



OFFICE OF THE PRINCIPAL  
**GOALPARA COLLEGE : GOALPARA**

Recognised by UGC under Section 2 (f) and 12 (b) of U.G.C. Act of 1956

**NAAC Accredited Grade A+ (CGPA 3.41)**

P.O. & Dist: Goalpara, Assam, Pin-783101



*Dr. Subhash Barman, M.A., Ph.D.*  
*Principal & Secretary*

Phone : +91 73990 022  
E-mail : goalparacollege55@gmail.com  
Website : www.goalparacollege.ac

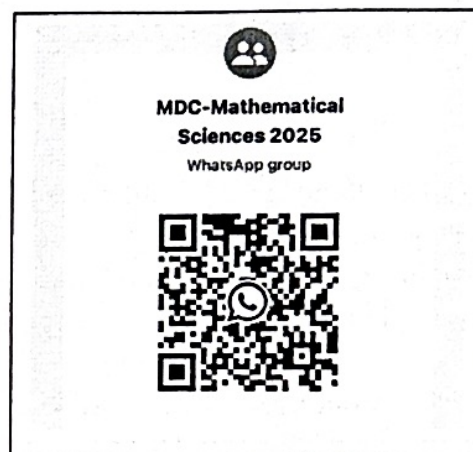
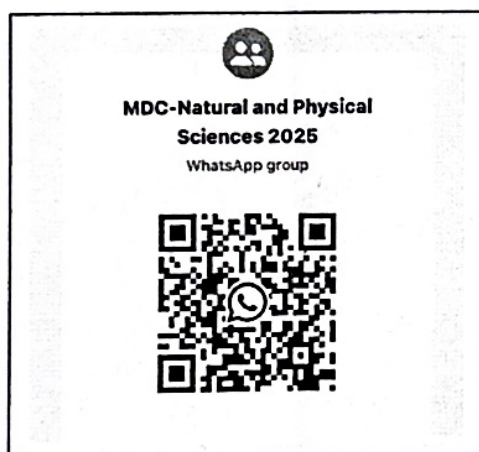
Ref.No. GC/Notice/335/2025

Date: 18/08/2025

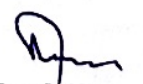
**NOTICE**

It is for general information of all concerned that the MDC paper for all the FYUGP-B.Sc. 1<sup>st</sup> semester students for the session 2025-26 will be : 1. **Natural and Physical Sciences** 2. **Mathematical Sciences** 3. **Life Sciences** and 4. **Earth Sciences**. Students from B.Sc. 1<sup>st</sup> semester can choose any one paper and join their respective WhatsApp group by scanning the QR codes Given below.

The students are hereby asked to attend their class as per their class routine.



Copy: 1. Notice Board/Website  
2. File

  
(Dr. Subhash Barman)  
Principal,  
Goalpara College, Goalpara  
(Dr. Subhash Barman)  
Principal/DDO  
Goalpara College

## Syllabus::

### 1. Natural and Physical Sciences

#### MDC-1: Introduction to Natural and Physical Sciences

Chemistry

Unit 1: Structure and Constituents of the Material World—atoms, molecules, and ions; Essential Elements; Structure and Bonding; Acids and Bases; Chemical Formula and Equations; Night Sky.

Unit 2: Laws of Nature— Gas laws; Kinds of Forces; Equilibrium, Kinetics, Osmosis; Heat and Thermodynamics; Electrical and Magnetic Behaviour of Nature, Friction, Waves & Oscillations.

Physics

Unit 3: Properties of Matter— States and Strength of Materials, Optical properties- Emissions and Absorptions, Interference, Diffraction, and Polarization; Nanomaterials; Smart Materials; Sounds and Musical Instruments.

#### MDC-2: Natural and Physical Sciences in Everyday Life

Chemistry

Unit 1: Carbohydrates, Proteins, and Amino Acids, Vitamins & Minerals, Foods and Beverages; Germicides, Pesticides; Human Health; Patterns and Variations in Nature.

Unit 2: Solutions and Colloids, Plastics, Cements, Glass, Soaps and Detergents; Pollutants and Contaminants; Heavy Metal Poisoning; Poisonous Gases; Green House Effect; Acid Rain, Corrosion.

Physics

Unit 3: Waste Water Treatment; Nuclear Energy; Conventional and Renewable Energy Sources; Battery Basics; Future Fuels.

#### MDC-3: Applications and Prospects of Natural and Physical Sciences

Unit 1: Solar Light and Radiations; Introduction to Microscopic and Spectroscopic Techniques; MRI and CT Scan; Fluorescence.

Unit 2: Sensors & Detectors; Telescopes; Images and Information; Communications; Space and Atmosphere.

Unit 3: Measurements and Errors; Observation, Representation, and Interpretation—Testing and Analysis; Evaluation and Conclusion.

Physics



## 2. Mathematical Sciences

### MDC-1: Foundations of Mathematical Sciences- I

**UNIT-I:** Numbers, Division algorithm, Divisibility test, Test of prime numbers. Definition of number system (decimal and binary), Conversion from decimal to binary system and vice – versa. Indices, Logarithm and Antilogarithm, Laws and properties of logarithms.

**No of contact hours: 10**

**UNIT-II:** Percentage, Average, Discount, Profit & loss. Problems based on Age, Time, speed & distance, Time & work, clock & calendar, Partnership, Ratio & Proportions, Simple Interest and Compound Interest, Effective rate of interest, Present value, net present value and future value, Annuities, Calculating value of Regular Annuity, Pipes and Cisterns, Mixture and Allegation, Boats and Streams, Races and Games.

**No of contact hours: 13**

**UNIT-III:** Historical development of statistics, statistics in everyday life, statistics through observed data, Scope, limitations, importance, and applications of statistics in other fields, roles of computer in statistics. Statistical data: primary and secondary data and methods of their collection. Time series data, qualitative data and quantitative data. Data Representation: Frequency distribution, Graphical representation of frequency distribution Histogram, Frequency polygon, Frequency curve, Ogive.

**No of contact hours: 11**

**UNIT-IV:** Data Analysis: Arithmetic mean, Geometric mean, Harmonic mean, Median, Mode and their properties. Partition Values: Quartiles, Deciles, Percentiles. Graphical location of Mode, Quartiles, Deciles and Percentiles.

**No of contact hours: 11**

Course Learning Out comes: This course will enable the students to:

- (i) learn about numbers, conversion of decimal numbers in binary system and binary to decimal system.
- (ii) relate indices and logarithm /antilogarithm and learn about properties of logarithms.
- (iii) Learn basic mathematical tools to solve real life problems.
- (iv) Know application of mathematical tools in decision making problems
- (v) acquire the skill of statistical analysis of data from real life situation in a scientific manner.
- (vi) acquire knowledge on the basic aspects of statistical reasoning and drawing conclusions

## 7. Life Sciences

### MDC-1: Basics in Life Sciences

#### Course objectives:

The paper will provide a comprehensive overview of topics in plant science, anthropology, Zoological Science, and the applications of life science. Students will gain knowledge and understanding of the general features of organisms, the principles and practices in these areas, and the significance of these fields in various contexts.

#### Learning outcomes:

By completing the paper, students will -

1. Learn the general features of organisms like bacteria, viruses, algae, fungi, bryophytes, pteridophytes, gymnosperms, and angiosperms; about economic botany, disease management, breeding methods, crop domestication, and the role of national institutes in plant breeding; and the importance of agriculture in the national economy.
2. Gather knowledge on the mechanisms of evolution in mammals, primates, modern apes, and human evolution through fossil evidence; explore racial criteria, classification, and elements in India, along with basic concepts in genetics and heredity.
3. Learn about the principles of aquaculture, freshwater aquaculture in India and the North Eastern States, artificial fish breeding, integrated fish farming, and the market potential of aquatic organisms. They will also study sericulture, including races, economic advantages, and types of silk produced, as well as the importance and history of apiculture and bee rearing techniques.
4. Explore biotechnology, including its origin, history, scope, and definition. They will learn about genes, genetic engineering, DNA, RNA, PCR, molecular markers, cloning, and sequencing. The unit also covers the applications of biotechnology in medicine, agriculture, the environment, food, and industry.

#### THEORY [Total no. of contact classes: 45; Credits: 3]

##### Unit 1: Basics of Plant science

No. of Contact Classes: 12

General features of Bacteria, Viruses, Algae, Fungi, Bryophytes, Pteridophytes, Gymnosperms and Angiosperms; Elements of economic botany, integrated diseases management; Breeding methods for self-pollinated, cross-pollinated and clonally propagated crops; Crop domestication; Objectives and accomplishments in plant breeding and the role of National institutes; Importance of Agriculture in national economy.

##### Unit 2: Basics of Anthropology

No. of Contact Classes: 10

Basic concepts: mechanism of evolution of life; Mammal, Primate, Modern apes, Man's place in the animal kingdom; Fossil evidence of human evolution; Racial criteria, Major races, Racial classification, Racial elements in India; Genetics, Heredity.

Botany

Zoology



Zoology

### Unit3: Basics in Economic Zoology

No. of Contact Classes: 13

**Aquaculture:** Basic principles of aquaculture; Prospects & Challenges of Aquaculture in North Eastern States; Diversification of Aquaculture, Induced breeding & larval rearing, integrated & composite fish farming, Pearl Culture, Prawn Culture, Crustacean and Crab Culture, Post harvest Technology, Fish Preservation: principle & practices.

**Sericulture:** Origin and history; Races & classification of silkworm; economic advantages; scope of sericulture in India; Domesticated and semi domesticated Silk worm of NE India and their economic viability. Culture of Silk worm. Propagation of food plants of Silk worm. Sericulture as an entrepreneurship venture, Natural dye of silk

**Apiculture:** General morphology & behaviour of honey bee, Importance and history of Honey bee culture in NE India. Diversity & major types of economically important honeybees in NE India. Selection of bee species for apiculture; Artificial Bee Rearing (Newton and Langstroth box).

### Unit4: Applications of life science

No. of Contact Classes: 10

Origin, history, scope and definition of biotechnology, concept of gene, gene manipulation & genetic engineering. Concept of DNA, RNA, PCR, molecular markers, cloning and sequencing. Applications of biotechnology in medicine, agriculture, environment, food, and industry.

Botany

### Reading list:

1. Ahsan J, Sinha SP (2010) *A Hand Book on Economic Zoology*, S Chand Publishing.
2. Das BM (1980) *Outlines of Physical Anthropology*. Kitab Mahal Publication.
3. Ember CR, Ember M, Peregrine PN (2011). *Anthropology*. Pearson Education Asia, Singapore.
4. Gardner A, Davies T (2012) *Human Genetics*. Viva Books Pvt Ltd., Delhi, India.
5. Graham LE, Graham JM, Wilcox LW (2013) *Plant Biology*, 2<sup>nd</sup> edition, Pearson Education, Inc., Upper Saddle River, NJ.
6. Harris M (1991) *Cultural Anthropology*, Harper & Row, New York, NY
7. Kochhar SL (2016) *Economic Botany*, Cambridge University Press.
8. Lewin R (1998) *Principles of Human Evolution*. Blackwell Sciences Inc. USA
9. Lewis B (2004) *Genes VII*, 3<sup>rd</sup> Edition, Oxford University & Cell Press, NY.
10. Nicholl DST (2008) *Introduction to Genetic Engineering*, 3<sup>rd</sup> edition, Cambridge University press, UK.
11. Pillay TVR (2005) *Aquaculture - Principles and Practices*, Wiley-Blackwell.
12. Raven PH, Evert RF, Eichhorn SE (2005) *Biology of Plants*, 7<sup>th</sup> edition, W. H. Freeman and Company, New York, NY.
13. Stanford C, Allen SJ, Anton CS (2013) *Biological Anthropology: The Natural History of Mankind*, 3<sup>rd</sup> edition. Pearson India Education Services, Noida.
14. Swindler DR (2009) *Introduction to the Primates*. Overseas Press India Pvt. Ltd., New Delhi, India.
15. Thieman WJ, Palladino MA (2021) *Introduction to Biotechnology*, Pearson publisher, Boston, MA.

## 8. Earth Sciences — Geography

### MDC-1: Understanding Physical Formations of the Earth

Unit	Contents	Lecture
<b>Unit-I</b> Origin of the Earth	Views on origin and age of the earth; Components of the earth system and the characteristics of the Lithosphere from the perspective of geological formations; Geological time scale	7
<b>Unit-II</b> Internal structure of the earth	General constitution of the earth; Layers of the earth and their composition and characteristics: Crust, mantle, outer core and inner core	7
<b>Unit-III</b> Rocks and minerals	Definition of rock and mineral; Mineral: Properties and types; Rock: Classification and types	6
<b>Unit-IV</b> Landform dynamics on the earth	Landform and its classification; Geomorphic forces, associated processes and landform development: Endogenic and exogenic; Folding and faulting; Erosion, mass wasting and landslide; Earthquake and volcanic eruption-Causes, consequences and distribution	14

#### Books Recommended:

1. Klein, C. and Philpotts, A. (2016). Earth Materials: Introduction to Mineralogy and Petrology, 2<sup>nd</sup> edition, Cambridge University Press, 616p.
2. Patwardhan, A. M. (2020). The Dynamic Earth System. 4<sup>th</sup> edition, PHI Learning Pvt. Ltd., 576p.
3. Plummer, C. C., Carlson, D., and Hammersley, L. (2015). Physical Geology., 15<sup>th</sup> edition, McGraw Hill, 672p.
4. Reynolds, S. and Johnson, J. (2021). Exploring Geology. 6<sup>th</sup> edition, McGraw Hill, 704p.
5. Singh, S. (2012). Geomorphology, Pravalika Prakashans, Allahabad, 652p.

### MDC-2: Understanding the Changing Environment

Unit	Contents	Lect.
<b>Unit-I</b> Environment as a system	Meaning of environment; Components of earth's environment system and their characteristics and interrelationship: Lithosphere, Hydrosphere, Atmosphere and Biosphere; Ecosystem, its components and functioning; Concept of balanced environment	8
<b>Unit II</b> Changing man and environment relationship	Impact of natural environment on man and his activities (Agriculture, food, dress, house, power development, human adjustment in different	10