
	<b>CO2</b>	Measurement of blood glucose , blood inorganic phosphate, serum total protein, determination albumin globulin ratio, determination of serum amylase
<b>SEC1T</b>		
<b>CC3 (DSC1C)</b>	<b>CO1</b>	Study about nervous system &Nerve-muscle Physiology
	<b>CO2</b>	Learning about Histological structure & functions of skin and body temperature regulation
<b>DSC1CT  (Nerve –Muscle Physiology, Nervous system, Skin and Body Temperature Regulation )</b>	<b>CO1</b>	Learning about the staining of muscle fibers
	<b>CO2</b>	Developing practical skills in neurological experiments
<b>DSC1CP</b>		

### Semester - IV

<b>Paper Code &amp; Name</b>	<b>Outcomes</b>	
<b>CC8 (Energy</b>	<b>CO1</b>	Learning about Energy metabolism, Carbohydrate metabolism,Protein metabolism
	<b>CO2</b>	Understanding Biological oxidation, Fat and cholesterol metabolism

<b>Balance, Metabolism and Nutrition)</b>  <b>C8T</b>	<b>CO3</b>	Building the concept about Reactive Oxygen Species, nutrients, nutraceutical, cosmoceutical, neutrigenomic
	<b>CO4</b>	Study about Biological value of proteins, vitamins and minerals, Human nutrition
<b>C8P (Biochemical Estimation)</b>	<b>CO1</b>	Learning Quantitative estimation of glucose and sucrose
	<b>CO2</b>	Learning Quantitative estimation of amino nitrogen
	<b>CO3</b>	Estimation of percentage quantity of lactose in milk
<b>CC9 (Gastrointestinal Function)</b>  <b>C9T</b>	<b>CO1</b>	Learn the basic concept about Digestion & Absorption of food materials
	<b>CO2</b>	Understanding the Regulation of Gastrointestinal Function, Gastrointestinal hormones
	<b>CO3</b>	Studying the Mechanism, function and regulation of mastication, deglutition, movements of alimentary canal
<b>C9P (Gastrointestinal Function)</b>	<b>CO1</b>	Learning about Dale's Experiments; Kymographic recording of normal movements of rat's intestine
	<b>CO2</b>	Studying the Effects of hypoxia, acetylcholine and adrenaline on normal intestinal movements
<b>CC10 (Respiratory Physiology)</b>  <b>C10T</b>	<b>CO1</b>	Studying about the Pulmonary Function; Anatomy of the lungs, Mechanics of breathing, Gas exchange in the lungs.
	<b>CO2</b>	Learning about the Gas transport between the Lungs & the tissues
	<b>CO3</b>	Understanding the Regulation of Respiration; chemical and neural control
	<b>CO4</b>	Study about the Respiratory adjustments in Health & Respiratory Disease
<b>C10P (Respiratory Physiology)</b>	<b>CO1</b>	Acquiring skills about Measurement of peak expiratory flow rate & Measurement of forced expiratory volume
	<b>CO2</b>	Understanding the Measurement of oxygen saturation by pulse oxymeter
<b>SEC2 (Computer application in Health science)</b>  <b>SEC2T</b>	<b>CO1</b>	Studying the Importance of computer application in biological sciences and medicine
	<b>CO2</b>	Studying about the Brief history of development of computer & its application in health sciences
	<b>CO3</b>	Understand Computer Software & Hardware – types & function.
	<b>CO4</b>	Studying the Application of computer in physiology and medicine, Application of computer in physiological data analysis & in physiological models



	<b>CO5</b>	Learning about the Computer assisted therapy in health science
<b>SEC2P (Computer application in Health science)</b>	<b>CO1</b>	Learning about the Basic operation of computer: data entry, Graphical presentation of data & tabulation of physiological data
	<b>CO2</b>	Understanding the Computation of frequency and percentage distribution of different physiological parameters
	<b>CO3</b>	Learning about the Significance of testing by 't' test with interpretation&Preparation of case history of a patient by using computer
<b>CC4 (DSC-1D)  DSC1DT ( Sensory Physiology, Endocrine and Reproductive System, Renal Physiology)</b>	<b>CO1</b>	Study about Sensory Physiology & Endocrinology
	<b>CO2</b>	Gain knowledge about the reproductive physiology and renal physiology
<b>DSC1DP</b>	<b>CO1</b>	Develop practical skills in Staining and identification of different tissue sections
	<b>CO2</b>	Learn about the estimation of different constituents of urine; sperm count and sperm motility
	<b>CO3</b>	Learn how to determine of visual acuity & colour blindness
<b>SEC-2 (Instrumentation Techniques in Biology )</b>	<b>CO1</b>	Learn about the basics of Microscopy-Features, Working principle, Advantages and limitations; different types of microscopy
	<b>CO2</b>	Study about the different staining methods and optical methods
	<b>CO3</b>	Develop understanding about the different methods of chromatography ; Biotechnology and Immunological techniques

## Semester - V

Paper Code & Name	Outcomes	
<b>CC11 (Sensory Physiology)  C11T</b>	<b>CO1</b>	Study of the Classification of general and special senses and their receptors
	<b>CO2</b>	Understanding about the neural pathway of touch, pressure, pain, thermal and kinesthetic sensation
	<b>CO3</b>	Acquiring knowledge about the vision, visual pathway, and the various biological mechanisms associated with vision
	<b>CO4</b>	Learning about the Hearing & Equilibrium, sound waves , auditory pathway and disorders associated with the mechanisms
		Study about the Smell & Taste: Receptors, Pathways, Physiology of Taste & Features of Taste sensation
<b>C11P (Histological and Human Experiments)</b>	<b>CO1</b>	Studying Principles of fixation and staining
	<b>CO2</b>	Learning to Determine visual acuity& color blindness
	<b>CO3</b>	Learning about how to map the peripheral field of vision with perimeter & Mapping of physiological blind spot
	<b>CO4</b>	Understanding Recording of auditory and visual reaction time & Exploration of conductive and perceptive deafness
<b>CC12 (Endocrinology)  C12T</b>	<b>CO1</b>	Understanding the Concept of endocrine systems, glands, hormones Types of endocrine glands Experimental and clinical methods of study of endocrine glands.
	<b>CO2</b>	Studying the Morphology, structure, function, and regulation of pituitary gland
	<b>CO3</b>	Learning about the Anatomical considerations, Electron microscopic structure, functions of thyroid gland and thyroid hormones; diseases associated with thyroid gland
	<b>CO4</b>	Knowing about the Hormonal Control of Calcium Metabolism & the Physiology of Bone
	<b>CO5</b>	Acquiring knowledge about the Adrenal Medulla & Adrenal Cortex:
	<b>CO6</b>	Understanding the Endocrine Functions of the Kidneys, Heart, & Pineal Gland
	<b>CO7</b>	Studying Endocrine Functions of the Pancreas & the Regulation of Carbohydrate Metabolism

<b>C12P (Endocrinology)</b>	<b>CO1</b>	Gathering skills about Fixation, staining and identification of endocrine glands
	<b>CO2</b>	Studying the effects of oxytocin & adrenaline on uterine contraction of albino rat
	<b>CO3</b>	Learning to Estimate estrogen by spectrophotometric method & plasma level of any hormone using ELISA
<b>DSE - 1 (Biostatistics)</b>  <b>DSE1T</b>	<b>CO1</b>	Studying about the Scope of statistics – utility and misuse, Principles of statistical analysis of biological data
	<b>CO2</b>	Knowing about the Basic concepts – variable, Population and sampling -- parameter, Presentation of data
	<b>CO3</b>	Understanding about the statistical tabulation and presentation of data and various statistical methods of data analysis
	<b>CO4</b>	Learning about Degrees of freedom, probability. Normal distribution
	<b>CO5</b>	Testing of hypothesis Distribution-free test - Chi-square test. Linear correlation and linear regression
<b>DSE1P (Biostatistics)</b>	<b>CO1</b>	Learning about the Computation of mean, median, mode, standard deviation and standard error, of the physiological data of human subjects
	<b>CO2</b>	Studying about Graphical representation of data in frequency polygon and histogram, Student's t test
	<b>CO3</b>	Understanding about Statistical analysis and graphical representation of biological data with computer application program
<b>DSE - 2 (Sports Physiology, Work Physiology and Ergonomics)</b>  <b>DSE2T</b>	<b>CO1</b>	Learning the Concepts of physical work and physiological work
	<b>CO2</b>	Studying about the Exercise & Performance, affecting factors and associated tests
	<b>CO3</b>	Building concepts about Physical Training: General principles and different methods, sports nutrition
	<b>CO4</b>	Knowing Basic concepts of sports psychology, Sports Biochemistry, Ergogenic aids & Dietary supplement
	<b>CO5</b>	Studying Ergonomics – Basic concepts and its application in industry to improve efficiency; Occupational diseases
	<b>CO6</b>	Understanding Anthropometry and its implication in general; Sports Anthropometry
<b>DSE2P</b>	<b>CO1</b>	Learning Measurements of resting and working heart rate using thirty beats and ten beats methods; Measurement of blood pressure
	<b>CO2</b>	Developing practical skills about the Determination of Physical Fitness Index, recording of recovery heart rate after standard exercise, cardiac cost of specific work, VO <sub>2</sub> max, endurance time
	<b>CO3</b>	Learning the Measurement of some common anthropometric parameters

	<b>CO4</b>	Learning Determination of body surface area, Body Mass Index & body fat percentage
<b>DSE -1A</b> <b>DSE -1AT</b> <b>(Sports Physiology, Work Physiology and Ergonomics)</b>	<b>CO1</b>	Learning the Concepts of physical work and physiological work ; Studying about the Exercise & Performance, affecting factors and associated tests
	<b>CO2</b>	Building concepts about Physical Training: General principles and different methods, sports nutrition
	<b>CO3</b>	Studying Ergonomics – Basic concepts and its application in industry to improve efficiency; Occupational diseases
<b>DSE1AP</b>	<b>CO1</b>	Learning Measurements of resting and working heart rate using thirty beats and ten beats methods; Measurement of blood pressure
	<b>CO2</b>	Developing practical skills about the Determination of Physical Fitness Index, recording of recovery heart rate after standard exercise, cardiac cost of specific work, VO2 max, endurance time
	<b>CO3</b>	Learning the Measurement of some common anthropometric parameters
<b>SEC- 3 (Maternal and Child Nutrition)</b>		Develop concepts about the nutritional management during pregnancy, child care management; child nutrition policy programs

## Semester - VI

<b>Paper Code &amp; Name</b>	<b>Outcomes</b>	
<b>CC13 (Reproductive Physiology, Embryology and Chronobiology)</b>  <b>C13T</b>	<b>CO1</b>	Learning about the general concepts of Reproductive physiology
	<b>CO2</b>	Knowing about the anatomy, control & functions of Male & Female Reproductive System
	<b>CO3</b>	Studying about Pregnancy: Fertilization and the establishment of pregnancy , Hormonal control ,Placenta formation ,Pregnancy tests, Parturition
	<b>CO4</b>	Studying about Lactation and Mammary gland: structure , function; milk ejection reflex

	<b>CO5</b>	Understanding Reproductive Health , Reproductive Genetics, Human Genetics and Human Reproductive Disorders
	<b>CO6</b>	Building concepts about Embryology& Chronobiology
<b>C13P (Reproductive Physiology, Embryology and Chronobiology)</b>	<b>CO1</b>	Study of estrous cycle; Tissue fixation, microtomy , slide preparation
	<b>CO2</b>	Examination of histological sections of permanent slides of rat/human
	<b>CO3</b>	Pregnancy test from human urine;Sperm count, sperm motility test in rat
	<b>CO4</b>	Study of circadian functions in humans
	<b>CO5</b>	Project work on assessment of individual differences in human circadian rhythmsby questionnaire method
<b>CC14 (Renal Physiology, Skin and Body Temperature Regulation, Biomedical Instrumentation)  C14T</b>	<b>CO1</b>	Gaining general concepts about Renal Physiology- structure and function of kidney
	<b>CO2</b>	Learning about the Mechanism of urine formation, Constituents of urine, Disorders of Renal Functions
	<b>CO3</b>	Study the Physiology of Urinary bladder, urine storage and micturation, neural controls
	<b>CO4</b>	Acquiring knowledge about Skin and Body Temperature Regulation
	<b>CO5</b>	Study about the Biomedical basis of Diseases&Basics of Biomedical Instrumentation
	<b>CO6</b>	Building concepts about Medical diagnostic techniques related equipment& Biomedical instruments
	<b>CO7</b>	Acquiring knowledge about Optics, Fiber Optics, Diathermy equipment, Audiometer and Laser; Application of computer in Biomedical field, Biotelemetry, Physiological modeling-
<b>C124P</b>	<b>CO1</b>	Learning Tissue fixation, embedding in paraffin, microtomy, slide preparation
	<b>CO2</b>	Identification for normal &abnormal or pathological constituents of urine
	<b>CO3</b>	Learning Tests for urinary deposits, Detection of specific gravity of urine

	<b>CO4</b>	Learning how to Estimate albumin, urea & total phosphates in urine
	<b>CO5</b>	Knowing how to Study the skin to blunt injury - triple response
<b>DSE - 3 (Microbiology and Biotechnology)</b>  <b>DSE3T</b>	<b>CO1</b>	Learning about the Viruses: structure, lytic & lysogenic cycle; Viroids and Prions
	<b>CO2</b>	Studying Bacteria: structure, classification; Staining :- Principle , procedure; Understanding Bacterial metabolism: pathways
	<b>CO3</b>	Study about the Antibiotics, bacteriostatic & bactericidal agents, Bacteriolytic agents
	<b>CO4</b>	Building Concepts about antiseptic, probiotics and prebiotics; Basic idea about medical bacteriology, mycology, Food microbiology
	<b>CO5</b>	Understanding Environmental Microbiology: Role of microbes in Bio-geo chemical cycle
	<b>CO6</b>	Study History and importance DNA and RNA. Gene, Genome and Genetic code
	<b>CO7</b>	Learning Recombinant DNA technology: concepts, techniques and application
	<b>CO8</b>	Understanding various methods and techniques used in biotechnology; Physiology and biotechnology process
	<b>CO9</b>	Learning about Bio-pesticides, bio-plastics, biosensors, biochips; Bio-safety and intellectual property Rights
<b>DSE3P</b>	<b>CO1</b>	Learning about disinfection and sterilization techniques; Culture procedure and isolation of bacteria; Biochemical characterization of microorganisms
	<b>CO2</b>	Gaining practical skills about various staining techniques of bacteria ; Bacterial spore staining; Isolation of DNA from blood and microbial culture
<b>(Microbiology and Biotechnology)</b>	<b>CO3</b>	Acquiring skills about Separation of DNA, Extraction of DNA& Quantification of DNA; Quantification of protein
	<b>CO4</b>	Understanding various biochemical techniques and processes in biotechnology
<b>DSE- 4  (Patho- physiological Basis of Diseases)</b>  <b>DSE4T</b>	<b>CO1</b>	Study about the History of pathology, Basic definitions and common terms used in pathology, scope and techniques used.
	<b>CO2</b>	Building concepts about Cell Injury and responses of cells: Cellular Adaptations and Cell Death
	<b>CO3</b>	Learning the Role of inflammation in disease & Role of tissue repair healing and fibrosis
	<b>CO4</b>	Study about Common Hemodynamic Disorders & Nutritional diseases
	<b>CO5</b>	Acquiring knowledge about Cancer biology & discussion about Infectious diseases epidemiology
	<b>CO1</b>	Learning about Urine analysis; Measuring Erythrocyte Sedimentation Rate

<b>DSE4P (Patho- physiological Basis of Diseases)</b>	<b>CO2</b>	Gaining skills of Tissue Processing and preparation of permanent histological slide
	<b>CO3</b>	Indulge in Study of histological slides of various pathological conditions; Diagnostic tests for detection of various diseases
	<b>CO4</b>	Learning about PCR based techniques & Physiological data acquisition
<b>DSE-1B  DSE1BT  (Clinical Hematology)</b>	<b>CO1</b>	Study about different types of anemia; Laboratory investigation and management
	<b>CO2</b>	Learn about different blood cells; Hemostasis and Coagulation
	<b>CO3</b>	Learn about blood groups and develop theoretical knowledge about different hematological experiments
<b>DSE1BP</b>	<b>CO1</b>	Learn how to determine PCV, ESR, total RBC count and WBC count reticulocyte count, blood group
	<b>CO2</b>	Develop practical skills about the staining and isolation of different blood cells
<b>SEC-4  (Health Psychology, Physiology of stress and Stress Management)</b>	<b>CO1</b>	Learn about health psychology, health behavior; Barriers to health behavior; Theories of health behavior and their implications.
	<b>CO2</b>	Study about the Physiology of Stress and stress management

## GARHBETA COLLEGE

### DEPARTMENT OF SANSKRIT

#### Report Of

#### Program out comes, Program Specific outcomes & Course outcomes

### PROGRAM OUTCOMES

Program outcomes	Description
Program Outcome -1 Developing intellectual ability	Translator, grammar, prose, poet, drama, short story, criticisms, study in Indian and western literature, language knowledge.
Program Outcome -2 Communication skills	Ensuring high standard of Behavioral attitude through literary Subjects and shaping the students, social responsible citizens, Human values, social injustice, women & Dali sensation.
Program Outcome -3 Job opportunity	Jyotishi, Priest, Researcher, Social service, Science & Technology, Professor, Editor, Anchor, Reporter, Writer, school teacher, Higher education, competitive examination.

### PROGRAMME SPECIFIC OUTCOMES

- 1.It gives importance on the inheritance of great cultural heritage of India, which gives a broader vision to the learners to understand their life.
- 2.The syllabus gives an overall idea of Sanskrit literature and provides the students the information of History of Sanskrit literature.



- 3. It acquaints the learners with the preliminary concepts of various disciplines like the Vedic literature, Epic literature, Philosophy, Medical science, Vedic Mathematics, Vastu Sastra, Poetics, etc.
- 4. The knowledge of Philology gives opportunity to the learners to know the linguistic patterns as well as socio-cultural conditions of various linguistic groups.
- 5. It prepares the students to face the examination and the challenges of real life as well.
- 6. The information and knowledge, incorporated in the ancient texts inspire the students for interdisciplinary research activities, which lead to the sustainable development of the nation.
- 7. It acquaints the learners with the technical and scientific literature in Sanskrit. The technical literature comprises Poetics, Rhetoric, Prosody, etc.
- 8. The lessons on Sanskrit Grammar give a solid foundation to learn the structure of Sanskrit language.
- 9. The learners are acquainted with the basic information on Computer.
- 10. It possesses all the potentialities to develop human resources as it inculcates the spirit of ethical values,

## COURSE OUTCOMES

### B.A. ( HONS. ) PROGRAM

SEM-1	Course Code	Course Name	Course Outcome
	CC-1	Classical Sanskrit Literature(Poetry)	<p>1. This course aims to get students acquainted with Classical Sanskrit Poetry.</p> <p>2. This course provides the students the information of History of Sanskrit literature, especially the development of Sanskrit literature.</p> <p>3. The course also seeks to help students to negotiate texts independently.</p>
	CC - 2	Critical Survey of Sanskrit Literature	<p>1. This course aims to get acquainted the students with the journey of Sanskrit literature from Vedic literature to Purāna.</p> <p>2. It also intends to give an outline of different Śāstric traditions, through which the students will be able to know the different genres of Sanskrit Literature and Śāstras.</p>

SEM-2	Course Code	Course Name	Course Outcome
	CC -3	Classical Sanskrit Literature (Prose)	<p>1. This course aims to acquaint students with comprehensive information of Classical Sanskrit Prose literature. Origin and development of prose, Important prose romances and fables Sanskrit, etc., have also been included here to acquaint the students with the history of Sanskrit Prose literature.</p> <p>2. Besides the information of history this course also seeks to help students to select the Sanskrit texts for independent literary study.</p>
	CC - 4	Self-Management in the Gītā	<p>1. The objective of this course is to study the philosophy of self-management in the Śrīmadbhagavadgītā.</p> <p>2. This course helps the students for creative writing and analytical study.</p> <p>3. This also guides the students to find out the relevance of Śrīmadbhagavadgītā in present context.</p> <p>4. It helps the students to understand the broader perspective of life.</p> <p>5. It helps the students to know various ways of maintaining balance between thought and action</p>

SEM-3	Course Code	Course Name	Course Outcome
	CC-5	Classical Sanskrit Literature (Drāmā)	<p>1. This course aims to acquaint students with three most famous dramas of Sanskrit literature which represent three stages in the growth of Sanskrit drama.</p> <p>2. Mudrārāksasa of Vishakhadatta is a drama, written on the political background which acquaints the students with a different genre of Sanskrit drama.</p>
	CC-6	Poetics and literary criticism	<p>1. The study of Sāhityaśāstra (Sanskrit Poetics) embraces all poetic arts and includes concepts like alamkāra, rasa, rīti, vakrokti, dhvani, aucitya etc.</p> <p>2. The entire domain of Sanskrit poetic has flourished with the topics such as definition of poetry and divisions, functions of word and meaning, theory of rasa and alamkāra (figures of speech) and chandas (metre), etc.</p> <p>All these familiarize the students with the fundamental technical structures of Sanskrit literature.</p> <p>3. This develops capacity for creative writing and literary appreciation.</p>
	CC -7	Indian Social Institutions and Polity	<p>Social institutions and Indian Polity have been highlighted in Dharma- śāstra literature. The aim of this course is to make the students acquainted with various aspects of social institutions and Indian polity as propounded in the ancient Sanskrit texts such as Samhitās, Mahābhārata, Purāna, Kautilya's Arthaśāstra and other works known as Nītiśāstra.</p>
	SEC - 1	Acting and Script Writing	<p>The acting is connected with the practical aspect of the play and depends on actor while script writing is closely related with society and this paper aims at teaching the theoretical aspect of this art. The training of composition and presentation of drama can further enhance one's natural talent. This paper deals with the rules of presentation of play (acting) and dramatic composition (script writing) and aims at sharpening the dramatic talent of the students.</p>

SEM-4	Course Code	Course Name	Course Outcome
	CC-8	Indian Epigraphy, Paleography and Chronology	<p>1. This course aims to acquaint the students with the epigraphical journey in Sanskrit, the only source which directly reflects the society, politics, geography and economy of the time.</p> <p>2. The course also seeks to help students to know the different styles of Sanskrit writing.</p>
	CC-9	Modern Sanskrit Literature	The purpose of this course is to expose students to the rich & profound tradition of modern creative writing in Sanskrit, enriched by new genres of writing.
	CC- 10	Sanskrit and World Literature	This course is aimed to provide information to students about the spread & influence of Sanskrit literature and culture through the ages in various parts of the world in medieval & modern times.
	SEC - 2	Sanskrit Meter and Music	<p>1. This course is aimed to provide information to students about the vedic and classical chandas and music method of Sanskrit literature and culture through the ages.</p> <p>2. This also aimed to gain knowledge of chandas and music in the modern age through this vedical meter and music.</p>

SEM-5	Course Code	Course Name	Course Outcome
	CC-11	Vedic Literature	This course on Vedic literature aims to introduce various types of Vedic texts. Students will also be able to read one Upanisad, namely, Mundaka, where primary Vedānta-view is propounded.
	CC-12	Sanskrit Grammar	To acquaint the students with general Sanskrit Grammar.
	DSE - 1	Art of Balanced Living	1. This Course will help the students to gain knowledge about how to present themselves. 2. This also helps to know how to concentrate . 3. This will also help to refine their behaviour.
	DSE - 2	Theatre and Dramaturgy in Sanskrit	Objective of this course is to introduce Principles and practices of Indian Theatre to students.

SEM-6	Course Code	Course Name	Course Outcome
	CC-13	Indian Ontology and Epistemology	1. This course aims to get the students acquainted with the cardinal principles of the Nyāya-Vaiśeṣika philosophy through the Tarkasamgraha and to enable students to handle philosophical texts in Sanskrit. 2. It also intends to give them an understanding of essential aspects of Indian Philosophy
	CC-14	Sanskrit Composition and Communication	This paper aims at teaching composition and other related information based on Laghusiddhāntakaumudī Vibhaktiyartha Prakaraṇa .
	DSE - 3	Sanskrit Linguistic	This course will introduce Sanskrit language from the linguistic point of view like Phonology, Morphology, Semantics, and Syntax etc. Sanskrit is also the main language required to understand PIE (Proto Indo European) linguistics.

	<b>DSE - 4</b>	<b>Fundamental Of Ayurveda</b>	<b>Ayurveda is a traditional Indian system of healthcare that has been traced back as early as 5,000 BCE. Through the classroom lectures and discussions, this course will introduce students to the theory of Ayurveda. The theory modules sessions that make up this course offer an introduction to Ayurveda that is well rounded, comprehensive and useful for students in their own day-to-day living. The major objective is to understand the basic principles and concepts of preventative medicine and health maintenance, diet and nutrition, usage of commonly used spices and herbs and outline of Ayurvedic therapeutic procedures in Ayurveda.</b>
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### **GENERIC ELECTIVE PAPERS**

<b>SEM</b>	<b>Course Code</b>	<b>Course Name</b>	<b>Course Outcome</b>
<b>SEM - 1</b>	<b>GE - 1</b>	<b>Basic Sanskrit</b>	<b>1. Students will acquire basic knowledge of the Sanskrit language . 2. They will be able to communicate in simple Sanskrit. 3. They will develop an interest in Sanskrit and the Bhagwadgita and they will be motivated to study further.</b>
<b>SEM - 2</b>	<b>GE – 2</b>	<b>Sanskrit and other Modern Indian Languages</b>	<b>Students will acquire knowledge of the Sanskrit language and other modern Indian languages. By which they will be able to communicate through many languages.</b>
<b>SEM – 3</b>	<b>GE – 3</b>	<b>Fundamentals of Indian Philosophy</b>	<b>This course aims to get the students acquainted with the basic approach to study Indian philosophy. It also intends to give an elementary understanding of Indian Philosophy and to enable students to handle philosophical texts in Sanskrit easily.</b>

SEM – 4	GE – 4	Basic Principles Of Indian Medicine System(Ayurveda)	<p>Āyurveda is a traditional Indian system of healthcare that has been traced back as early as 5,000 BCE. Through the classroom lectures and discussions, this course will introduce students to the theory of Āyurveda. The theory modules sessions that make up this course offer an introduction to Āyurveda that is well rounded, comprehensive and useful for students in their own day-to-day living. The major objective is to understand the basic principles and concepts of preventative medicine and health maintenance, diet and nutrition, usage of commonly used spices and herbs and outline of Āyurvedic therapeutic procedures in Āyurveda.</p>
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### B.A . ( GENERAL ) PROGRAM

SEM	Course Code	Course Name	Course Outcome
SEM - I	DSC- 1A	Sanskrit Poetry	This course aims to get the students acquainted with the Classical Sanskrit Poetry. It also intends to give an understanding of literature, through which students will be able to understand the basics of Sanskrit. The course also seeks to help the students negotiate the text independently with the help of Proficiency of Sanskrit.
SEM - 2	DSC -2A	Sanskrit Prose	This course aims to acquaint the students with the Classical Sanskrit Prose literature. One of the most famous prose texts of modern era, namely Śivarājvijayam is also included here for the students to get acquainted with the beginnings of modern Sanskrit literature. The course also seeks to help students negotiate the text independently with the help of Proficiency of Sanskrit.
SEM – 3	DSC- 1C	Sanskrit Drama	This course aims to acquaint the students with two most famous dramas of Sanskrit literature, which not only reflect poetic excellence but also depict contemporary society and highlight human values.

SEM – 4	DSC -1D	Sanskrit Grammar	<p>1. This course aims to get students to learn the basics of Sanskrit grammar through Laghusiddhāntakaumudī based Samjñā, Sandhi and Vibhakti prakarana.</p> <p>2. Students will be able to learn the application of Pānini's sutras.</p>
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#### DISCIPLINE SPECIFIC ELECTIVES

SEM – 5	DSE- 1A	Philosophy, Religion & Culture in Sanskrit Tradition	Indian philosophical tradition advocates an integrated approach to human personality where material and psychological growth complement each other. This course seeks to introduce some theoretical concepts and practical techniques for development of the human person.
SEM - 6	DSE-2B	Literary Criticism	This course aimed to develop capacity for creative writing and literary appreciation.

#### SKILL ENHANCEMENT COURSE

SEM	Course Code	Course Name	Course Outcome
SEM - 3	SEC - 1	Indian Architecture System	This section deals with the fundamental principles of the science of Architecture (Vastushastra). The students will become aware of the synchronization of five elements (Mahabhutas) in constructions.
SEM - 4	SEC - 2	Yogasutra of Patanjali	This course aimed to grow awareness about yoga and it will help the students to grow their mental and physical ability.
SEM - 5	SEC - 3	Basic Elements of Jyotish	This course will help the students to grow their knowledge about ancient jyotish system, human body & environment .



**GENERAL ELECTIVE COURSE**

<b>SEM</b>	<b>Course Code</b>	<b>Course Name</b>	<b>Course Outcome</b>
<b>SEM - 5</b>	<b>GE - 1</b>	<b>Nationalistic Thoughts in Sanskrit Literature</b>	<b>After completing this course, students will realize about the importance of Nation in their upbringing. They will have admiration for their Nation and will like to know more and more about the National heritage. Socio-Religious Nationalist thoughts of our seers, freedom fighters, and modern thinkers will give them wider vision to understand Nationalism. The study of important and famous poems of Sanskrit, Hindi, and Urdu poets will create new interest and social harmony in students.</b>
<b>SEM - 6</b>	<b>GE - 2</b>	<b>Basics Of Sanskrit Linguistics</b>	<b>This course will introduce Sanskrit language from the linguistic point of view like Phonology, Morphology, Semantics, and Syntax etc. Sanskrit is also the main language required to understand PIE (Proto Indo European) linguistics.</b>





# GARHBETA COLLEGE

(Affiliated to Vidyasagar University)

Accredited by NAAC

Website : [www.garhbetacollege.ac.in](http://www.garhbetacollege.ac.in)

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☆ At - GARHBETA ☆ P.O.: GARHBETA ☆ DIST.: PASCHIM MEDINIPUR ☆ STATE.; WEST BENGAL ☆ PIN- 721127

## DEPARTMENT OF ZOOLOGY

### Under-Graduate Course| Department of Zoology| Garhbeta College

#### PROGRAM OUTCOME (PO)

PO	Summary	Description
PO1	Fundamental approaches towards learning Zoology	Aware students about knowledge and skill in the fundamentals and systematics of animal kingdom and analyse complex interactions among the various animals of different phyla, their distribution and their relationship with the environment
PO2	Gripe on the subject	Enhance the capability of deep study and understanding in the subject Zoology. To understand and be aware of relevant theories, paradigms, concepts and principles of zoology. Compare and contrast the characteristics of animals that differentiate them from other forms of life.
PO3	Concepts in advanced Zoology	Gain knowledge of anatomical structure and various metabolic functions of organisms. Correlates the physiological processes of animals and relationship of organ systems. Apply the knowledge of internal structure of cell, its functions in control of various metabolic functions of organisms. Explain the role of various biomolecules in living systems. Understands the complex evolutionary processes and behaviour of animals.
PO4	Awareness about Public Health and Diseases	Understands about various concepts of genetics and its importance in human health. To impart knowledge to the students regarding communicable and non-communicable diseases to improve personal and public health and to build social awareness

<b>PO</b>	<b>Summary</b>	<b>Description</b>
P05	Awareness about environment	Awareness about environment and its conservation processes, pollution control and its importance for sustainability of life.
P06	Develop Research aptitude.	Induce the students to ask questions and correlate the different disciplines of Zoology, clarify gaps in their understanding and develop problem solving approach
P07	To develop Laboratory skills	Acquire the skills in handling scientific instruments, planning and performing in laboratory experiments. Information and skill of advanced biological techniques for experimental purpose.
P08	Employment and Carriers	Inculcate the ability to crack competitive examinations for higher studies and inspire the students to find jobs in the fields of Biotechnology, Industrial Zoology, Research and Development Organizations, researches, education, public health and allied sciences.
P09	Develop positive scientific outlook	Communicate scientific information through effective formal and informal methods generally used in sciences. Acquire time management and self-management skills. Recognize the need for, and have the preparation and ability to engage in independent and life-long learning
P010	Moral and ethical	Aware students about ethical principles and commit to professional ethics and responsibilities. Also Develops empathy and love towards the animals
P011	Awareness about Socio-economic Zoology	Information and skill of applied zoology including sericulture, apiculture, fisheries, poultry, vermiculture, agricultural pests and their control etc.

PO12	Conservation of Animals	Aware the students about the importance of animal conservation and implementation of strategies for conservation of endangered species in real time.
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### **PROGRAMME SPECIFIC OUTCOME (PSO) : Zoology Undergraduate Courses**

PSO1	Understand the unity of life with the rich diversity of organisms and their ecological and evolutionary significance
PSO2	Apply the knowledge of various branches of Zoology and General biology meant both for a undergraduate course and also for higher studies.
PSO3	Acquire basic skills in the observation and study of nature, biological techniques, experimental skills and scientific investigation
PSO4	Develop insight and improve their analytical communication and professional skills in the field of animal sciences.
PSO5	Understanding the morphology and functional characteristics at cellular and sub-cellular (molecular) level
PSO6	Enhancing the technical skills for experimental purposes and focus to prepare them with research-oriented approach in frontier areas of research in Zoology.
PSO7	Develop positive attitude towards sustainable development.
PSO8	Analyse the impact of environment on our bodies and develop respect for nature
PSO9	Explain the role and impact of different environmental conservation programmes
PSO10	Identification of animals beneficial to humans along with various potential risk factors to health of humans.
PSO11	Explain the importance of genetic engineering and use tools of information technology for all activities related to zoology









	<b>Cell Biology (CC-4)</b>	<b>C4T (Theory)</b>	<ol style="list-style-type: none"> <li>1. To understand how the cellular components are used to generate and utilize energy in cells.</li> <li>2. To understand the cellular components underlying mitotic and meiotic cell division.</li> <li>3. To study the basic structure of Prokaryotic and Eukaryotic cells, viruses, viroid, prion and mycoplasma.</li> <li>4. To understand responses to environmental or physiological changes, or alterations of cell function brought about by mutation.</li> <li>5. To study the ultra structure and composition of Plasma membrane, Fluid mosaic model, Active and Passive transport across membrane, Facilitated transport and the concept of cell junctions which include tight junctions, gap junctions and desmosomes.</li> <li>6. To understand the structure and functions of Endoplasmic Reticulum, Golgi Apparatus and Lysosomes.</li> <li>7. To study the structure of mitochondria, its semi-autonomous nature, the endosymbiotic hypothesis of Mitochondrial Respiratory Chain and Chemi-osmotic hypothesis.</li> <li>8. To understand the structure and functions of peroxisomes and centrosome.</li> <li>9. To study the type, structure and functions of cytoskeleton, accessory proteins of microfilament &amp; microtubule and have a brief idea about molecular motors.</li> <li>10. To understand the structure of Nucleus: Nuclear envelope, Nuclear pore complex, Nucleolus, Chromatin: Euchromatin and Hetrochromatin and packaging (nucleosome).</li> <li>11. To develop a clear concept on cell cycle and its regulation, concept of oncogenes and tumor suppressor genes with special reference to p53.</li> <li>12. To understand the process of cell division in both somatic and germ cell.</li> <li>13. To study the different cell signalling transduction pathways and types of signaling molecules and receptors GPCR.</li> <li>14. To understand the role of second messenger (cAMP), extracellular matrix-cell interactions and the concept of Apoptosis and Necrosis.</li> </ol>
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		<b>C4P (Practical)</b>	<ol style="list-style-type: none"><li>1. Preparation of temporary stained squash of onion root tip to study various stages of mitosis.</li><li>2. Study of various stages of meiosis.</li><li>3. Preparation of permanent slide to show the presence of Barr body in human female blood cells/cheek cells.</li><li>4. Preparation of permanent slide to demonstrate DNA by Feulgen reaction.</li><li>5. Preparation of permanent slide to demonstrate cell viability study by Trypan Blue staining.</li><li>6. Preparation of permanent slide to demonstrate mitochondria identification through vital staining.</li></ol>
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	<p><b>Fundamentals of Biochemistry (CC-7)</b></p>	<p><b>C7T (Theory)</b></p>	<ol style="list-style-type: none"> <li>1. To understand the structural chemistry of proteins, carbohydrates, lipids, and nucleic acids.</li> <li>2. To understand the biological importance of proteins, carbohydrates, lipids, and nucleic acids.</li> <li>3. To understand the metabolism of proteins, carbohydrates, lipids, and nucleic acids.</li> <li>4. To understand the structure, function, and classification of amino acids and concept of protein metabolism.</li> <li>5. To understand the structures of purines and pyrimidines, nucleosides, nucleotides and nucleic acids and to have the basic concept of nucleotide metabolism.</li> <li>6. To understand the nomenclature and classification of enzymes and mechanism of enzyme kinetics.</li> <li>7. To study the factors affecting rate of enzyme-catalyzed reactions and enzyme inhibition.</li> <li>8. To understand the concept of allosteric enzymes and their kinetics and the strategy of enzyme action-Catalytic and Regulatory.</li> <li>9. To understand the concept of Oxidative Phosphorylation and Redox systems.</li> <li>10. To review mitochondrial respiratory chain, Inhibitors and un-couplers of Electron Transport System.</li> </ol>
	<p><b>Apiculture (SEC-1)</b></p>	<p><b>C7P (Practical)</b></p>	<ol style="list-style-type: none"> <li>1. Qualitative tests of functional groups in carbohydrates, proteins and lipids.</li> <li>2. Paper chromatography of amino acids.</li> <li>3. Quantitative estimation of Lowry Methods.</li> <li>4. Demonstration of proteins separation by SDS-PAGE.</li> <li>5: To study the enzymatic activity of Trypsin and Lipase.</li> <li>6. To perform the Acid and Alkaline phosphatase assay from serum/ tissue.</li> </ol>
		<p><b>SEC1T (Theory)</b></p>	<ol style="list-style-type: none"> <li>1. To study the history, classification of honeybees and the social organization of bee colony.</li> <li>2. To understand the different bee keeping methods and equipment for the extraction of honey.</li> <li>3. To understand the basic concept regarding artificial bee rearing and construction of beehives – Newton and Langstroth.</li> <li>4. To study the bee diseases and enemies, their control and preventive measures.</li> <li>5. To gain knowledge on the products of Apiculture Industry and its uses.</li> <li>6. To understand the Bee Keeping Industry and the recent modern methods in employing artificial beehives for cross pollination in horticultural gardens.</li> </ol>

<b>IV</b>	<b>Comparative Anatomy of Vertebrates (CC-8)</b>	<b>C8T (Theory)</b>	<ol style="list-style-type: none"> <li>1. To understand the structure, functions, and derivatives of integumentary systems in amphibian, birds, and mammals.</li> <li>2. To understand the overview of axial and appendicular skeletal systems from fish to mammals.</li> <li>3. To understand the comparative anatomy of stomach in digestive system and dentition in mammals.</li> <li>4. To study the respiratory organs and systems from fish to mammals.</li> <li>5. To understand the general plan of circulation and comparative account of heart and aortic arches from fish to mammals.</li> <li>6. To understand the succession of kidney and structure, types and evolution of urinogenital system.</li> <li>7. To study the comparative anatomy of brain and the cranial nerves in mammals.</li> <li>8. To understand the different sense organs and the classification of receptors in vertebrates.</li> </ol>
		<b>C8P (Practical)</b>	<ol style="list-style-type: none"> <li>1. To study the placoid, cycloid, and ctenoid scales through permanent slides/photographs.</li> <li>2. To study the disarticulated skeleton of Toad, Pigeon and Guineapig.</li> <li>3. To demonstrate Carapace and plastron of turtle.</li> <li>4. To identify the mammalian skulls: One herbivorous (Guineapig) and one carnivorous (Dog) animal.</li> <li>6. To study the dissection of Tilapia: Circulatory system, Brain, pituitary, urinogenital system.</li> </ol>



	<p><b>Immunology (CC-10)</b></p>	<p><b>C10T (Theory)</b></p> <p><b>C10P (Practical)</b></p>	<ol style="list-style-type: none"> <li>1. To understand the different cells, organs, and molecules involved in immunology.</li> <li>2. To have the basic concepts of health and diseases and the historical perspective of Immunology.</li> <li>3. To understand the concept of antigenicity and immunogenicity, immunogens, adjuvants and haptens, B and T-Cell epitopes.</li> <li>4. To study the various factors influencing immunogenicity.</li> <li>5. To understand the structure and functions of different classes of immunoglobulins.</li> <li>6. To understand the antigen- antibody interactions.</li> <li>7. To understand the immunoassays (ELISA and RIA), hybridoma technology and monoclonal antibody production.</li> <li>8. To understand the structure and functions of MHC molecules.</li> <li>9. To have basic idea on the structure of T cell Receptor and its signalling and T cell development &amp; selection.</li> <li>10. To study the types, properties and functions of cytokines.</li> <li>11. To understand the components and pathways of complement system.</li> <li>12. To have the concepts of Gell and Coombs' classification and brief description of various types of hypersensitivities.</li> <li>13. To understand the immunology of certain diseases like Malaria, Filariasis, Dengue and Tuberculosis.</li> <li>14. To have basic concepts on the various types of vaccines and active &amp; passive immunization both artificial and natural.</li> </ol> <ol style="list-style-type: none"> <li>1. Demonstration of lymphoid organs.</li> <li>2. Histological study of spleen, thymus, and lymph nodes through slides/ photographs.</li> <li>3. Preparation of stained blood film to study various types of blood cells.</li> <li>4. ABO blood group determination.</li> <li>5. Demonstration of ELISA.</li> </ol>
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	<p><b>Sericulture (SEC-2)</b></p>	<p><b>SEC2T (Theory)</b></p>	<ol style="list-style-type: none"> <li>1. To study the different types of silkworms, and mulberry and non-mulberry Sericulture.</li> <li>2. To understand the definition, history, and present status of Sericulture.</li> <li>3. To study the life cycle of Bombyx mori, structure of silk gland and secretion of silk.</li> <li>4. To understand the selection of mulberry variety and establishment of mulberry garden, rearing house and rearing appliances.</li> <li>5. To study the different disinfectants: Formalin, bleaching powder, RKO.</li> <li>6. To understand the silkworm rearing technology: Early age and late age rearing, the types of mountages, spinning, harvesting, and storage of cocoons.</li> <li>7. To gain knowledge on the different pests and diseases of silkworms, its control and preventive measures.</li> <li>8. To understand the prospectus of Sericulture in India, Sericulture industry in different states, employment, potential in mulberry and non-mulberry sericulture.</li> </ol>
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	<p><b>Genetics (CC-12)</b></p>	<p><b>C12T (Theory)</b></p> <p><b>C12P (Practical)</b></p>	<ol style="list-style-type: none"> <li>1. To understand the behavior of chromosomes during meiosis and detailed understanding of the chemical basis of heredity.</li> <li>2. To study the principles of inheritance of Mendelian Genetics and its Extension.</li> <li>3. To have the basic concepts on incomplete dominance and co-dominance, epistasis, multiple alleles, lethal alleles, pleiotropy, sex-linked, sex- influenced and sex-limited inheritance and polygenic Inheritance.</li> <li>4. To understand how inheritance patterns are affected by position on chromosomes.</li> <li>5. To understand the concept of Linkage and Crossing Over, molecular basis of crossing over, measuring recombination frequency and linkage intensity using three factor crosses, interference, and coincidence.</li> <li>6. To study the types of gene mutations, types of chromosomal aberrations with one suitable example of each, non-disjunction, and variation in chromosome number and molecular basis of mutations in relation to UV light and chemical mutagens.</li> <li>7. To understand the similarities and differences between how genetic information is passed on in prokaryotes and eukaryotes.</li> <li>8. To evaluate conclusions that are based on genetic data.</li> <li>9. To understand the mechanisms of sex determination in Drosophila and mammals.</li> <li>10. To study the dosage compensation in Drosophila &amp; human.</li> <li>11. To understand the criteria for extra chromosomal inheritance: Antibiotic resistance in Chlamydomonas, Kappa particle in Paramecium and Shell spiralling in snail.</li> <li>12. To study the concepts of Conjugation, Transformation, Transduction, and Complementation test in Bacteriophage.</li> <li>13. To understand results of genetic experimentation in animals.</li> <li>14. To understand Transposable Genetic Elements in bacteria, Ac-Ds elements in maize and P elements in Drosophila, LINE, SINE, and Alu elements in humans.</li> </ol> <ol style="list-style-type: none"> <li>1. Chi-square analyses.</li> <li>2. Linkage maps based on conjugation.</li> <li>3. Identification of chromosomal aberration in Drosophila and man from photograph.</li> <li>4. Pedigree analysis of some human inherited traits.</li> </ol>
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	<p><b>Fish and Fisheries (DSE-1)</b></p>	<p><b>DSE1T (Theory)</b></p>	<ol style="list-style-type: none"> <li>1. To enhance the students with an in-depth knowledge about the importance of sustainable fishing and protecting the marine environment and how fish adapt themselves to better survive their environment.</li> <li>2. To discuss advantages and disadvantages with the two aquatic food primary production systems, fishery, and aquaculture.</li> <li>3. To study the general description of fish, feeding habit, habitat and manner of reproduction and the classification of fish.</li> <li>4. To understand the morphology and physiology of fins and their modifications, locomotion in fish with special emphasis to hydrodynamics.</li> <li>5. To study the different types of scales, use of scales in determination of age of fish, Gills and gas exchange.</li> <li>6. To understand the types of swim bladder and its role in respiration and buoyancy.</li> <li>7. To study osmoregulation in Elasmobranchs and Reproductive strategies, electric organ, and bioluminescence.</li> <li>8. To understand the concept of Inland Fisheries and Marine Fisheries.</li> <li>9. To study the environmental factors influencing the seasonal variations in fish catches in the Arabian Sea and the Bay of Bengal, Fishing crafts and Gears.</li> <li>10. To understand the causes of depletion of fisheries resources, application of remote sensing and GIS in fisheries and fisheries law and regulations.</li> <li>11. To understand sustainable aquaculture, extensive, semi-intensive and intensive culture of fish.</li> <li>12. To study the pen and cage culture, polyculture, composite fish culture, brood stock management, and induced breeding of fish.</li> <li>13. To understand the management of finfish hatcheries, preparation and maintenance of fish aquarium, preparation of compound diets for fish and the role of water quality in aquaculture.</li> <li>14. To study the bacterial, viral, and parasitic fish diseases, its preservation and processing of harvested fish and the different fishery by-products.</li> <li>15. To understand the concept of transgenic fish and Zebrafish as a model organism in research.</li> </ol>
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	<p style="text-align: center;"><b>Microbiology (DSE-2)</b></p>	<p style="text-align: center;"><b>DSE2T (Theory)</b></p>	<ol style="list-style-type: none"> <li>1. To understand the bacterial taxonomy, its principles and modern approaches of bacterial taxonomy and have a basic idea about Hackel and Whittaker's kingdom concept and domain concept of Carl Woese.</li> <li>2. To understand the morphology of bacteria and virus cell wall.</li> <li>3. To understand the distribution of normal flora in the body and their harmful effects.</li> <li>4. To study the infection of pathogens to human populations: Communicable, Non-communicable, Endemic, Epidemic, Pandemic and Sporadic.</li> <li>5. To understand Koch's postulates and sensitivity and specificity of test results.</li> <li>6. To understand the principles and applications of Simple staining, Gram-staining, and Acid-fast staining.</li> <li>7. To study the collection of specimens, growth requirements and growth factors and oxygen requirement.</li> <li>8. To understand the different culture media: Simple media, Complex media, Selective media and Enriched media.</li> <li>9. To understand the pathogenicity of microorganisms and infection of pathogens to human populations.</li> <li>10. To understand the genetic recombination in bacteria.</li> <li>11. To gain knowledge on the different microbial diseases, pathogens, symptoms, pathogenesis, mode of action &amp; preventive measures of different diseases.</li> </ol>
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<p style="text-align: center;"><b>VI</b></p>	<p style="text-align: center;"><b>Developmental Biology (CC-13)</b></p>	<p style="text-align: center;"><b>C13T (Theory)</b></p>	<ol style="list-style-type: none"> <li>1. To understand how organisms maintain gametic population.</li> <li>2. To understand the basic concepts of the phases of development, cell cell interaction, differentiation and growth, and differential gene expression.</li> <li>3. To understand the events that leads up to fertilization process.</li> <li>4. To understand the early embryonic development: gametogenesis, spermatogenesis and oogenesis.</li> <li>5. To study the types of eggs, egg membranes, the planes and patterns of cleavage and the types of blastula.</li> <li>6. To understand the different techniques of fate maps.</li> <li>7. To understand the early development of frog and chick up to gastrulation and the embryonic induction and organizers.</li> <li>8. To describe the cell division in different groups.</li> </ol> <p>CO9: To understand way of cleavage and different patterns to form zygote.</p> <ol style="list-style-type: none"> <li>9. To describe the stages and cellular mechanisms for gastrulation.</li> <li>10: To understand the late embryonic development and the complete process of formation of germ layers.</li> <li>11. To study the extra-embryonic membranes in birds and implantation of embryo in humans.</li> <li>12. To study the structure, types and functions of placenta.</li> <li>13. To understand the post embryonic development of brain and Eye in Vertebrate.</li> <li>14. To study the different modes of regeneration, epimorphosis, morphallaxis and compensatory regeneration with one example of each.</li> <li>15. To understand the concept of Teratogenesis, teratogenic agents and their effects on embryonic development.</li> <li>16. To study the process of In vitro fertilization, Stem cell (ESC) and Amniocentesis.</li> </ol> <p style="text-align: center;"><b>C13P (Practical)</b></p> <ol style="list-style-type: none"> <li>1. To study of whole mounts of developmental stages of chick through permanent slides: Primitive streak (13 and 18 hours), 21, 24, 28, 33, 36, 48, 72, and 96 hours of incubation (Hamilton and Hamburger stages).</li> <li>2. To study of the developmental stages and life cycle of Drosophila from stock culture.</li> <li>3. To study of different sections of placenta (photomicrograph/ slides).</li> <li>4. To prepare a project report on Drosophila culture/chick embryo development.</li> </ol>
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## COURSE OUTCOME (CO) : Zoology GENERAL Courses

Semester	Paper Name	Paper Code	Outcome
I	Animal Diversity	Core-1 (DSC-1A)	<ul style="list-style-type: none"> <li>• Develop understanding on the diversity of life with regard to protists, non chordates and chordates.</li> <li>• Group animals on the basis of their morphological characteristics/ structures.</li> <li>• Develop critical understanding how animals changed from a primitive cell to a collection of simple cells to form a complex body plan.</li> <li>• Examine the diversity and evolutionary history of a taxon through the construction of a basic phylogenetic/ cladistics tree.</li> <li>• Understand how morphological change due to change in environment helps drive evolution over a long period of time.</li> <li>• The project assignment will also give them a flavour of research to find the process involved in studying biodiversity and taxonomy besides improving their writing skills. It will further enable the students to think and interpret individually due to different animal species chosen.</li> </ul>
I	Comparative Anatomy and Development Biology of Vertebrates	Core-4 (DSC-1B)	<ul style="list-style-type: none"> <li>• Develop an understanding of the evolution of vertebrates thus integrating structure, function and development.</li> <li>• Have an overview of the evolutionary concepts including homology and homoplasy, and detailed discussions</li> </ul>

			<p>of major organ systems.</p> <ul style="list-style-type: none"> <li>• Get a flavor of research besides improving their writing skills and making them well versed with the current trends. It will further enable the students to think and interpret individually due to different aspects chosen.</li> </ul>
	Physiology and Biochemistry	Core-7 (DSC-1C)	<ul style="list-style-type: none"> <li>• Understand how cells, tissues, and organisms function at different levels. The course content also provides the basis of understanding their abnormal function in animal and human diseases and new methods for treating those diseases.</li> <li>• Develop an understanding of the related disciplines, such as cell biology, neurophysiology, pharmacology, biochemistry etc. <ul style="list-style-type: none"> <li>• Undertake research in any aspect of animal physiology in future.</li> <li>• Understand about the importance and scope of biochemistry.</li> <li>• Understand the structure and biological significance of carbohydrates, amino acids, proteins, lipids and nucleic acids.</li> <li>• Understand the structure and function of immunoglobulins.</li> <li>• Understand the concept of enzyme, its mechanism of action and regulation.</li> <li>• Understand the process of DNA replication, transcription and translation.</li> <li>• Learn the preparation of models of peptides and nucleotides.</li> <li>• Learn biochemical tests for amino acids, carbohydrates, proteins and nucleic acids.</li> </ul> </li> </ul>

			<ul style="list-style-type: none"> <li>• Learn measurement of enzyme activity and its kinetics.</li> </ul>
IV	Genetics and Evolution Biology	Core-10 (DSC-1D)	<ul style="list-style-type: none"> <li>• Understand how DNA encodes genetic information and the function of mRNA and tRNA</li> <li>• Apply the principles of Mendelian inheritance.</li> <li>• Understand the cause and effect of alterations in chromosome number and structure.</li> <li>• Relate the conventional and molecular methods for gene manipulation in other biological systems.</li> <li>• Discuss and analyse the epigenetic modifications and imprinting and its role in diseases.</li> <li>• Get new avenues of joining research in related areas such as genetic engineering of cells, cloning, genetic disorders, human fertility programme, genotoxicity, etc.</li> <li>• Acquire an in-depth knowledge on the diversity and relationships in animal world.</li> <li>• Develop a holistic appreciation on the phylogeny and adaptations in animals.</li> <li>• Enable the students to understand the evolution of universe and life.</li> <li>• Understanding on the process and theories in evolutionary biology.</li> <li>• Develop an interest in the debates and discussion taking place in the field of evolutionary biology.</li> </ul>
V	Aquatic Biology	DSE-1	<ul style="list-style-type: none"> <li>• Understand and apply relevant scientific principles in the area of aquatic biology</li> </ul>

			<ul style="list-style-type: none"> <li>• Employ scientific methodologies such as experimentation and data analysis in the area of aquatic biology</li> <li>• Critically analyse, interpret and evaluate information relevant to aquatic biology</li> <li>• Appreciate the multidisciplinary nature of the study of aquatic biology and engage positively with people and ideas beyond their own discipline.</li> <li>• Explore some of the unique environmental problems dealing with aquatic environments.</li> <li>• Develop employable skills in freshwater biological water quality analysis.</li> </ul>
VI	Reproductive Biology	DSE-2	<ul style="list-style-type: none"> <li>• Explain and contrast the processes of spermatogenesis, oogenesis.</li> <li>• Demonstrate an understanding of the hormonal control of reproduction in males and how this is regulated;</li> <li>• Distinguish between the main stages of embryonic, foetal and neonatal development and causes of foetal disorders.</li> <li>• Understand the origin and characteristics of common congenital malformations;</li> <li>• Know how sexually transmitted diseases may contribute to altered neonatal or reproductive function.</li> <li>• Critically assess relevant scientific literature in Human Reproductive Biology and present their argument in oral and written work.</li> </ul>
	Sericulture	Sec-4	<ul style="list-style-type: none"> <li>• Generation of skilled man power in the field of sericulture,</li> </ul>

			<ul style="list-style-type: none"><li>• To impart training in extension management and transfer of technology,</li><li>• To impart training in Post Cocoon Technology, and</li><li>• To provide field exposure</li></ul>
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## Post Graduate Course| Department of Zoology| Garhbeta College

### Programme Outcome

- The course curriculum has been designed and developed giving utmost importance to both classical components of Zoology and its different ramifications in tune with the modern scientific development across the world.
- The classical Zoology includes basic structural, and functional organization of the NonChordates and Chordates, taxonomy, biosystematics, histology, animal physiology, evolution and adaptation.
- Modern dimension of the course curriculum contains the significant aspects of molecular biology, genetics, biotechnology, bioinformatics, biochemistry, immunology and biostatistics.
- Entire curriculum has been designed in such a manner that will to ensure and accelerate the academic performance and success rate among students appearing for different national and state level competition.
- Keeping pace with the above mentioned course curriculum the department is offering special papers (Fishery, Ecology, Genetics & Molecular biology and parasitology) which also enabled rural based students to get proper recognition both nationally and also getting different subject based services.
- All the courses in the program are carefully designed to equip the students for competitive exams like CSIR NET, SET etc. and also to write research proposals for grants.

### Programme Specific Outcomes (PSOs)

- PSO1: To understand the details of animal kingdom, its classification and identifying features of both Non-Chordates and Chordates.
- PSO2: To understand the structure, function and physiological mechanisms of different systems of the body.
- PSO3: To understand the early and late embryonic development and the different fundamental processes in development.
- PSO4: To study the structural chemistry, metabolism and the different biosynthetic pathways and cycles of proteins, carbohydrates and lipids.
- PSO5: To study the different diagnostics methods of different diseases.
- PSO6: To study the principles of inheritance of Mendelian Genetics and its extension, and detailed understanding of the chemical basis of heredity.
- PSO7: To study the basic techniques involved in animal cell culture and organs culture, the different recombinant DNA technology and isolation of genes.
- PSO8: To gain knowledge on aquatic biomes, freshwater and marine ecosystem.
- PSO9: To study the causes, effects and control measures of pollution of aquatic resources, its management, and conservation.
- PSO10: To understand the potential scope of aquarium fish industry, biology of different aquarium fishes and the maintenance of aquarium.
- PSO11: To understand the various sources, effects and control measures of various environmental hazards and the fate of toxic and persistent substances in the environment.
- PSO12: To study the parasite biology.

Semester Paper Name Paper Code

Outcomes

**ZOO-101**

**Non-Chordate & Chordates**

**Group A: Non-Chordates**

1. Develop understanding on the diversity of non chordate Biology.
2. Describe and discuss the rules of zoological nomenclature, classification and identification of invertebrates.
3. Develop critical understanding on evolution based on existing theories and hypothesis explaining non-chordate, especially metazoans origin and evolution.
4. Describe and discuss the phylogenetic relationships among metazoans based on superphyletic concepts.
5. Develop understanding on conservation strategies of metazoans for the ecological and economic benefits.

➤ *Non-chordates (Metazoa) representing largest groups of animal kingdom are characterised by several unique features and display various phenomena (polymorphism, torsions, matamorphosisetc), based on which an array of theories, hypothesis, scientific principles have been advocated in the gamut of the subject of Zoology. At the end of this course, the students will be acquainted with the nonchordate biology.*

**Group B: Chordates**

1. Describe and discuss the origin and evolutionary history with special reference to Primates.
2. Develop understanding of fish taxonomy and inland and marine fishery.
3. Describe and discuss the respiratory system and gall bladder amonh fishes.
4. Develop understanding of osmoregulation and excretory system in the chordates.
5. Describe and discuss the echolocation in bats.

➤ *Through the course, the students will be accustomed with the chordate biology. Students will be able to identify the chordates and classify them.*

**ZOO-102**

**Histochemistry & Animal Physiology**

**Group A: Histochemistry**

1. Understanding different microtechniques.
2. To understand the procedure and purposes of histological staining.
3. To be able to describe various properties and mode of action of dyes and fixatives.
4. To know the concepts of immuno-histochemitry and enzyme histochemistry.

➤ *Students will understand the Scope and importance of histology and histochemistry.*

**Group B: Animal Physiology**

1. Develop enhanced knowledge and appreciation of mammalian physiology
2. Understanding the functions of important physiological systems including the cardio-respiratory, renal, reproductive and metabolic systems
3. Understanding of how separate systems interact to yield integrated physiological responses to challenges such as exercise, fasting and ascent to high altitude, and how they

I

can sometimes fail.

4. To be able to perform, analyze and report on experiments and observations in physiology

5. To be able to recognize and identify principal tissue structures.

➤ *The course will provide detailed knowledge on the various physiological organ-systems and their importance to the integrative functions of the human body.*

### **ZOO-103**

## **Immunology and Methods in Biology**

### **Group A: Immunology**

1. To understand the different cells, organs, and molecules involved in immunology.

2. To have the basic concepts of health and diseases and the historical perspective of Immunology.

3. To understand the concept of antigenicity and immunogenicity, immunogens, adjuvants and haptens, B and T-Cell epitopes.

4. To study the various factors influencing immunogenicity.

5. To understand the structure and functions of different classes of immunoglobulins.

6. To understand the antigen- antibody interactions.

7: To understand the immunoassays (ELISA and RIA), hybridoma technology and monoclonal antibody production.

8. To understand the structure and functions of MHC molecules.

9. To have basic idea on the structure of T cell Receptor and its signalling and T cell development & selection.

10. To study the types, properties and functions of cytokines.

11. To understand the components and pathways of complement system.

➤ *This course will describe the immune systems of vertebrates that enable them to recognize and respond specifically to foreign substances. The students will be able to comprehend the roles of lymphoid organ, cells of immune system, antigens, antibodies, MHC, antigen presentation and immunity to infectious diseases.*

### **Group B: Methods in Biology**

1. Discuss and describe different molecular biology techniques including recombinant DNA technology, restriction digestion, production of recombinant DNA molecule, cloning vector, PCR, and DNA finger printing and its application.

2. Develop understanding on Bioremediation.

3. Develop critical understanding on Chromatography, Electrophoresis, Ultracentrifugation, Flow Cytometry, Western Blotting, and 2-D Gel Electrophoresis.

➤ *On completion of this course students will be able to:*



*address a research problem in biotechnology, Provide examples of current applications of biotechnology and advances in the different areas like medical, microbial, environmental and bioremediation.*

#### **ZOO-104**

### **Cell Biology &Cytogenetic**

#### **Group A: Cell Biology**

1. To understand how the cellular components are used to generate and utilize energy in cells.
2. To understand the cellular components underlying mitotic and meiotic cell division.
3. To study the basic structure of Prokaryotic and Eukaryotic cells, viruses, viroid, prion and mycoplasma.
4. To understand responses to environmental or physiological changes, or alterations of cell function brought about by mutation.
5. To study the ultra structure and composition of Plasma membrane, Fluid mosaic model, Active and Passive transport across membrane, Facilitated transport and the concept of cell junctions which include tight junctions, gap junctions and desmosomes.
6. To understand the structure and functions of Endoplasmic Reticulum, Golgi Apparatus and Lysosomes.
7. To study the structure of mitochondria, its semi-autonomous nature, the endosymbiotic hypothesis of Mitochondrial Respiratory Chain and Chemi-osmotic hypothesis.
8. To understand the structure and functions of peroxisomes and centrosome.
9. To study the type, structure and functions of cytoskeleton, accessory proteins of microfilament & microtubule and have a brief idea about molecular motors.
10. To understand the structure of Nucleus: Nuclear envelope, Nuclear pore complex, Nucleolus, Chromatin: Euchromatin and Hetrochromatin and packaging (nucleosome).
11. To develop a clear concept on cell cycle and its regulation, concept of oncogenes and tumor suppressor genes with special reference to p53.
12. To understand the process of cell division in both somatic and germ cell.
13. To study the different cell signalling transduction pathways and types of signaling molecules and receptors GPCR.
14. To understand the role of second messenger (cAMP), extracellular matrix-cell interactions and the concept of Apoptosis and Necrosis.

➤ *Students will be well informed with the membrane structure and composition, transport and trafficking of protein, the cytoskeleton, cell movement and extra cellular matrix. The mechanism of cell division and their regulation through different check points will thoroughly understood. Cell cycle, apoptosis, signal transduction and cancer biology are the important part of the course.*

**Group B:  
Cytogenetics**

1. To understand genetic fine structure, complementation test, and complementation mapping.
  2. To study the recombination in bacteria, conjugation, transformation, transduction.
  3. To have the basic concepts on viral oncogenes, proto-oncogenes, tumor suppressor genes.
  4. To understand the life cycle of Rous Sarcoma Viruses and the concept of cancer induction by Retroviruses.
  5. To understand the Hardy-Weinberg principles, allelic and genotypic frequency of population.
- article in Paramecium and Shell spiralling in snail.

➤ *The course will provide an understanding of genetic analysis at the gene, genome and population levels. Understanding the Drosophila genetics. Evaluation of the various aspects of structural, functional and comparative genomics.*

**ZOO-201**

**(Biosystematics & Ecological principles**

**Group A:  
Biosystematics**

1. Describe and discuss the basic concepts and rules of identification, classification, phylogenetic analysis and nomenclature.
2. Develop critical understanding on concept of species.
3. Understanding the different approaches of newer systematics, and molecular systematics.
4. To understand the ecological role of different groups of chordates.
5. Describe and discuss the importance of systematics in applied biology and public health management.

➤ *This course will describe the importance of taxonomy in biology, historical resume of systematics and stages of taxonomy. The course would enlighten the students with modern trends in biosystematics-concepts of different conventional and newer aspects.*

**Group B:  
Ecological principles**

1. Basic understanding of ecology; Understand and analyze different types and properties of food webs, cybernetic nature of an ecosystem.
2. Describe and discuss different aspects of population

ecology.

3. To understand the community characteristics and the concept of ecotone, edge effect, organismic and individualistic community concept.

4. Develop critical understanding on habitat and niche concept.

5. Discuss the evolutionary aspects of ecology.

➤ *The contents of this syllabus have been identified with an eye to make the students understand the basics of ecology putting more emphasis on the system ecology, habitat ecology, population and community ecology and evolutionary ecology so that ecology students can not only understand the ongoing ecological processes but also can contribute to the proper ecomanagement.*

#### **ZOO-202**

### **(Biophysics & Biochemistry**

#### **Group A: Biophysics**

1. To understand the biophysical principles.

2. Describe and discuss the concepts of thermodynamics and colloidal system.

3. To study the significance of microscopy in biology and medicine.

4. To understand the biophysical properties of biomembrane.

5. To understand the dynamics of circulation.

➤ *The course would be dealt with principle of thermodynamics, electromagnetic and ionizing radiation and principles of biophysical chemistry. At the end of the course the student will be able to understand fundamental concepts in biophysics that underlie biological processes.*

#### **Group B: Biochemistry**

1. To understand the structural chemistry, metabolism, and biological importance of proteins, carbohydrates, lipids, and nucleic acids.

2. To understand the structure, function, and classification of amino acids and concept of protein metabolism.

3. To understand the structures of purines and pyrimidines, nucleosides, nucleotides and nucleic acids and to have the basic concept of nucleotide metabolism.

4. To understand the nomenclature and classification of enzymes and mechanism of enzyme kinetics, and the factors affecting rate of enzyme-catalyzed reactions and enzyme inhibition.

5. To understand the concept of Oxidative Phosphorylation and Redox systems, mitochondrial respiratory chain, Inhibitors and un-couplers of Electron Transport System.

➤ *The course will provide an understanding of*

*fundamental biochemical principles such as biomolecules, metabolic pathway and regulation of biological process. The course also deals with the integration of metabolic process in cellular systems and organization of cellular pathways.*

### **ZOO-203**

#### **(Molecular Biology & Parasitology**

##### **Group A: Molecular Biology**

1. To study the mechanism of DNA Replication in Prokaryotes, Semi-conservative, bidirectional and discontinuous Replication, RNA priming and Replication of telomeres.
2. To study the mechanism of Transcription in prokaryotes and eukaryotes, the different transcription factors and difference between prokaryotic and eukaryotic transcription.
3. To understand the mechanism of protein synthesis in prokaryotes, Ribosome structure and assembly in prokaryotes, fidelity of protein synthesis, aminoacyl tRNA synthetases and charging of tRNA.
4. To recognize the different proteins involved in initiation, elongation and termination of polypeptide chain.
5. To understand the Genetic code, Degeneracy of the genetic code and Wobble Hypothesis, inhibitors of protein synthesis and difference between prokaryotic and eukaryotic translation.
6. To understand the different post transcriptional modifications and processing of eukaryotic RNA, the concept of Split genes, introns and exons, splicing mechanism, alternative splicing, exon shuffling and RNA editing.
7. To understand the regulation of Transcription in prokaryotes: lac operon and trp operon.

➤ *The course will able to explain the fundamentals of chemical and molecular processes that occur in between cell including the central dogma.*

##### **Group B: Parasitology**

1. To study the terms Parasite, Parasitoid and mechanical and biological vectors.
2. To study the morphology, life cycle, prevalence, epidemiology, pathogenicity, diagnosis, prophylaxis and treatment of parasitic Protists.
3. To study the morphology, life cycle, prevalence, epidemiology, pathogenicity, diagnosis, prophylaxis and treatment of parasitic Platyhelminthes.
4. To study the morphology, life cycle, prevalence, epidemiology, pathogenicity, diagnosis, prophylaxis and treatment of parasitic Nematodes.
5. To study the biology, importance and control of

parasitic Arthropods.

6. To study a brief account on parasitic Vertebrates.

➤ *The course will provide an understanding of the diversity and biology of parasites, besides the epidemiological aspects of different parasitic diseases would be explored.*

### ZOO-301

**Basic & applied Entomology and Ecotoxicology**

**Group A: Basic & applied Entomology**

1. To understand the general characters and classification criteria of insects.

2. Describe and discuss the importance, diversity and conservation of insects.

3. To have an in-depth knowledge on biology of insect pests and effective control measure.

4. To study different insect behaviours with emphasis on significance of pheromones and bioluminescence.

5. To understand the biology and diversity of aquatic insects and their role for environmental monitoring.

6. To understand the integrative relation and co-evolution of insects and plant.

➤ *The subject entomology dealing with the study of different aspects of insects, the largest animal taxa of the world. After studying this subject the students can develop not only the interest on this interesting and important faunal components but can undertake measures for the conservation of beneficial insects and control of the harmful ones.*

**Group B. Ecotoxicology**

1. To develop an general idea on physical and chemical properties of xenobiotics and toxins, and mechanism of action of toxins.

2. To study the different toxicity tests and bioassays; describe and discuss biomagnification, bioaccumulation, and biotransformation of xenobiotics in food chain.

3. To study the principles and aspects of aquatic toxicology.

4. To study the different aspects of immunotoxicology.

6. To study the detrimental effects of xenobiotics on environment.

➤ *The purpose of toxicity testing is to generate information about a substance's toxic properties so that the health and environmental risks it poses can be adequately evaluated. In aquatic sector toxicological study may ensure the health of the local aquatic organism and related to human health.*

### ZOO-302

**Group A:**

1. To understand different phylogenetic methods such as

**Molecular Evolution and Microbiology**

**Molecular Evolution** Distance methods, parsimony methods, maximum likelihood method, construction of phylogenetic tree.  
2. Understand and analyze the Hardy-Weinberg equilibrium and the destabilizing forces affecting the HW equilibrium.  
3. To study the amino acid sequencing.  
4. To have basic ideas on DNA-DNA hybridizations, restriction enzyme sites, nucleotide sequence comparisons and homologies.  
➤ *The curriculum in evolution includes modern aspects of evolution. PG students are benefitted by study of genome analysis and by finding the sequences they may be able to find out the molecular systematic position*

**Group B: Microbiology** 1. To study the classification scheme of microorganisms.  
2. To study the classification, morphology, growth, and chemotaxis of bacteria.  
3. Describe and discuss the different culture techniques for bacterial nutrition.  
4. To study the significance of microbes for maintaining the soil ecology.  
5. Develop an understanding on principle and method of fermentation.  
➤ *After studying the paper, students will be acquainted with different testing/pathology laboratory practices.*

**ZOO-303A**

**FISHERY SPECIAL Fish Taxonomy & Biology and Oceanography**

**Group A: Fish Taxonomy & Biology** In-depth knowledge on classification, nutrition, reproduction, migration, and endocrinology of fishes.

**Group B: Oceanography** Describe and discuss chemical, physical, and biological oceanography.

➤ *A sustainable approach to fisheries and aquaculture will help to protect our natural resources and ensure that fish stocks are available for future generations. Currently, overfishing, ineffective management practices, industrial development and agricultural pollution have reduced fish stocks.*

**ECOLOGY SPECIAL Biodiversity & Conservation Ecology and Aquatic Ecology**

**ZOO-303B**

**Group A: Biodiversity & Conservation Ecology** To develop an understanding on biodiversity, detail account on wildlife ecology and endemism of different species, and conservation strategies.

**Group B: Aquatic Ecology** To study structure, function, and diversity of different aquatic ecosystem; Detail understanding on waste water management.

➤ *Both theory and practical learning process are to acquaint students with both the*

*basic traditional/conventional components of the ecological science in order to develop proper knowledge base to tackle the ongoing ecological changes in and around human settlements with special emphasis to the landscapes & ecosystems of south West Bengal. The entire syllabus has four dimensions- Systems Ecology, Human Ecology, and Aquatic Ecology & Wildlife Ecology. The major emphasis was laid in developing the syllabus to cover not only on traditional aspects of Ecological but also on modern developments in the sphere of ecological sciences: system, mathematical, molecular, urban, restoration and aquatic ecology.*

### ZOO-303C

**GENETICS & MOLECULAR BIOLOGY SPECIAL Genetics & Molecular Biology**

**Group A: Genetics**

Develop an idea on eukaryotic genome organization; in-depth study on RNA splicing and crossing over; detail understanding on sex determination and dosage compensation in Mammals and *Drosophila*.

**Group B: Molecular Biology**

To study the DNA repair mechanism; clear understanding on different cellular signaling, and genetics of cancer; describe and discuss transposition, epigenetics, genomic imprinting, and gene therapy.

- *The course will acquaint the students to versatile tools and techniques employed in genetic engineering and recombinant DNA technology. A sound knowledge on methodological repertoire allows students to innovatively apply these in basic and applied fields of biological research. Students will introduced to properties, application and limitation of versatile DNA modifying enzymes, gene cloning, sequencing and genetic transformation etc. This course may be deemed as a foundation course serving as a platform for introduction of more advanced cutting-edge technologies that essentially are an amalgamation of basic techniques combined in diverse forms of modern applications. Understand and apply the principles and techniques of molecular biology which prepares students for further education and/or employment in teaching, basic research, or the health professions.*

### ZOO-303D

**PARASITOLOGY SPECIAL Diversity & Biology of Parasite and Immunoparasitology**

**Group- A: Diversity and Biology of Parasite**

Basic concept on parasites; develop in-depth knowledge on Protozoology and Helminthology.

**Group- B: Immunoparasitology**

Clear understanding on immunity and host defense mechanism; describe and discuss complement system, hypersensetivity, inflammation, tolerance, and autoimmunity; in-depth study on tumor immunology, and transplantation.

- *The course will acquaint the students to understand host parasite interactions, complement activation, mode of recognition by TLR and its signaling, hypersensitivity with special reference to asthma. The course will enlightened the students regarding different modern diagnostic methods to identify parasitic infections. Vector biology and epidemiology will be another focus to know the propensity of the vector borne diseases and proper formation of vector control.*

IV

**Environment  
al pollution  
&  
management  
and  
Biostatistic**

**ZOO-401**

**Group A: Environmental pollution & management**

1. To understand the global environmental problems, threats and management.
2. To study the causes of air pollution, properties of air pollutants, green house effect and global warming; photochemical smog, acid rains, effect of pollutants on human health and plants.
3. To study the causes, effects and protective measurements of water pollution.
4. To understand threats, and challenges of soil pollution.
5. To understand and analyze the conservation strategies, sustainable development, and other environmental management concepts.

➤ *The students would be provided with current status of environmental pollution and global environmental change. The course would cover biodiversity: status, monitoring and documentation; major drivers of biodiversity change and biodiversity management approaches.*

**Group B: Biostatistics**

1. To understand the concepts of biostatistics.
2. To analyze the measures of centraltendency and dispersion.
3. Develop a clear concept on probability and set theory.
4. Develop an understanding on correlation and regression, and analyse the variance.
5. Analyze and calculate Student 't' distribution, Z test, and Fisher's F test.

➤ *To learn about key biostatistical concepts and efficient tools for summarizing and plotting data, make decisions in the presence of uncertainty. Student will be acquainted with parametric and nonparametric statistics, sample and data. The will be able to understand t test, Chi square, correlation, regression and anova.*

**ZOO-402**

**Development  
al Biology &  
Neuroendocr  
inology**

**Group A: Developmental Biology**

1. To understand the early development and molecular mechanism of Amphibian axis foramation.
2. To study the Regeneration of animals with special emphasis on the process of regeneration in Hydra and Amphibia.
3. To have an in-depth knowledge on fertilization.

➤ *The course will provide a broad area from embryology to developmental biology. The students will be able to understandthe embryonic development, reproductive function and fertilization.*



**Group B: Neuro-Immuno Endocrinology**

1. Develop basic concepts on neural system.
2. Study on neuro-endocrine pathways, glands, and disorders in vertebrates.
3. Understanding the neural circuits in vertebrates.
  - *The course will provide an understanding of basic concept of neural system. Students would be acquainted with electrical signaling and mechanism. The course will cover evolutionary perspective nervous system, functional organization of the CNS and endocrine disorder.*

#### ZOO-403A

**FISHERY SPECIAL Aquaculture & Fish Technology and Inland & Marine fisheries**

**Group A: Aquaculture & Fish Technology**

1. To discuss the problems and prospects of aquaculture in India.
2. To discuss the integrated fish farming, fishing methods, harvesting, and fish diseases. intensive culture of fish.

**Group B: Inland and Marine fisherie**

1. To study the fresh water and marine water resources in India.
2. Develop an understanding on estuary, reservoir ecosystem, waste water management, and trends in aquaculture.

➤ *A sustainable approach to fisheries and aquaculture will help to protect our natural resources and ensure that fish stocks are available for future generations. Currently, overfishing, ineffective management practices, industrial development and agricultural pollution have reduced fish stocks.*

#### ZOO-403B

**ECOLOGY SPECIAL Systems Ecology & Human Ecology**

**Group A: Systems Ecology**

1. To understand the community ecology, species diversity, metapopulation concept, habitat fragmentation.
2. To study the sustainability and restoration measurements of ecology.
3. Describe and discuss eco-tourism.
4. Understand and analyze various mathematical ecological models.

**Group B: Human Ecology**

1. Describe and discuss the global environmental issues, global warming.
2. Develop an understanding on environmental management acts, urbanization, wasteland and watershed management.
3. In-depth knowledge on solid waste recycling.

➤ *Both theory and practical learning process are to acquaint students with both the basic traditional/conventional components of the ecological science in order to develop proper knowledge base to tackle the ongoing ecological changes in and*

*around human settlements with special emphasis to the landscapes & ecosystems of south West Bengal. Entire syllabus has four dimensions- Systems Ecology, Human Ecology, and Aquatic Ecology & Wildlife Ecology. The major emphasis was laid in developing the syllabus to cover not only on traditional aspects of Ecological but also on modern developments in the sphere of ecological sciences: system, mathematical, molecular, urban, restoration and aquatic ecology.*

### ZOO-403C

**GENETICS & MOL. BIOLOGY SPECIAL Genetic diseases &Molecular Analysis & Applied Genetics**

**Group A: Genetic diseases & Molecular Analysis**

1. To understand the Autosomal Disorders, X-linked Disorders, Metabolic Disorders, Dynamic Mutations, and Late onset disorders.
2. To understand various technologies; Protein blotting and Fluorescency, DNA and RNA Sequencing, Recombinant DNA, Plasmid Cloning Vectors.
4. To study the role of DNA markers in genetic analysis.

**Group B: Applied Genetics**

1. To study the genetic basis of multigene organization of Ig gene, V(D)J recombination, B cell and T cell receptor genes.
2. To study the human genome project.
3. To study the classical tools of positional cloning, Huntington disease, vectors for large scale genome project, and comparing Genomic sequences.

- *The course will acquaint the students to versatile tools and techniques employed in genetic engineering and recombinant DNA technology. A sound knowledge on methodological repertoire allows students to innovatively apply these in basic and applied fields of biological research. Students will introduced to properties, application and limitation of versatile DNA modifying enzymes, gene cloning, sequencing and genetic transformation etc. This course may be deemed as a foundation course serving as a platform for introduction of more advanced cutting-edge technologies that essentially are an amalgamation of basic techniques combined in diverse forms of modern applications. Understand and apply the principles and techniques of molecular biology which prepares students for further education and /or employment in teaching, basic research, or the health professions.*

### ZOO-403D

**PARASITOL OGY SPECIAL (Vector Biology &Vector borne Parasites and Molecular Diagnosis & Clinical parasitology**

**Group- A: Vector biology and vector borne parasites**

1. To describe the biology, importance and control of Mosquito (Anopheles, Culex, Aedes), Sand fly, Fleas, Ticks, Mites, Black fly, Tsetse fly.
2. To understand the life cycle, pathogenecity and control of *Plasmodium*, *Leishmania*, *Wuchereria*, *Babesia*.
3. General idea on Zoonosis, Myiasis, Filarial transmission, and African Trypanosomiasis. y of man.

**Group- B: Molecular diagnosis &**

1. Develop an in-depth knowledge on molecular diagnosis for various diseases.
2. Study of Immunoassay or serological techniques for

**clinical parasitology** laboratory diagnosis of endoparasites.  
3. Study the epidemiology of Malaria, Filariasis, Kala-azar.  
4. Study the fundamental techniques used in molecular diagnosis of endoparasites.

- *The course will acquaint the students to understand host parasite interactions, complement activation, mode of recognition by TLR and its signaling, hypersensitivity with special reference to asthma. The course will enlighten the students regarding different modern diagnostic methods to identify parasitic infections. Vector biology and epidemiology will be another focus to know the propensity of the vector borne diseases and proper formation of vector control.*

# Career in Zoology

