

NATIONAL UNIVERSITY

BANGLADESH



First Year Syllabus

Department of Geography and Environment

Four-Year B.Sc. (Honours) Program
Effective from the Session: 2024–2025

1. Mission

To promote “Progress for Everyone” by fostering transformative education, conducting pioneering research, and encouraging meaningful collaboration with individuals, communities, and partners both in Bangladesh and around the world.

2. Vision

We expect that on the hundredth anniversary of the National University, our commitment to “Progress for Everyone” will be evident in all areas of our operations and stakeholder engagements.

We leverage our core strength in education, research, and community engagement to address pressing global issues and foster sustainable development.

By 2042, National University aims to strengthen its positions as Bangladesh’s top academic institution and rank among the world’s leading universities. Our focus will be on expanding expertise building strategic partnerships, and increasing our global influence. Our services will be measured by the achievements of the individuals and communities we serve.

3. Name of the Program: B.Sc. (Honours) in Geography and Environment

4. Program Educational Objectives (PEOs)

PEO 1: Technical and Professional Competence

Graduates will demonstrate strong theoretical knowledge and practical skills in the field of Geography and Environment, enabling them to meet contemporary market demands in education, research, planning, and development sectors.

PEO 2: Research and Problem Solving

Graduates will be equipped to carry out collaborative, multidisciplinary research, evaluate geoenvironmental problems critically, and offer creative, evidence-based solutions to promote sustainable development in Bangladesh and elsewhere.

PEO 3: Social Responsibility and Ethics

Graduates will demonstrate a strong sense of social, ethical, and environmental responsibility, making valuable contributions to environmental management, community development, and the accomplishment of the Sustainable Development Goals (SDGs).

PEO 4: Lifelong Learning and Leadership

Graduates will pursue lifelong learning through continuous education and professional development, demonstrating leadership, teamwork, and communication skills essential for adapting to the dynamic global landscape.

5. Program Learning Outcomes (PLOs):

At the time of graduation, B.Sc. (Honours) in Geography and Environment students will have achieved the ability to:

PLO 1: Core Disciplinary Knowledge: Demonstrate a comprehensive understanding of fundamental concepts, theories, and frameworks in both human and physical geography, environmental science, and geospatial studies.

PLO 2: Application of Knowledge: Apply disciplinary knowledge and analytical skills to understand, explain, and address various spatial-temporal, environmental, and geographical phenomena using appropriate models, methods, and technologies.

PLO 3: Problem Solving and Critical Thinking: Identify, analyze, and propose solutions to complex geo-environmental problems using scientific reasoning, critical thinking, and decision-making abilities in real-world contexts.

PLO 4: Research and Innovation: Design and conduct scientific research through data collection, analysis, interpretation, and presentation, using innovative approaches to solve contemporary problems in geography and the environment.

PLO 5: Use of Modern Tools: Utilize modern tools, including GIS, remote sensing, statistical software, field instruments, and environmental monitoring systems, adhering to scientific, safety, and ethical standards.

PLO 6: Communication Skills: Effectively communicate geographic and environmental ideas, data, and findings in oral, written, and visual formats to both specialist and non-specialist audiences.

PLO 7: Teamwork and Leadership: Demonstrate leadership, interpersonal, and collaborative skills required to work in diverse teams and manage geo-environmental projects efficiently and ethically.

PLO 8: Professionalism and Ethics: Practice ethical conduct, social responsibility, and professional integrity in academic and field-based activities while addressing environmental and societal issues.

PLO 9: Lifelong Learning: Recognize the necessity for and engage in continuous learning, self-improvement, and professional development to adapt to evolving technologies and global challenges.

PLO 10: Societal and Environmental Responsiveness: Respond effectively to national and global environmental challenges, contributing to policy, planning, and community-based development aligned with the Sustainable Development Goals (SDGs).

PLO 11: Entrepreneurial and Employment Readiness: Demonstrate skills, attitudes, and knowledge required for employment in government, NGOs, academia, consultancy, research institutions, and geo-entrepreneurial ventures.

PLO 12: Project and Time Management: Plan, organize, and execute fieldwork and academic projects efficiently, demonstrating time management, task delegation, and responsibility in both individual and group settings.

6. Mapping PEO with PLO:

Program Learning Outcomes (PLOs)	PEO 1	PEO 2	PEO 3	PEO 4
PLO 1	✓			
PLO 2	✓	✓		
PLO 3	✓	✓	✓	
PLO 4	✓	✓		
PLO 5	✓	✓	✓	
PLO 6	✓		✓	✓
PLO 7	✓		✓	✓
PLO 8	✓		✓	✓
PLO 9				✓
PLO 10		✓	✓	✓
PLO 11	✓			✓
PLO 12	✓	✓		✓

7. Year wise Courses and marks distribution

FIRST YEAR

Course Code	Course Title	Marks	Credits
213201	Introduction to Geography and Environment	100	4
213203	Introduction to Physical Geography and Environment	100	4
213205	Introduction to Human Geography and Environment	100	4
213206	Practical-I	100	4
219901	History of Bangladesh: Language, Culture and Identity	100	4
219903	Information and Communication Technology	75	3
219904	Lab: Information and Communication Technology	25	1
Students Follow Either Group-A or Group-B			
Group-A (Any Two)			
212807	Chemistry-I	100	4
212808	Chemistry-I Practical	50	2
213709	Foundations of Mathematics	100	4
213711	Calculus-I	50	2
213007	Botany-I	100	4
213008	Botany Practical-I	50	2
213107	Zoology-I	100	4
213108	Zoology Practical-I	50	2
213607	Fundamentals of Statistics	100	4
213610	Lab-I: Fundamentals of Statistics	50	2
Group-B (Any Three)			
212009	Introducing Sociology	100	4
212109	Introduction to Social Work	100	4
211909	Introduction to Political science	100	4
213407	Basic Psychology	100	4
212209	Principles of Economics	100	4
Total (Allied Courses)		300	12
Total =		900	36

Course Code:	213201	Marks: 100	Credits: 4	Class Hours:60
Course Title:	Introduction to Geography and Environment			

Course Description

This course provides the basic concept of geography and earth system science with the definition, meaning, nature and scope. The content of the course is also described the astronomical aspects of the earth. After completion of this course students will learn about the universe, galaxy, solar system and the earth along with the understanding of latitude, longitude and global timing.

Course Learning Outcomes (CLOs)

CLO1	Able to understand the introduction of geography and environment, and their relations giving emphasis on astronomical knowledge.
CLO2	Able to describe the creation of Universe, formation of galaxy, Solar System and differences between Earth and other planets in the Solar System
CLO3	Able to explain earth's co-ordination system, global calendar system and its application in the real life.
CLO4	Able to analyze the Earth's movement (rotation and revolution) and its effects on time, day length, seasons, and illumination.
CLO5	Able to interpret time zone differences and calendar systems from different cultural and geographic perspectives.
CLO6	Able to evaluate the interrelationships between environment, society, and geography with emphasis on human-environment interaction.
CLO7	Able to collaborate in group activities and demonstrate critical thinking through map reading, timeline analysis, and concept mapping.

Mapping CLOs with PLOs

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12
	✓	✓						✓				
CLO2	✓	✓	✓					✓	✓	✓	✓	
CLO3	✓	✓			✓							
CLO4	✓	✓	✓		✓			✓	✓	✓	✓	✓
CLO5	✓	✓	✓		✓	✓				✓		
CLO6	✓	✓	✓			✓		✓	✓	✓	✓	
CLO7	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓

Course Contents

Module No.	Contents	Teaching-Learning Strategies	CLOs
1	Geography and Environment: Meaning, fundamental concepts, scope, nature and branches. The relationship between geography and astronomy	Lecture (PPT), short video clips, concept mapping, group discussion, Q&A, think-pair-share	CLO1
2	Universe: Big-Bang theory, creation of primary elements, formation of galaxy, and stars.	Multimedia lecture, group activity on cosmic timeline, guided Q&A	CLO2
3	Solar System: Planets and Satellites, Sun, Earth and Moon.	PPT-based lecture, discussion, solar system model interpretation, visual quiz	CLO2
4	Earth System: Form and shape of the earth including oblate and spheroid curvature of the earth. Common centre of gravity. Polar axis and equatorial axis.	Diagram demonstration, 3D globe activity, interactive lecture, problem-solving	CLO3
5	Earth's Circumference and Area: Longitude and Latitude determination. Prime meridian. Length of latitudes and longitudes. Great circle. Rhumb line.	Practical mapping task, group exercise, case examples, peer feedback discussion	CLO3 & CLO7
6	Rotation and Revolution: Illumination of the globe. Circle of illumination. Almanac and analema. Length of day and night, and altitude of the sun. Solstices and equinoxes. Twilight - types, determination.	Lecture with animation, diagram-based demonstration, almanac analysis, class discussion	CLO4 & CLO7
7	Time: Longitude and time. Local and standard time, division of the earth according to standard time. Standard time of USA, India and Bangladesh. International Date Line. Calendar-Astronomical, Jewish, Mohammedan, Roman, Julian, Gregorian and World.	Timeline construction, comparative charting, calendar workshop, case-based learning	CLO5 & CLO7

	Time Zone Calculation: Measurement of Local and International Time Zones, Latitude and Longitude.		
8	Environment: Meaning, structure, types and components of Environment; Society, Ecology, Sustainability.	Interactive lecture with PPT, case study analysis on human-environment interaction	CLO6

List of Books

- Adhikari, S. (2011). *Fundamentals of geographical thought*. Chaitanya Publishing House, Allahabad, India.
- Arny, T., & Schneider, S. E. (1994). *Explorations: An introduction to astronomy*. Mosby.
- Berry, B. J. L. (1973). *A paradigm for modern geography*. In R. J. Chorley (ed.), *Directions in geography*. Methuen, London.
- Broek, J. O. (1965). *Geography: Its scope and spirit*. Charles E. Merrill, Columbus, Ohio.
- Branley, F. M. (1975). *Astronomy*. Thomas Y. Crowell & Co., New York.
- Singh, S. (2001). *Environmental geography*. Prayag Pustak Bhawan, India.
- Strahler, A. H., & Strahler, A. N. (2006). *Introducing physical geography*. Wiley.

Course Code:	213203	Marks: 100	Credits: 4	Class Hours: 60
Course Title:	Introduction to Physical Geography and Environment			

Course Description

This course is designed to study physical geography as a foundation of the earth's physical environment. In this course, major emphasis will be given on earth's evolution through its geological history, origin of the earth, exogenetic-endogenetic process and geological properties of the earth including formation and characteristics of rocks and minerals. The geomorphological processes that modify the earth's surface and influence the environment and the earth's hydrological system are also included in this course.

Course Learning Outcomes (CLOs)

CLO1	Able to describe the fundamental concepts of physical geography.
CLO2	Able to demonstrate/explain the origin, structure, endogenetic and exogenetic processes and formation of the earth.
CLO3	Able to categorize the broader concept of earth system and apply critical thinking skills in advanced study
CLO4	Able to explain the interrelationships among the four spheres of the Earth (lithosphere, atmosphere, hydrosphere, biosphere) in shaping the physical environment.
CLO5	Able to identify and distinguish rock and mineral types through hands-on observation and relate their characteristics to geological processes.
CLO6	Able to analyze system models in physical geography using the systems approach and interpret natural systems as open or closed with feedback mechanisms.

Mapping CLOs with PLOs

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12
CLO1	✓	✓				✓						
CLO2	✓	✓	✓					✓	✓	✓	✓	
CLO3	✓	✓	✓		✓							
CLO4	✓	✓	✓		✓	✓		✓	✓	✓	✓	✓
CLO5	✓	✓	✓		✓			✓			✓	✓
CLO6	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓

Course Contents

Module No.	Contents	Teaching-Learning Strategies	CLOs
1	Introduction to Physical Geography: Definition, development, significance and scope. Major branches and connection with other physical sciences.	Lecture (PPT), group discussion, concept mapping, Q&A	CLO1
2	Dynamic Earth: Origin, internal structure, movement, continental drift theory and plate tectonics.	Lecture, 3D model demonstration, group activity, video analysis, Q&A	CLO1 & CLO2
3	Scales and Dimensions in Physical Geography: Geological history, earth's external formation, and the geological time scale.	Multimedia lecture, geological timeline workshop, PPT, guided discussion	CLO1 & CLO2
4	Spheres of the Earth and its Interaction: Lithosphere, hydrosphere and biosphere, and their role in structuring environment.	Interactive lecture, role-play (on inter-sphere interaction), field observation, group discussion	CLO2 & CLO4
5	Rocks and Minerals: Definition, characteristics, compositions and classification of rocks and minerals.	Lecture, physical sample observation, PPT, video demonstration, group quiz	CLO5
6	Endogenetic Processes: Faults and folds, cleavage and unconformities and major structural features, Landforms produced by volcanic activities and earthquake. Seismology, Isostasy. Exogenetic Processes: Agents of earth's sculpture- rivers, glaciers, winds and waves. Weathering and Erosion, Mass wasting and Deposition	Lecture, Diagram drawing workshop, model demonstration, lecture, group poster presentation	CLO2 & CLO5

7	Atmosphere: Nature and composition of atmosphere, vertical structure of atmosphere, elements and factors of weather and climate	Interactive lecture with PPT and animation, weather map reading activity, Q&A	CLO4
8	Biosphere: Component of Biosphere. Earth as habitat, The flow of energy (Food chain, Food web)	Multimedia lecture, food web simulation activity, collaborative concept mapping	CLO4
9	Hydrosphere: Hydrological cycle, surface and subsurface water and aquifers.	Lecture, Animated video, concept mapping, field-based discussion (aquifer visit or case study)	CLO4
10	Systems Approach in Physical Geography: Morphologic, cascading, process response, control systems, open, closed and isolated systems, and positive and negative feedback in systems and ecosystems.	Lecture, group project on ecosystem system models, simulation videos, field trip/case visit	CLO3 & CLO6

List of Books

- Brooks/Cole, USA.
- Cunningham, W. P., & Cunningham, M. A. (2007). *Principles of environmental science*.
Foster, R. J. (2009). *Physical geography*. Brooks/Cole, USA.
- Gabler, R. E., Petersen, J. F., Trapasso, L. M., & Sack, D. (2009). *Physical geography*.
McGraw-Hill, USA.
- Miller, E. W. (1985). *Physical geography*. Columbus Press, USA.
- Park, C. (2008). *The environment*. Taylor & Francis Inc., USA.
- Singh, S. (2002). *Physical geography*. Prayag Pustak Bhawan, India.
- Singh, S. (2008). *Environmental geography*. Prayag Pustak Bhawan, India.
- Smithson, P., Addison, K., & Atkinson, K. (2002). *Fundamentals of the physical environment*. Routledge, London.
- Strahler, A. H., & Strahler, A. N. (1992). *Modern physical geography*. John Wiley & Sons, Singapore.

Course Code:	213205	Marks:100	Credits: 4	Class Hours:60
Course Title:	Introduction to Human Geography and Environment			

Course Description

This course is designed to study the spatial structures and processes of human organizations, activities, and cultural aspects. It particularly examines spatial and temporal patterns of human-nature relationships, environmental changes, cultural diversities and economic development of the world. Several other issues such as the application of human geographic perspectives, approaches, concepts, theories, tools and techniques will also be discussed in this course.

Course Learning Outcomes (CLOs)

CLO1	Able to define the major concepts and approaches in human geography including location, space, scale, region, diffusion, spatial interaction, economic and cultural landscapes
CLO2	Able to understand the present world which is demographically, ecologically, economically, and politically interconnected, interdependent, and overwhelmingly changing.
CLO3	Able to explain/solve problems geographically using maps and geospatial techniques, interpreting cultural landscapes, and applying human geographic concepts.
CLO4	Demonstrate knowledge of human-environment interaction, cultural diffusion, and urban-rural dynamics from a regional and global perspective.
CLO5	Apply geographical knowledge to assess global and local development initiatives, such as SDGs, eco-tourism, and sustainable practices.
CLO6	Analyze geopolitical concepts and political boundaries, including their historical development and influence on international relations and global conflicts.
CLO7	Evaluate spatial patterns of population, settlement, transportation, and trade, and their implications on regional development and environmental challenges.

Mapping CLOs with PLOs

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12
CLO1	✓	✓				✓				✓	✓	
CLO2	✓	✓	✓			✓		✓	✓	✓	✓	
CLO3	✓	✓	✓		✓	✓					✓	✓
CLO4	✓	✓	✓		✓	✓		✓	✓	✓	✓	✓
CLO5	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓
CLO6	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
CLO7	✓	✓	✓		✓	✓		✓	✓	✓	✓	✓

Course Contents

Module No.		Contents	Teaching-Learning Strategies	CLOs
1		Perspectives of Human Geography: Nature and perspective of human geography, major geographical concepts, approaches, tools and techniques.	Lecture (PPT), Group Discussion, Q&A, Concept Mapping, Short Quiz	CLO1
2		Population and Settlement: Population size and distribution, demographic transitions, human migration and development, population dynamics, types and patterns of rural settlements, environmental issues in rural settlements, urbanization and cities, and urban sustainability	Lecture, Thematic Maps Analysis, Case Study, Group Discussion, Multimedia demonstration	CLO1 & CLO2
3		Cultural Aspects: Concepts of culture, cultural differences and regional patterns, and cultural diffusion. Racial, linguistic, and ethnic diversities. Gender, religions and minorities. Cultural landscapes and cultural identity. Cultural differences in rural and urban settings.	Lecture, PPT, Documentary/Video, Cultural Mapping Exercise, Case Study	CLO2 & CLO3

4		Economy and Development: Economy and economic activities, economic development of land, vegetation, surface and groundwater, energy, minerals, biotic and marine resources. Theories of development, trade and world economy. The green revolution, eco-tourism and development. Sustainable Development Goals (SDGs).	Lecture, Resource Mapping, SDG-based Group Project, Demonstration, Discussion	CLO2 & CLO3
5		Transportations and Trade: Spatial interaction; Modes; Routes; Aspects of international trades	Lecture (PPT), Transport Network Mapping Exercise, Group Presentation	CLO2 & CLO7
6		Political Issues: Territory, space and society. The concept of the nation-state. Geopolitical traditions and globalization.	Lecture, Geopolitical Case Analysis, Video, PPT, Role-Play on Global Conflicts	CLO3 & CLO6
7		Man and Environment: Fundamentals of human-environment geography, contemporary perspectives and thematic issues in human- geography. Ecology and ecosystem, m a n -environment relationships, global environment changes, environmental hazards and	Lecture, Ecosystem Simulation, Field Trip or Virtual Tour, Group Discussion, Video	CLO2, CLO3 & CLO5

		disasters.		

List of Books

- Aitken, S., & Valentine, G. (Eds.). (2006). *Approaches to human geography*. Sage Publications, London.
- Blunden, J. (1979). *Fundamentals of human geography*. Harper & Row, London.
- De Blij, H. J., & Alexander, B. (2003). *Human geography: Culture, society, and space* (7th ed.). Wiley, New York.
- Dorrell, D., Henderson, J. P., Connor, G., & Lindley, T. (2018). *Introduction to human geography*. University of North Georgia Press.
- Fouberg, E. H., Murphy, A. B., & De Blij, H. J. (2015). *Human geography: People, place, and culture*. John Wiley & Sons.
- Gregory, D., Johnston, R., Pratt, G., Watts, M., & Whatmore, S. (2011). *The dictionary of human geography*. Wiley-Blackwell.
- Haggett, P., Cliff, A. D., & Frey, A. (1977). *Locational analysis in human geography*. Edward Arnold.
- Hartshorn, A. T., & Alexander, J. W. (1988). *Economic geography*. Prentice-Hall, New Delhi.
- Knox, P. L., & Marston, S. A. (2001). *Places and regions in global context: Human geography*. Prentice Hall, Upper Saddle River, NJ.
- Kuby, M., Harner, J., & Patricia, G. (2004). *Human geography in action* (3rd ed.). John Wiley, New York.
- Norton, W. (1998). *Human geography*. Oxford University Press, UK.
- Pitzl, G. R. (2004). *Encyclopedia of human geography*. Greenwood Publishing, Westport.
- Rubenstein, J. M. (2002). *The cultural landscape: An introduction to human geography* (7th ed.). Prentice-Hall, Upper Saddle River, N.J.

Course Code:	213206	Marks: 100	Credits: 4	Class Hours: 60
Course Title:	Practical-I			

Course Description

This course offers practical, map-based lab activities focused on fundamental and advanced cartographic techniques. Students will learn about various types of maps, their features, and applications, including map construction, transformation, scale use, enlargement, and reduction. The course emphasizes thematic mapping—qualitative, quantitative, chorochromatic, and choreographic—as well as the interpretation of topographic, cadastral maps, and aerial photographs. Skills will be developed in drawing cross-profiles from contour lines, identifying physical features, applying interpolation techniques, generating isopleths from spot heights, using vertical exaggeration, and conducting inter-visibility analysis.

Section-I: Map Scale, Composition and Reproduction

Course Learning Outcomes (CLOs)

CLO1	Able to define the fundamental concepts and basic principles of maps and map making techniques.
CLO2	Able to acquire knowledge about basic cartographic techniques and tools such as map scales; construction, transformation and reproduction of map.
CLO3	Able to design/construct map scale for different type of thematic maps.
CLO4	Able to be skilled for map design, preparation, reproduction, reduction and enlargement of map.

Mapping CLOs with PLOs

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12
CLO1	✓	✓						✓				
CLO2	✓	✓	✓		✓			✓	✓	✓	✓	
CLO3	✓	✓	✓		✓			✓	✓			✓
CLO4	✓	✓	✓		✓	✓		✓			✓	✓

Course Contents

Module No.	Contents	Teaching-Learning Strategies	CLOs
1	Construction of map scale (simple, comparative, and diagonal).	Lecture with Demonstration, Guided Drawing Practice, Q/A Session, Class Discussion	CLO1 CLO2 & CLO3
2	Transformation of map scale and measurement of area	Group Work, Hands-on Exercise, Field Demonstration, Use of Graph Paper/Planimeter	CLO2 & CLO4
3	Drawing of thematic maps. Qualitative, quantitative, chorochromatic, and choreographic maps.	Field Visit, Practical Mapping Session, Role Play (map interpretation), Simulation Tools (GIS-based if available)	CLO1 & CLO3
4	Techniques of statistical mapping. Qualitative and quantitative distribution maps, dot maps, graduated symbol maps, circle ratio maps, square, cubes, spheres, and other point symbol maps, gradient maps, flow maps.	On-site Task, Visual Demonstration, GIS/Manual Exercise, Observation Task, Peer Review of Maps	CLO3 & CLO4
5	Map design, preparation, reproduction, reduction and enlargement of map.	Seminar (on Map Errors & Best Practices), Hands-on Practice, Drawing Lab Sessions, Use of Photocopying & Scanning Tools	CLO3 & CLO4

List of Books

Monkhouse, F. J., & Wilkinson, H. R. (1976). *Maps and diagrams: Their compilation and construction*. Methuen, London.

Raisz, E. (1948). *General cartography*. McGraw-Hill, New York.

Robinson, A. H. (1978). *Elements of cartography*. John Wiley & Sons, New York.

Singh, R. L. (1979). *Elements of practical geography*. Kalyani Publisher, New Delhi.

Section-II: Interpretation of Relief and Map Features

Course Learning Outcomes (CLOs):

CLO1	Able to acquire knowledge on topographic maps, cadastral maps, aerial photographs
CLO2	Able to be expert on cross-profile drawing from contour lines in maps
CLO3	Able to analyze physical features, interpolation techniques and creating isopleths.
CLO4	Able to work individually with vertical exaggeration of scales and inter-visibility study.

Mapping CLOs with PLOs

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12
CLO1	✓	✓			✓			✓				
CLO2	✓	✓	✓		✓			✓	✓	✓	✓	✓
CLO3	✓	✓	✓		✓			✓	✓			✓
CLO4	✓	✓	✓		✓	✓		✓			✓	✓

Course Contents

Module No.	Contents	Teaching-Learning Strategies	CLOs
1	Getting familiar with topographic maps, cadastral maps, aerial photographs of both from Bangladesh and from other countries	Lectures with Visual Aids (maps/photographs), Hands-on Lab Sessions, Class Discussions, Pair Work (Map Reading)	CLO1
2	Making cross-profiles from contour lines in maps and identify various physical features, Interpolation techniques and creating isopleths from spot values.	Group Work, Hands-on Exercises, Map Lab Session, Use of Transparent Grid Sheets	CLO2 & CLO3
3	Vertical exaggeration of scales and inter-visibility study.	Field Visit, Practical Drawing Exercise, Simulation (manual or digital), Use of Profile Drawing Tools and Tracing Paper	CLO4

Distribution of Marks for First Year Final Examination (Section I & II)
Total Marks=100

1. Final Exam: 60 Marks

Time: 6 (Six) Hours

Section I: 40 Marks

- a) One question will be set from Module 1, which is compulsory. (1x10=10)
- b) Four additional questions will be set from the remaining modules, from which candidates must answer any three. (3x10=30)
- c) Each question carries 10 marks.
- d) Each question will be subdivided into (a/b/c) or (a/b) as applicable.

Section II: 20 Marks

- a) One question will be set from Module 2, which is compulsory. (1x10=10)
- b) Two additional questions will be set from the remaining modules, from which candidates must answer any one. (1x10=10)
- c) Each question carries 10 marks.
- d) Each question will be subdivided into (a/b/c) or (a/b) as applicable.

2. Lab Notebook: 10 Marks

3. Lab Viva-voce: 10 Marks

4. Presentation: 10 Marks

5. Field Report: 10 Marks (One Day-long fieldwork)

List of Books

Kannan, M., & Yadav, S. (2022). *Practical geography*. Rawat Publications.

Monkhouse, F. J., & Wilkinson, H. R. (1976). *Maps and diagrams: Their compilation and construction*. Methuen, London.

Raisz, E. (1948). *General cartography*. McGraw-Hill Book Co., New York.

Robinson, A. H. (1978). *Elements of cartography*. John Wiley & Sons, New York.

Singh, R. L. (1979). *Elements of practical geography*. Kalyani Publisher, New Delhi, India.

GROUP-A (Any Two)

Course Code:	212807	Marks: 100	Credits: 4	Class Hours: 60
Course Title:	Chemistry-I			

Course Objective

The course is designed for the student to impart and improve fundamental knowledge and aspects related to understand the fundamental physical, Organic and Inorganic chemistry topics. To develop and extend student's knowledge on state of matter, structure of atom, radiochemistry, chemical bonding, Liquid and Solution, chemical equilibrium, pH, aliphatic and aromatic hydrocarbons.

Course Learning Outcomes (CLOs)

After completing this course, students will be able to:

CLO1	Explain fundamental concepts of matter & atomic structure to describe the states of matter and their transitions, apply Avogadro's number, mole concept, and stoichiometry in chemical calculations and analyze atomic models and electronic configurations using quantum numbers and Aufbau principle.
CLO2	Understand chemical bonding & molecular structure to classify types of chemical bonds, predict molecular geometry using VSEPR theory and hybridization and compare valence bond theory (VBT) and molecular orbital theory (MOT).
CLO3	Analyze chemical reactions & equilibrium to differentiate between physical and chemical changes, balance redox reactions and determine oxidation states and apply Le Chatelier's principle to predict equilibrium shifts in reactions.
CLO4	Apply principles of physical chemistry to derive and apply gas laws, calculate colligative properties and interpret Raoult's & Henry's laws and determine pH, buffer capacity, and solubility product (K _{sp}) in acid-base systems.
CLO5	Classify & characterize hydrocarbons (aliphatic & aromatic) to name hydrocarbons using IUPAC nomenclature, compare reactivity of alkanes, alkenes, and alkynes and explain aromaticity, electrophilic substitution, and substituent effects in benzene derivatives.

Mapping of CLOs with PLOs

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12
CLO1	✓	✓	✓		✓							✓
CLO2	✓	✓	✓		✓							✓
CLO3	✓	✓	✓		✓			✓				✓
CLO4	✓	✓	✓	✓	✓			✓		✓		✓
CLO5	✓	✓	✓		✓	✓		✓		✓	✓	✓

Course contents

Module No.	Contents	Teaching-Learning Strategy	CLOs
1.	State of Matter in Chemistry: Nature and classification of matter. Classical states of solid, liquid, gas and Liquid crystals, state of aggregation of matter. Changes of state of matter. Intramolecular and intermolecular force and their role for the determination of state of matter. Modern state as plasma. Avogadro's number with application, Concept of mole: calculation and importance. Stoichiometry.	Lecture, Group Discussion, Assignment	CLO1
2.	Structure of atom: Fundamental particles of atoms, Nucleus and discovery of nucleus, atomic model of Rutherford, Bohr atom model: postulates, limitations and success, Spectrum of atomic hydrogen, Dual nature of electron, Heisenberg uncertainty principle, Quantum numbers, atomic orbitals, Aufbau principle, Pauli exclusion principle, Hund's rule of maximum multiplicity, electronic configuration of atoms.	Lecture, Group Discussion, Assignment	CLO1
3.	Radiochemistry: Atomic number and mass number, atomic mass unit, atomic nucleus, Isotopes, Nuclear stability, natural and artificial radioactivity, half-life and average life of radioelements, radioactive decay, nuclear reactions.	Lecture, Group Discussion, Assignment	CLO1
4.	Periodic table: Periodic law, Periodic table, Periodic properties of the elements such as ionization energies, Electron affinity, Electro negativity, Atomic/ionic radius along a period and down a group, Diagonal relationship.	Lecture, Group Discussion, Assignment	CLO2
5.	Chemical bond: Definition and causes chemical bonds, octet rule and duplet rule, types of chemical bonds: ionic, covalent bond, polar and non-polar bond, Ionic character of covalent compound and covalent character of ionic	Lecture, Group Discussion, Assignment	CLO2

	compounds VSEPR theory, Valence bond theory, Hybridization, σ and π -bonding in compounds, Molecular orbital theory, coordination, metallic, hydrogen bonds.		
6.	Chemical Reactions: Physical change and Chemical change, Methods of bringing about chemical reaction, Redox reactions, oxidizing and reducing agents, oxidation state and oxidation number, redox half reactions, rules for balancing redox reactions, acid base reactions.	Lecture, Group Discussion, Assignment	CLO3
7.	Chemical Equilibrium: Equilibrium in chemical reactions. Stoichiometry, law of mass action, concentration Versus time curves, equilibrium law and equilibrium constant: K_p , K_c , and K_x , effects of temperature, pressure and concentration changes of equilibrium, principle and applications of Le Chatelier and Braun, reaction quotient, extent of reaction, thermodynamic equilibrium constant.	Lecture, Group Discussion, Assignment	CLO3
8.	Gaseous State: Vapour and gas, measurable properties of gases, determination of gas pressure, the gas laws: derivation, molecular explanation and practical applications, effusion, diffusion, osmosis, ideal and real gases, ideal gas equation with applications, kinetic theory of gas, deviation from ideal behaviour, Van der Waals equation, critical constants. Dalton's law of partial pressure.	Lecture, Group Discussion, Assignment	CLO4
9.	Liquids and Solutions: Liquids and their characteristics, evaporation, measurement vapour pressure, dependence of vapour pressure on temperature variation, boiling, distillation, Types of solution, solubility and solubility curve, units of concentration for solution, Raoult's law, ideal and non-ideal solutions. Henry's law. a brief treatment of colligative properties.	Lecture, Group Discussion, Assignment	CLO4
10.	pH and Buffer: Ostwald dilution law, solubility product with principle and applications, common ion effect, ionic product of water (K_w), pH with applications, buffer solution, buffer mechanism,	Lecture, Group Discussion, Assignment	CLO4

	Henderson-Hasselbach equation. Acid-base titrations, Acid-base indicators. Theories of acids and bases, conjugate acids and bases, neutralization reactions, acid-base strength, Salts: Classification and their applications, neutralization reactions.		
11.	Aliphatic hydrocarbons: Organic compounds, homologous series, the causes of diversity of organic compounds, Hydrocarbons: classifications and IUPAC nomenclature. Formation of carbocations, carbanion, free radicals and their stabilities. Sources, properties, general methods of preparation of following hydrocarbons: Alkane, Alkene and Alkynes. Classification of organic compounds based on their functional groups.	Lecture, Group Discussion, Assignment	CLO5
12.	Aromatic hydrocarbons: Definition and classification, nucleus and side chain, Structure, preparation and uses of benzene. Aromaticity, Electrophilic aromatic substitution reactions with reference to nitration, halogenation, sulphonation and alkylation. Orientation of substituents in benzene ring, activating and deactivating group.	Lecture, Group Discussion, Assignment	CLO5

List of Books

Bahl, B. S., & Bahl, A. (2024). *Text- Book of organic chemistry*. S. Chand & Company Ltd Ram Nagar, New Delhi-110055

English, J., Cassidy, H.G., & Baird, R. I. (1949). *Principles of organic chemistry: An Introductory Text in Organic Chemistry*. McGraw Hill.

Finar, I. L. (1973). *Organic chemistry, Vol. I*. Pearson Education, India.

Griffin, R. W. (2024). *Modern organic chemistry*. McGraw Hill.

Morrison, R.T. & Boyd, R. N. (1992). *Organic chemistry*. Benjamin-Cummings Pub Co

Muny, J. Mc. (2010). *Organic chemistry*. Thomson Brooks-Cole.

Roberts, J. D., & Caserio, M. C. (1977). *Basic principles of organic chemistry*. W. A. Benjamin, Inc., Menlo Park, CA.

Skoog, D. A., & West, M. D. (2022). *Fundamentals of analytical chemistry*. Publisher, Cengage Learning.

Solomons, T. W. G. (2008). *Fundamental of organic chemistry*. Wiley.

Course Code:	212808	Marks: 50	Credits: 2	Class Hours: 30
Course Title:	Chemistry-I Practical			

Course Objectives

To gain a fundamental knowledge on laboratory safety policy, some inorganic salts and radical analysis, preparation of solution with standardization, titration and precipitation.

Course Learning Outcomes (CLOs)

After completing this course, students will be able to:

CLO1	Discuss about the general laboratory safety policy, rules and regulations and chemical management process.
CLO2	Explain the applications of apparatus and reagents in various experiments, different laboratory glassware and chemicals.
CLO3	Prepare standard solution and pH- neutralization curves
CLO4	Qualitative analysis of mixtures of inorganic salts consisting of up to five different radicals
CLO5	Explain the determination of Fe^{2+} , copper (II), nickel as Ni (HDMG) 2 complex using difference methods.

Mapping of CLOs with PLOs

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12
CLO1	✓	✓			✓	✓		✓				✓
CLO2	✓	✓	✓		✓	✓					✓	✓
CLO3	✓	✓	✓		✓							✓
CLO4	✓	✓	✓	✓	✓						✓	✓
CLO5	✓	✓	✓	✓	✓	✓		✓		✓	✓	✓

Course contents

Module No.	Contents	Teaching-Learning Strategies	CLOs
1	Safety: Introduction of chemical, equipment's and safety in the laboratory.	Lecture, Experimental, Assignment	1-5
2	Preparation: Preparation of $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$ Mohr's salt and potash alum.	Lecture, Experimental, Assignment	1-5
3	Separation and identification: Separation and identification of four radicals from a mixture of anions and cations. The cations are Pb^{2+} , Cu^{2+} , Cd^{2+} , Al^{3+} , Fe^{2+} , Fe^{3+} , Co^{2+} , Ni^{2+} , Zn^{2+} , Ca^{2+} ,	Lecture, Group Discussion, Experimental, Assignment	1-5

	Ba ²⁺ , Na ⁺ , K ⁺ , and NH ₄ ⁺ , the anions are NO ₃ ⁻ , CO ₃ ²⁻ , S ²⁻ , SO ₄ ²⁻ , Cl ⁻ , Br ⁻ and I ⁻ .		
4	Standardization: Standardization of NaOH solution using standard oxalic acid solution.	Lecture, Experimental, Assignment	1-5
5	Determination: Determination of Fe ²⁺ using standard permanganate solution.	Lecture, Experimental, Assignment	1-5
6	Iodometric method: Iodometric determination of copper (II) using standard Na ₂ SO ₃ solution.	Lecture, Group Discussion, Experimental, Assignment	1-5
7	Gravimetric Method: Gravimetric determination of nickel as Ni (HDMG) ₂ complex.	Lecture, Group Discussion, Experiment, Assignment	1-5
8	pH-Neutralization Curves: Determination of the pH-neutralization curves of a strong acid by a strong base.	Lecture, Experiment, Assignment	1-5

List of Books

Alexeyev, V. (2024). *Qualitative analysis*. Mir Publishers.

Braun, D. R. (2024). *Introduction to chemical analysis*. McGraw Hill International.

Christian, G. D. (2023). *Analytical chemistry*. John Wiley & Sons.

Vogel, A. I. (2017). *A Text-Book of macro and semimicro qualitative inorganic analysis*.

Longmans, Green and Co. Ltd.

Welcher, F. J., & Hahn, R. B. (2024). *Semimicro qualitative analysis*. D. Van Nostrand Co. Inc.

Course Code:	213709	Marks: 100	Credits: 4	Class Hours: 60
Course Title:	Foundations of Mathematics			

Course Description

Foundations of Mathematics provides the basic tools required for higher studies in mathematics and related fields. The course covers relations and functions, real and complex number systems, polynomial equations, algebraic and geometric series, two- and three-dimensional geometry, and vectors.

Objective of the Course

To give students a clear understanding of essential mathematical concepts and techniques, preparing them for advanced courses in mathematics and allied disciplines.

Course Learning Outcomes (CLOs)

After completing this course, students will be able to:

CLO1	Define and explain basic concepts of relations, functions, and their graphs.
CLO2	Demonstrate understanding of real and complex numbers and apply their properties in problem-solving.
CLO3	Solve polynomial and related equations using appropriate methods.
CLO4	Apply formulas of algebraic and geometric series to compute sums and related results.
CLO5	Use the principles of two- and three-dimensional geometry to solve basic geometrical problems.
CLO6	Explain the basic concepts of vector space and apply them to simple problems.
CLO7	Represent and manipulate vectors in two and three dimensions to solve problems in mathematics and other fields.

Mapping of CLOs with PLOs

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12
CLO1	✓	✓							✓			✓
CLO2	✓	✓	✓					✓	✓		✓	✓
CLO3	✓	✓	✓		✓				✓		✓	✓
CLO4	✓	✓	✓						✓		✓	✓
CLO5	✓	✓	✓		✓			✓	✓	✓	✓	✓
CLO6	✓	✓	✓		✓				✓		✓	✓
CLO7	✓	✓	✓		✓	✓			✓		✓	✓

Course Contents

Module No.	Contents	Teaching-Learning Strategies	CLOs
1	Relations and functions: Relations; Order relation; Equivalence relations; Functions; Images and inverse images of sets; Injective, surjective, and bijective functions; Inverse functions.	Whiteboard-based lecture, Assignment, Short presentations by students	CLO1
2	Real Number System: Field and order properties; Prime numbers; Natural numbers; Integers and rational numbers; Absolute value and its properties; Basic inequalities (including inequalities of means and powers); Inequalities of Cauchy, Chebyshev, Weierstrass.	Whiteboard-based lecture, Assignment	CLO2
3	Complex Number System: Field of Complex numbers; De Moivre's theorem and its applications.	Whiteboard-based lecture, Assignment	CLO2
4	Matrices and Determinants: Notion of matrix; Algebra of matrices; Different types of matrices; Invertible matrices; Determinant function; Properties of determinants; Minors, Cofactors, expansion, and evaluation of determinants. Elementary row and column operations and row-reduced echelon matrices, Invertible matrices, Diagonal, triangular, and Symmetric matrices.	Whiteboard-based lecture, Assignment	CLO3
5	System of Linear Equations: Linear equations; System of linear equations (homogeneous and non-homogeneous) and their solutions using different methods. Gaussian elimination, Application of matrices and determinants for solving systems of linear equations, Applications of systems of equations in real-life problems.	Whiteboard-based lecture, Assignment	CLO3
6	Summation of finite series: Arithmetic and geometric series; Method of difference; Successive differences; Summation of trigonometric series.	Whiteboard-based lecture, Assignment	CLO4
7	Theory of Equations: Relations between roots and coefficients; Symmetric functions of roots; Sum of the powers of roots; Synthetic division; Descartes' rule of	Whiteboard-based lecture, Assignment	CLO3

	signs; Multiplicity of roots; Transformation of equation.		
8	Two-dimensional Geometry: Transformation of coordinates, Pair of straight lines (homogeneous second-degree equations, General second-degree equations representing pair of straight lines, angle between pair of straight lines, Bisectors of angle between pair of straight lines), General equations of second degree (reduction to standard forms, Identifications, Properties and tracing of conics).	Whiteboard-based lecture, Assignment	CLO5
9	Three-dimensional Geometry: Three-dimensional coordinates, Distance, Direction cosines and direction ratios, Planes and straight lines.	Whiteboard-based lecture, Assignment	CLO5
10	Vector Geometry: Vectors in plane and space; Algebra of vectors; Rectangular components; Scalar and Vector products; Coplanar vectors; Scalar triple product and vector triple product; Applications of vectors to geometry (vector equations of straight lines and planes, areas and volumes).	Whiteboard-based lecture, Assignment	CLO6 CLO7
11	Vector Spaces: Euclidean n -space, Real vector spaces, Subspaces, Linear combination of vectors, Linear dependence of vectors, Basis and dimension, Linear transformations, Matrix representation of linear transformation, Kernel and image, Eigenvalues and Eigenvectors.	Whiteboard-based lecture, Assignment	CLO6 CLO7

List of Books

Anton, H., & Rorres, C. (2013). *Elementary linear algebra with applications* (11th ed.). Wiley.

Barnard, S., & Child, J. M. (1997). *Higher algebra* (6th ed.). Cambridge University Press.

Hall, H. S., & Knight, S. R. (1992). *Higher algebra* (7th ed.). Macmillan. Hummel.

J. A. (1994). *Vector geometry*. Prentice Hall.

Khosh Mohammad. (2010). *Analytic geometry and vector analysis*. Ideal Library, Dhaka.

Lipschutz, S. (1997). *Schaum's outline of set theory and related topics* (Schaum's Outline Series). McGraw-Hill.

Rahman, M. A. (2015). *Basic algebra*. Nahar Book Depot and Publications, Dhaka.

Rahman, M. A. (2016). *Linear algebra*. Nahar Book Depot and Publications, Dhaka.

Spiegel, M. R. (1974). *Vector analysis* (Schaum's Outline Series). McGraw-Hill

Course Code:	213711	Marks: 50	Credits: 2	Class Hours: 30
Course Title:	Calculus-I			

Course Description

Calculus is one of the most fundamental courses in Mathematics, which consists of two parts (Differential and Integral). The course is designed to develop the topics of Differential and Integral calculus. Understanding this course will enable everyone to learn other mathematical courses that require the fundamentals of differentiation and integration.

Objective of the Course

- a) To develop the basic ideas of functions and their graphs.
- b) Learning the basic properties of limit and continuity and analyzing them both mathematically and graphically.
- c) To understand the ideas and applications in solving real-life-oriented problems of differentiation and integration.

Course Learning Outcomes (CLOs)

After completing this course, students will be able to:

CLO1	Identify and graph various types of functions, including polynomial, rational, exponential, logarithmic, trigonometric, and hyperbolic functions, and describe their key properties.
CLO2	Explain the concepts of limits and continuity, and apply relevant theorems to compute limits.
CLO3	Apply techniques of differentiation, including rules and theorems (e.g., Leibniz's rule), to solve problems related to rates of change and approximations in mathematical and real-life contexts.
CLO4	Analyze functions using derivative-based tools, such as the Mean Value Theorem, to determine maximum and minimum values, and concavity, to solve optimization and curve analysis problems.
CLO5	Apply techniques of integration (definite and indefinite) and related theorems to solve problems involving area, volume, arc length, and surface area.
CLO6	Apply approximation techniques using Taylor polynomials and series to estimate function values and analyze convergence.
CLO7	Evaluate series expansions and perform differentiation and integration of series to solve complex calculus problems.

Mapping of CLOs with PLOs

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12
CLO1	✓	✓							✓			✓
CLO2	✓	✓	✓						✓		✓	✓
CLO3	✓	✓	✓		✓				✓		✓	✓
CLO4	✓	✓	✓						✓		✓	✓
CLO5	✓	✓	✓		✓				✓		✓	✓
CLO6	✓	✓	✓						✓		✓	✓
CLO7	✓	✓	✓						✓		✓	✓

Course Contents

Module No.	Contents	Teaching Learning Strategies	CLOs
1	Functions and Their Graphs: Polynomial and rational functions; logarithmic and exponential functions; trigonometric functions and their inverses; hyperbolic functions and their inverses; combinations of such functions.	Whiteboard-based lecture, Assignment	CLO1
2	Limit and Continuity: Definitions and basic theorems on limit and continuity; Limit at infinity and infinite limits; Computation of limits.	Whiteboard-based lecture, Assignment	CLO2
3	Differentiation: Tangent lines and rates of change; Definition of derivative; One-sided derivatives; Rules of differentiation; Successive differentiation; Leibnitz's theorem; Related rates; Linear approximations and differentials.	Whiteboard-based lecture, Assignment, Tutorial	CLO3
4	Applications of Differentiation: Mean value theorem; Maximum and minimum values of functions; Concavity and points of inflection; Optimization problems.	Whiteboard-based lecture, Assignment	CLO4
5	Integration: Antiderivatives and indefinite integrals; Techniques of integration; Definite integration using antiderivatives; Fundamental theorems of calculus; Basic properties of integration; Integration by reduction.	Whiteboard-based lecture, Assignment	CLO5
6	Applications of Integration: Arc length; Plane areas; Surfaces of revolution; Volumes of solids of revolution; Volumes by cylindrical shells; Volumes by cross sections.	Whiteboard-based lecture, Assignment	CLO5

7	Approximation and Series: Taylor polynomials and series; Convergence of series; Taylor's series; Taylor's theorem and remainders; Differentiation and integration of series.	Whiteboard-based lecture, Assignment	CLO6 CLO7
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List of Books

- Anton, H., Bivens, I. C., & Davis, S. (2016). *Calculus: Early transcendentals* (11th ed.). Wiley.
- Das, B. C., & Mukherjee, B. N. (1938). *Integral calculus*. U. N. Dhur & Sons Pvt. Ltd, Kolkata.
- Das, B. C., & Mukherjee, B. N. (1949). *Differential calculus*. U. N. Dhur & Sons Pvt. Ltd, Kolkata.
- Matin, M. A., & Chakraborty, B. (1994). *Differential calculus*. Standard Publications, Dhaka.
- Mohammad, K., & Bhattacharjee, P. K. (1987). *Integral calculus* (6th ed.). H. Bhattacharjee, Chittagong.
- Mohammad, K., Bhattacharjee, P. K., & Latif, M. A. (1968). *Differential calculus* (1st ed.). S. Tripathy, Chittagong.
- Stewart, J. (2015). *Calculus: Early transcendentals* (8th ed.). Cengage Learning.
- Swokowski, E. W. (1988). *Calculus with analytic geometry* (6th ed.). Brooks/Cole.
- Thomas, G. B., & Finney, R. L. (1996). *Calculus and analytic geometry* (9th ed.). Addison-Wesley.

Course Code:	213007	Marks:100	Credits: 4	Class Hours: 60
Course Title:	Botany -1			

Course objectives

This course aims to introduce non-major students to the fundamentals of plant biology, including the origin and evolution of life, and the key differences between plants and animals. It covers microorganisms, algae, lichens, and major plant groups such as bryophytes, pteridophytes, gymnosperms, and angiosperms, focusing on their classification, structure, reproduction, and economic importance. Students will also learn basic plant pathology and the significance of plants in daily life, including their uses in food, medicine, and industry.

Course Learning Outcomes (CLOs)

After going through the course, students will be able to learn the following outcomes

CLO1	Describe the origin and evolution of life and differentiate between plant and animal characteristics.
CLO2	Explain the structure, reproduction, classification, and importance of viruses, bacteria, viroids, prions, rickettsia, and mycoplasma.
CLO3	Demonstrate understanding of the morphology, reproduction, classification, and ecological roles of fungi, cyanobacteria, and algae.
CLO4	Identify key features and importance of phytoplankton, lichens, and aquatic ecosystems.
CLO5	Classify and describe major plant groups: bryophytes, pteridophytes, gymnosperms, and angiosperms, including their life cycles and economic roles.
CLO6	Recognize economically important plant families and their characteristics using plant classification systems.
CLO7	Explain the causes, symptoms, and control measures of common plant diseases and understand the principles of plant pathology
CLO8	Identify and describe the uses of economically important plants for food, medicine, timber, fiber, oil, and vegetables, including processing methods for tea and rubber.

Mapping of CLOs with PLOs

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12
CLO1	✓	✓										✓
CLO2	✓	✓	✓							✓	✓	✓
CLO3	✓	✓			✓							✓
CLO4	✓	✓										✓
CLO5	✓	✓										✓
CLO6	✓	✓										✓
CLO7	✓	✓										✓
CLO8	✓	✓										✓

Course Contents

Module No.	Contents	Teaching-Learning Strategies	CLOs
1.	Introduction: Origin and evolution of life; differences between plants and animals; modern concepts of classification of living organisms.	Lecture, PPT, Discussion	CLO1
2.	Microbiology: a) Introduction to Viroids, Prions, Rickettsia and Mycoplasma. b) Virus: Physical and chemical nature of phage, plant and animal viruses, multiplication of HIV virus and economic importance. c) Bacteria: Types, fine structure, reproduction and importance. d) Fungi: Habitat, characteristics, classification up to class (Alexopoulos), reproduction, importance, life history of <i>Saccharomyces</i>. e) Cyanobacteria: Habitat, characteristics, structure, importance of Cyanobacteria . f) Algae: Habitat, characteristics, classification up to class (Fritsch), reproduction, importance; life history of <i>Oeodogonium</i>. g) Phytoplankton: Habitat, characteristics, classification and importance.	Lecture, Group discussion, Video presentations	CLO2
3.	Lichen: Habitat, characteristics, classification and importance.	Illustrated lecture, Model demonstration	CLO2
4.	Limnology: Definition, scope, importance and classification of lakes.	Chalk-talk, Diagrams, Group activities	CLO3
5.	Bryophyta: Habitat, characteristics, classification up to classes and reproduction; life history of Riccia and Anthoceros.	Lecture with images, Case studies	CLO3
6.	Pteridophyta: Habitat, characteristics, classification up to classes, importance; life history of Selaginella	Hands-on lab, Lecture	CLO5

	and Christella.		
7.	Gymnosperms: Habitat, characteristics and importance; life history of Cycas and Gnetum.	Illustrated discussion, Lab demo	CLO4
8.	Angiosperms: Habitat, characteristics, ICBN, classification systems of plant kingdom. (Artificial, natural & phylogenetic). Identifying characters and economic importance of the following families: (a) Fabaceae, (b) Solanaceae and (c) Malvaceae and (d) Poaceae.	Field visit, Family specimens	CLO6
9.	Plant Pathology: Concept of diseases in plants, causes, diagnosis, classification and importance of plant diseases, symptomatology and control measures; forecasting of plant diseases. Causal organisms, symptoms and control measures of brown spot of rice, blast disease of rice, tungro disease of rice, bacterial blight of rice, stem rot of jute, anthracnose of chilli, citrus canker and soft rot of jackfruit.	Case studies, Lecture, Sample study	CLO7
10.	Economic Botany: Local and scientific names, parts used and importance of at least 8 prominent plants of each of the following groups: (a) Food, (b) medicine, (c) timber, (d) fibre, (e) oil and (f) vegetables. Cultivation and processing of tea and rubber.	Case studies, Lecture, Sample study	CLO7

Course Code:	213008	Marks:50	Credits: 2	Class Hours: 30
Course Title:	Botany Practical-I			

Course Objectives

The practical component of this course aims to provide students with foundational skills in identifying and observing major plant groups and microorganisms. Students will learn to examine structural features of algae, fungi, bryophytes, pteridophytes, gymnosperms, and angiosperms. Emphasis is placed on understanding the economic importance of plants and recognizing common plant diseases through specimen observation. Basic techniques such as slide preparation, microscopic analysis, and scientific drawing will also be practiced.

- Detail study including dissection (where necessary), mounting, drawing, description and identification with classification of the following genera: 10

Cyanobacteria:	<i>Nostoc, anabaena</i>
Algae:	<i>Saccnaromyces and Accoboius</i>
Bryophyte:	<i>Riccia and Marchantia</i>
Pteridophyte:	<i>Selaginella, Christella</i>
Gymnosperms:	<i>Cycas</i>
Angiosperm:	Poaceae and Fabaceae
- Identification of the following genera with reasons: 06

Algae:	<i>Volvox, Polysiphonea and Fucas.</i>
Fungi:	<i>Rhizopus, A garicus, Puccinia and Penicillium.</i>
Lichen:	<i>Crustose, Foliose and Fructose.</i>
Bryophyte:	<i>Anthoceros, Semibarbula.</i>
Pteridophyte:	<i>Selaginella, Marsilea, Azolla and Pteris</i>
Gymnosperms	Male and female cones of <i>Cycas</i>
Angiosperms:	Scientific names of common plants around the institution.
- Find out algal specimens from local fresh water sample; draw and describe 05
- Study of the symptoms and causal organisms of Brown spot of rice and stem rot of Jute. 05
- Detailed taxonomic study of the families as included in the theory syllabus. 08
- Study of plant and plant parts, and economic uses of angiosperms included in the syllabus. 06
- Preparation of herbarium specimens of local plants and submission during examination. 05
- Laboratory Note book. 05

List of Books

- Agrios, G. N. (1997). *Plant pathology* (4th ed.). Academic Press.
- Alam, A. R., & Mojumder, Z. (n.d.). *Mouluka botany* (Vols. 1, 2, & 3).
- Bold, H. C., & Wynne, M. J. (1978). *Introduction to the algae*. Prentice Hall of India.
- Hawker, L. E. (1967). *Fungi*. Cambridge University Press.
- Hill, F. A. (1972). *Economic botany*. Tata McGraw-Hill Publishing Company.
- Lawrence, G. H. M. (1951). *Taxonomy of vascular plants*. The Macmillan Company.
- Mukherji, H., & Ganguly, A. K. (2000). *Plant groups*. Central Book Agency.
- Pelczar, M. J., Chan, E. C. S., & Krieg, N. R. (1993). *Microbiology: Concepts and applications*. McGraw-Hill Inc.
- Vashishta, P. C. (1993). *Botany for degree students: Pteridophyta*. S. Chand & Company Ltd.
- ইসলাম, এম. আর., সাহা, এম. এল., এবং বাসার, এম. এ. (২০০৪). *অণুজীব বিজ্ঞান*, হাসান বুক হাউজ, ঢাকা।
- রায়, এস. কে., পাল, এন. কে., এবং পাশা, এম. কে. (১৯৯৫). *অপুষ্পক উদ্ভিদবিজ্ঞান (১ম)*, বাংলা একাডেমী, ঢাকা।

Course Code:	213107	Marks:100	Credits: 4	Class Hours: 60
Course Title:	Zoology –I			

Course Objectives

This course is an introduction to basic concepts in biology through study of the major lineages of invertebrate with emphasis on the ontogeny, structure, and function of organ systems. The students will be able to understand the living organisms with a focus on the animal kingdom and their direct impact on our economy.

Course Learning Outcomes (CLOs)

After going through the course, students will be able to learn the following outcomes:

CLO1	Fundamental Knowledge: Explain the scope, levels of biological organization, and foundational zoological concepts with emphasis on animal diversity and phylogeny.
CLO2	Biodiversity & Taxonomy: Identify and classify major animal phyla and economically significant species using morphological, ecological, and systematic criteria, with focus on Bangladesh's fauna.
CLO3	Practical Research Skills: Apply field and laboratory techniques to study animal anatomy, life cycles, and biodiversity, including calculations of diversity indices for local ecosystems.
CLO4	Applied Zoology: Analyze the role of zoology in agriculture, fisheries, and public health, proposing context-specific solutions for Bangladesh.
CLO5	Ethics & Communication: Present scientific findings on animal systems through structured reports or presentations, adhering to ethical guidelines in wildlife research and conservation.

Mapping of CLOs with PLOs

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12
CLO1	✓	✓										✓
CLO2	✓	✓	✓							✓	✓	✓
CLO3	✓	✓			✓							✓
CLO4	✓	✓								✓		✓
CLO5	✓					✓		✓				✓

Course Contents

Contents	Teaching Learning Strategy	CLOs
Group-A: General Zoology		
1. Introduction to Zoology: Definition and scope of zoology. Foundation of animal life: Level of organization (protoplasmic, cellular, tissue, organ, organ system, organism, species, individual, population, community, fauna, biota, ecosystem, biosphere, biodiversity. Cells: Cell and cell theory, structure and functions of cell organelles. Gametogenesis: Spermatogenesis and oogenesis; placentation. Classification of animals: Animal kingdoms; classification up to phyla based on organization, symmetry, coelom and phylogeny; different taxa, Linnean hierarchy and nomenclature.	Lecture, and Group Discussion,	CLO1
2. Biodiversity: Concept, types, components, importance and values, bioresources – threats and conservation importance, estimation and calculation process of biodiversity, faunal diversity in Bangladesh.	Lecture, Group Discussion, Assignments and tutorial sessions	CLO2 & CLO3
3. Methods of Studying Animals: Survey of aquatic and terrestrial animals; Methods of animal collection, transportation, preservation, identification, description, tagging	Lecture, Group Discussion, and Assignments	CLO3 & CLO5
4. Systematics: Identifying characteristics, life cycle, habitats, and economic importance of a. Zooplankton: Radiolarians, foraminiferans, and dinoflagellates, cnidarians, and crustaceans b. Parasitic and vector insects: Fleas, lice, mites, ticks, mosquitoes, and various flies c. Aquatic Insects: Trichoptera, Ephemeroptera, True bugs, Odonata, Plecoptera, Beetles, Caddisflies, Non-biting midges, Coleoptera, Diptera, Dragonflies and damselflies, Mayflies, Stoneflies	Lecture, Group Discussion, Lab demo and Field visit	CLO2
Group B: Type Study		
1. Short study: Diagnostic characteristics and economic importance of the following non-chordates with examples – Apicomplexa, Ciliophor, Porifera, Cnidaria, Ctenophora, Platyhelminthes, Gastrotricha, Nematomorpha, Rotifera, <i>Trypanosoma</i> , <i>Leishmania</i> , <i>Amoeba</i> , <i>Monocystis</i> , <i>Nosema</i> , <i>Spongilla</i> , <i>Adamsia</i> , <i>Fasciola</i> , <i>Schistosoma</i> , <i>Convoluta</i> , <i>Diphyllbothrium</i> , <i>Ancylostoma</i> , <i>Enterobius</i> , <i>Wuchereria</i> , <i>Loa</i> , <i>Trichuris</i> , <i>Loligo</i> , <i>Octopus</i> , <i>Mytilus</i> , <i>Sepia</i> , <i>Tubifex</i> , <i>Limulus</i> , <i>Eupagurus</i> , <i>Squilla</i> , moths & butterflies, termite, bugs and bees	Lecture, Group Discussion, and Assignments	CLO2

2. Descriptive study: Systematic position, habitats, external morphology, organ systems such as digestion, movement, circulation, respiration, excretion, nervous, and reproduction and development; food and feeding habits– a. Phylum Sarcomastigophora: <i>Euglena</i> b. Phylum Ciliophora: <i>Paramecium</i> c. Phylum Porifera: <i>Scypha</i> d. Phylum Cnidaria: <i>Obelia</i> e. Phylum Nematoda: <i>Ascaris</i> f. Phylum Platyhelminthes: <i>Taenia</i> g. Phylum Mollusca: <i>Pila</i> h. Phylum Arthropoda: Prawn i. Phylum Echinodermata: <i>Astropecten</i> j. Phylum Hemichordata: <i>Balanoglossus</i>.	Lecture, Group Discussion, and tutorial sessions	CLO1
3. Applied Zoology: a. Introduction to the major fields of Applied Zoology: Entomology, Fisheries, Wildlife Biology, Parasitology and others. b. Agricultural Pests: Major Pests of Rice, Jute, Sugarcane & stored grain. c. Integrated Fish Farming: Types; Poultry, Livestock and Paddy-cum -Fish Culture. d. Poultry farming: g of poultry farming, diseases of poultry and their control, economic importance of poultry and their impacts on socio-economic condition of Bangladesh.	Lecture, Group Discussion, Assignments and Field visit	CLO4 & CLO5

List of Books

- Campbell, N., & Reece, J. (2005). *Biology* (7th ed.). Pearson
- Gaston, K. J., & Spicer, J. I. (2013). *Biodiversity: An introduction* (2nd ed.). John Wiley and Sons Inc., New York.
- Hickman, C.P., Keen, S. L., Eisenhour, D.J., Larson, A., & I'Anson, H. (2023). *Integrated principles of zoology* (19th ed.). McGraw-Hill Co. Inc., New York, USA.
- Nigam, H. C. (2013). *Biology of non-chordates*. Vishal Publishing Co., India.
- Parker, T. J. & Haswell, W. A. (2005). *Text book of zoology* (Vol. I). Macmillan
- Ruppert, E. E., Fox, R. S., & Barnes, R. D. (2006). *Invertebrate Zoology* (8th ed.). Holt Saunders International edition
- Singla, M., Kaur, A., Sitre, S. R., & Gupta, A. (2023). *Applied zoology and animal biotechnology* (1st ed.). AG Publishing House, India.
- উদ্দিন, প্র. মোঃ. না. (২০০৪). স্নাতক প্রাণিবিজ্ঞান. (প্রোটোজোয়া এবং নন-কর্ডাটা). নিসর্গ প্রকাশনী-বাংলা বাজার, ঢাকা।
- দত্ত, স্ব. কু., এবং অন্যান্য., (২০০৪). প্রাণিবৈচিত্র-প্রথম খণ্ড-অমেরুদণ্ডী প্রাণী. মল্লিক ব্রাদার্স-বাংলা বাজার, ঢাকা।
- হোসেন, আ. এবং অন্যান্য., (২০০৩). প্রাণিবিজ্ঞান পরিচিতি. মল্লিক ব্রাদার্স, বাংলাবাজার, ঢাকা।

Course Code:	213108	Marks:50	Credits: 2	Class Hours: 30
Course Title:	Zoology Practical-I			

1. **Study of museum specimens:** Representative of all major non-chordate phyla (*Sycon*, *Spongilla*, *Spongia*, *Physalia*, *Metridium*, *Adamsia*, *Ascaris*, *Fasciola*, *Taenia*, *Nereis*, *Arenicola*, *Pheretima*, *Hirudo*, *Sipunculus*, *Lingula*, prawn, *Chiton*, *Pila*, *Unio*, *Nautilus*, *Sepia*, *Loligo*, *Octopus*, *Eupagurus*, *Limulus*, millipedes, centipedes, *Palaemon*, *Antedon*, *Asterias*, *Echinus*, *Holothuria*)
2. **Study of permanent slides:** Whole mount, body parts and various cells and invertebrate tissues (at least 10 slides to be studied)
 - a. Whole animals – representatives of protozoans, rotifers and arthropods.
 - b. Mouth parts of arthropods.
 - c. Parasites – nematodes and platyhelminths.
 - d. Different larval forms of invertebrates.
 - e. Histological slides of invertebrates.
3. **Preparation and study of whole mounts of different non-chordates.**
4. **External morphology and dissection of various organ systems of earthworm, cockroach, prawn, *Pila* and *Lamellidens*.**
 - a. Digestive system of prawn, *Pila* and *Lamellidens*.
 - b. Nervous system of cockroach, grasshopper, prawn, *Pila* and *Lamellidens*.
5. **Temporary mounting –**
 - a. Brain of earthworm.
 - b. Salivary gland of cockroach.
 - c. Statocyst of prawn.
6. **Study the appendages of prawn.**
7. **Animal physiology –**
 - a. Estimation of blood pressure and pulse rate.
 - b. Determination of blood group.
8. **Class records.**

Distribution of Marks for First Year Final Examination

1. Major dissection (dissection 8 + display 2 + drawing and labeling 3) = 13 marks.
2. Temporary mount (staining, mounting and display 3 + drawing and labeling 2) = 5 marks.
3. Spotting of museum specimens – 8 items (identification and classification 1 + diagnostic characteristics 1) = 16 marks.
 - Invertebrate specimens (4 items) $2 \times 4 = 8$ marks.
 - Whole mount slides (mouth parts, parasites, larvae) (2 items) $2 \times 2 = 4$ marks.
 - Histological slides (2 items) $2 \times 2 = 4$ marks.
4. Appendages (detachment, placement and drawing on a Course sheet 3, labeling 2, displaying 1) = 6 marks.
5. Class records = 10 marks

Course Code:	213607	Marks:100	Credits: 4	Class Hours: 60
Course Title:	Fundamentals of Statistics			

Course Objectives

To be able to understand the nature, characteristics, scope, application and abuse of statistics. To make familiar with data, nature of data, how to process and condense the data, sources of data and graphical presentation of data, and to apply appropriate statistical tools and techniques to analyze the data. To acquaint students with necessary skills for solving probability related problems using appropriate laws. To provide knowledge on time series and statistical indices.

Course Learning Outcomes (CLOs)

After going through the course, students will be able to learn the following outcomes

CLO1	Understand the nature, characteristics, scope, application and abuse of statistics. Knowledge on sources of data and how to process, condense and presentation of data. Understand different characteristics of statistical data such as measures of location, dispersion, moments, skewness, kurtosis and their properties.
CLO2	Understand the relationship between variables such as simple correlation, rank correlation, correlation ratio, simple regression analysis. standard error of estimators of regression coefficients & their properties and fitting of regression lines.
CLO3	Comprehend different approaches of defining probability and useful laws of probability to solve problems. Also learn some commonly used probability distributions.
CLO4	Gain knowledge about meaning and application of statistical indices.
CLO5	Identify the pattern and trends and isolate the influencing factors of the time series data for future planning and control.
CLO6	Understand the concept of numerical methods, including interpolation and use of numerical methods in application to real problems.

Mapping of CLOs with PLOs

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12
CLO1	✓	✓										✓
CLO2	✓	✓	✓									✓
CLO3	✓	✓	✓									
CLO4	✓	✓										
CLO5	✓	✓	✓									✓
CLO6	✓	✓										✓

Course Contents

Module No.	Contents	Teaching Learning Strategies	CLOs
1	Descriptive Statistics: Statistics–Its nature and some important uses, Qualitative and quantitative data, Classification, Tabulation and frequency distribution, Graphical representation of data, Measures of location, Measures of Dispersion, Skewness and Kurtosis, Mathematical relationship among different measures of location, dispersion, Skewness and kurtosis.	Lecture, Assignment	CLO1
2	Bivariate Data: Correlation coefficient, Correlation analysis, The purpose and uses of regression analysis, Simple regression and methods of least squares and estimation of parameters, Correlation ratio, Rank correlation, Partial and multiple correlation.	Lecture, Assignment	CLO2
3	Elementary Probability: Meaning of Probability, Classical and empirical definitions of Probability, Axiomatic approach of defining probability, Event, Sample space and simple problems on probability, Addition rule, Conditional probability, Multiplication rule and Bayes theorems, The concept of a random variables, Probability function and probability density function, Joint probability function. Marginal and conditional distributions, Statistical independence, expected value and related theorems, Moment generating function, Common probability distributions, Binomial, Poisson and Normal probability distributions.	Lecture, Group Discussion, Assignment	CLO3
4	Index Number: Concept of an index number and problems in the construction of index number, Types of indices (Price, Quantity, Value and cost of living	Lecture, Group Discussion, Workshop and Assignment	CLO4

	indices) and their uses, Tests for index numbers.		
6	Time Series analysis: Elements of time-series analysis, Measurement of trend by moving average, By least square method, Trend curve, Determination of seasonal indices, Cyclical movements.	Lecture, Group Discussion, and Assignment	CLO5
7	Numerical Mathematics: Differences of a polynomial, Finite difference operator, Difference table, Newton's formula and starling's central difference formula, Inverse interpolation, Numerical integration.	Lecture, Group Discussion, Workshop and Assignment	CLO6

List of Books

Gupta, S.C. & Kapoor, V.K. (1994). Fundamentals of *applied statistics*. Sultan Chand & Sons.

Hoel, P.G. (1971). *Introduction to statistics (4th ed.)*. Wiley and Sons

Islam, M.N. (2015). *An introduction to statistics and probability (4th ed.)*. Mullick & Brothers.

Jalil, M. A., & Ferdous R. (1999). *Basic statistics: Methods and applications*, Robi Publications.

Mostafa, M.G. (1989). *Method of statistics (4th ed.)*. Karim press and Publications.

Shil, R. N., & Debnath, S.C. (2016). *An introduction to the theory of statistics*. Star Publications.

Simpson, G., & Kapka, F. *Basic statistics*. Oxford Ibh Publishing Co.

Weiss, N. A., & Weiss, C. A. (2012). *Introductory statistics*. Pearson Education.

Course Code:	213610	Marks:50	Credits: 2	Class Hours: 30
Course Title:	Lab-1: Fundamentals of Statistics			

Data condensation and tabulation. Formation of frequency distribution from both qualitative and quantitative data. Construction of bivariate table. Graphical representation of data. Measures of location and dispersion, Calculation of moments, Measures of skewness and kurtosis. Simple correlation coefficient and fitting of regression lines. Computation of rank correlation coefficient. Fitting of Binomial, Normal and Poisson's distributions, Finding trend values and seasonal variation from time series data by different methods, Calculation of Index numbers and test of index number, Use of Newton's forward and backward formula, Solution of numerical integration.

GROUP-B (Any Three)

Course Code:	212009	Marks:100	Credits: 4	Class Hours: 60
Course Title:	Introducing Sociology			

Course objectives

The course is designed to provide foundational knowledge of sociology as a social science. It will explain key concept, principles and perspectives in sociology. It will highlight various structural issues like major social institutions, inequality, social classes, population and urbanization. Besides this, the course helps the students to develop sociological thinking to understand society and human behavior.

Course Learning Outcome (CLO)

After going through the course, students will be able to learn the following outcomes

CLO1	Students will be demonstrating knowledge about preliminary ideas of sociology.
CLO2	They will be informed about the contributions of sociologists.
CLO3	They will apply several procedures of scientific social research.
CLO4	They will explain various terms of culture and cultural diversity in society.
CLO5	Students will get knowledge about different types and evolution of society.
CLO6	Students will know both about social institutions and various factors which contribute to social stratification and mobility within society.
CLO7	They will recognize different social problems of Bangladesh.
CLO8	They will be able to analyse the influences of social forces on individual behavior and social change which happens globally.

Mapping of Clos with PLOs

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12
CLO1	✓	✓										✓
CLO2	✓	✓	✓									
CLO3	✓	✓			✓							
CLO4	✓											
CLO5	✓											
CLO6	✓											
CLO7	✓											
CLO8	✓	✓										

Course Contents

Module	Contents	Teaching-Learning Strategies	CLOs
1	Definition, Scope and Development of Sociology: Definition of Sociology, Nature and scope of Sociology, Emergence of Sociology, Importance of Sociology as a science, Value freeness of sociology, relation with other scientific subjects.	Lecture and Assignment	CLO1
2	Founding thinkers and major theoretical perspectives: Auguste Comte, Karl Marx, Herbert Spencer, Emile Durkheim, Max Weber, Functionalist, conflict and Interactionist perspectives.	Lecture, Assignment and Group discussion	CLO2
3	Major Methods and Techniques of Sociology: Social research, Qualitative and Quantitative techniques, Survey method, Comparative Method, historical method, Scientific method, Case study, FGD, Interviews, Observation, and Experiments. Ethics in social research.	Lecture, Fieldwork and Group presentation	CLO3
4	Culture, Society and Civilization: Meaning and characteristics of culture, elements of culture and cultural change, Cultural lag, civilization, culture and civilization, community, organization and group.	Lecture, Assignment and Group Discussion	CLO4
5	Evolution and different types of society: Hunting and food gathering society, Horticultural society, Agricultural Society, Industrial society, Primitive communism, Slavery, Feudal, Capital, Socialism, Different types of capitalism, Socialism and modern communism,	Lecture and Assignment	CLO5
6	Social Institutions: Marriage and family, education, religion, economy and state. Characteristics and functions of each institution. Changing nature of institutions in modern society.	Lecture and Assignment	CLO6
7	Social problems and Inequality: Nature of social problems, Population problem, poverty, unemployment, crime and deviance, corruption, drug addiction, over-urbanization. Social inequality and forms of stratification: caste, class race and	Lecture and Assignment	CLO7

	gender. Theories of inequality and social mobility.		
8	Social Interaction and Social Change: Social interaction and exchange, socialization, Causes of Social Change, theories of Social Change, technology and Social Change, globalization and its impact. Postmodern and postindustrial society.	Lecture and Assignment and Group Discussion	CLO8

List of Books

Giddens, A. (2009). *Sociology (6th ed.)*. The Polity Press.

Goldthorpe, J. E. (1985). *An introduction to sociology*. Cambridge University Press.

Haralambos, M., & Holborn, M. (2013). *Sociology: Themes and perspectives*. Harper Collins publications.

Ritzer, G., & Murphy, W. W. (2019). *Introduction to sociology*. SAGE publications.

Schaefer, R. T. (2012). *Sociology: A brief introduction (10th ed.)*. McGraw-Hill.

Stolley, K. S. (2005). *The basics of sociology (1st ed.)*. Greenwood Press.

Turner, B. S. (1999). *Classical sociology (91st ed.)*. Sage Publications.

ড. সেন, র. (১৯৯৭) *বাংলাদেশের সামাজিক স্তরবিন্যাস*, (২য় সংস্করণ), ঢাকা, বাংলাদেশ: নিউ এজ পাবলিকেশনস।

ড. সেন, র. এবং নাথ, বি.কু., ২০০৫. *প্রারম্ভিক সমাজবিজ্ঞান*, (২য় সংস্করণ), ঢাকা, বাংলাদেশ: নিউ এজ।

Course Code: 212109	Marks: 100	Credits: 4	Credit Hours: 60	BSS Hon's 1st Year
Course Title: Introduction to Social Work (Allied Course)			Course Orientation: Theoretical	

Course Description

Introductory social work is an allied course for the registered students of respective disciplines. The focal objective of this course is to spread basic knowledge of social work education along with the concept, methods, relationship of social work with other disciplines, practice in different settings and social work as a profession. The course also covers industrial revolution, the philosophical foundations of social work, the development of professional education and its relationship with various religious creeds. Ethical principles and values are also discussed in this course.

Course Objectives

The objectives of this course encompass:

- To familiarize students about historical development and associated disciplines of social work;
- To help students able to understand the social work profession and industrial revolution;
- To attain knowledge about major social problems and intervention of social work;
- To introduce students about social work methods, types and practice in different settings;
- To introduce students to research and social research in social work arenas;
- Introduce students to religious and philosophical foundations of social work.

Course Contents

Chapter	Topics	Teaching Learning Strategy	CLOs
1	Concepts Relevant to Social Work Practice: Social Work, Social Welfare, Social Value, Social Reform, Social Legislation, Social Security, Social Development, Good Governance, Climate Justice, Field Work.	Class Lectures, PP Presentations, Content Analysis	CLO1
2	Associated Disciplines and Their Relations with Social Work: Sociology, Psychology, Economics, Political Science, Law, Journalism, Medical and Public Health, Anthropology.	Lesson Plans, Lectures, Handouts, Paraphrasing	CLO1
3	a. International Growth and Development of Social Work: UK and USA. b. Social Welfare Practices and Movements in Undivided India and Bangladesh: Traditional Welfare Activities and Charity, Social Reformers and their Movements. c. Evolution of Social Work Education in the Sub-continent and Bangladesh.	Lectures, Handouts, Exhibition of Audio-Visual Recordings, PP Presentations.	CLO2
4	Social Work Profession: Profession, Occupation, Social Work as a Profession, Values and Professional Code of Ethics of Social Work, NASW.	Lectures, Seminar Presentation, Group Discussion.	CLO2
5	Social Problems and Social Services in Bangladesh: Major Social Problems and Intervention of Social Work, Social Work Practice in Govt. Organizations (USS, RSS) and NGOs, Probation and Parole.	Lectures, Content Analysis, Visit And Demonstration	CLO3
6	Industrial Revolution (IR): Renaissance, Globalization, Industrialization, Urbanization, Impacts of IR on Society, Facing 4 th IR challenges with Communication skill, Analytical Ability, Problem Solving Ability, Digital Literacy and Adaptability; Skills of Social Work, 5 th Industrial Revolution and Social Work.	Lectures, Handouts, Audio-Visual Recordings, Visit And Demonstration. symposium,	CLO4
7	Types and Methods of Social Work: Types, Green Social Work, Basic and Auxiliary Methods; Concept, Elements, Principles, Significance of Social Work Methods in Bangladesh.	Lectures, Content Analysis, Seminar presentation, Group Discussion	CLO5
8	Social Research: Research, Research as a Scientific Method, Social Research, Methods, Techniques and Tools of Social Research, Sampling and Its Types, Research Proposal, Importance of Social Research.	Lectures, Handouts, Reading, Assignments, Content Analysis	CLO5
9	Social Philosophy and Religion: Social Philosophy, Individualism, Socialism, Welfare State, Contribution of Major Religions on Social Work and Humanity, Philosophical, Religions and Humanitarian Basis of Social Work.	Lectures, PP presentations, Workshop etc. according to pedagogy.	CLO6

Course Learning Outcomes (CLOs)

After Fruitful conclusion of the course apprentices can be able to:

CLO1: Know about the related concepts and associated disciplines of social work;

CLO2: Elucidate the international growth and development of social work profession;

CLO3: Demonstrate major social problems and social services in Bangladesh;

CLO4: Understand the Industrial revolution and its challenges;

CLO5: Know about social work types, methods of social work and social research;

CLO6: Understanding of social philosophy, religions and social work.

Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs)

CLO/PLO	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12
CLO1	✓	•		✓		•		✓	✓		•	✓
CLO2	•	✓	✓		✓	✓		•		✓	✓	
CLO3	✓		•				✓		•			✓
CLO4		✓	✓	✓		•		✓	✓	✓	✓	
CLO5	•				✓	✓		✓				✓
CLO6	✓	✓	•		✓			✓	✓	•	✓	•

✓ = Strong Relation

• =Weak Relation

Blank = Limited or No Relation

List of Books

Barker, R. L. (1995). *The Social Work Dictionary*. Washington DC: NASW Press.

Friedlander, W.A. (1977). *An Introduction to Social Welfare*. New York: Prentice Hall.

Houssian, M.N. & Alauddin, M. (1990). *Introduction to Social Work Methods*. Dhaka: Bangladesh, Anwari publication.

Morales, A. & Sheafor, B. W. (1977). *Social Work: A Profession of Many Faces*. Boston: USA, Allyn and Bacon.

Skidmore, R. A. & others. (1993). *Introduction to social work*. New Jersey: USA, Prentice Hall.

ইসলাম, ড. মো. নু. (২০১৪). *সমাজকর্ম পরিচিতি*, ঢাকা: বাংলাদেশ, তাসমিয়া পাবলিকেশন্স।

ইসলাম, মো. শ. এবং হাসান, মো. খা. (২০২৫). *সমাজকর্ম পরিচিতি*, ঢাকা: বাংলাদেশ, গ্রন্থকুটির।

উদ্দিন, আ. আ. (১৯৭৮). *রাষ্ট্রচিন্তা পরিচিতি পুঁটো থেকে মার্ক (২য় সংস্করণ)*, ঢাকা: বাংলাদেশ, আইডিয়াল লাইব্রেরী।

করিম, রে. (২০০৬). *সমাজকর্ম: ধারণা, ইতিহাস ও দর্শন*, ঢাকা: বাংলাদেশ, জ্ঞানকোষ প্রকাশনী।

রহমান, হা., দাস, তু., ইসলাম, মো. ফ. ও ইসলাম, মো. রে. (অনূদিত) (১৯৯৭). *সমাজকর্ম অনুশীলন*, ঢাকা: বাংলাদেশ, গতিধারা।

Course Code:	211909	Marks: 100	Credits: 4	Class Hours: 60
Course Title:	Introduction to Political Science			

Course Learning Objectives

LO1	To absorb the basic concepts of political organization and their composition, functions and institutional structures.
LO2	To identify various forms of government and organs of the state.
LO3	To identify and explain the central principles, institutions, procedures, and decision-making processes of the political system
LO4	To evaluate the basic strengths and weaknesses of the political systems of the Western World;
LO5	To give knowledge about the theoretical and practical role of state, their governmental organs and the relationship among legislatures, executives and judiciaries.

Course Learning Outcomes (CLO)

At the end of the course, students should be able to:

CLO1	Understands the basic concept of political organizations, relations and functions of institutional structure
CLO2	Think critically why countries choose different mechanisms and institutions for governing and why these choices are important;
CLO3	Develop a sound knowledge about the major concepts, and tools of political science and the relationships among organs of the government and their application in different countries.

Mapping of CLOs with PLOs

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12
CLO1	✓	✓						✓				
CLO2	✓	✓	✓					✓	✓	✓		
CLO3	✓	✓			✓							

Course Contents

Module No.	Contents	Teaching Learning Strategy	CLOs
1	Introducing Political Science: Definition, Scope, Nature, State and Society, State and Government, Theories of the Origin of State. Fundamental Concepts: Sovereignty, Law, Liberty, Rights, Nation, Nationalism, and Internationalism	Lecture Assignment	CLO1
2	Constitution: Definition, Necessity, Methods of Establishing Constitution, Characteristics of a good Constitution, supremacy of the Constitution, amendment process	Lecture Assignment	CLO1
3	Forms of Government: Democracy and Dictatorship, Parliamentary and Presidential, and Unitary and Federal.	Lecture Assignment	CLO2
4	Organs of State: Legislature-Its Importance and Functions, Unicameral and Bi-cameral Legislature, Decline of the Power of the Legislature; Executive – Its Importance and Functions, Growing Power of the Executive, Cabinet Dictatorship; Judiciary – Its Importance and Functions, Independence of Judiciary, Judicial Review	Lecture Assignment	CLO2
5	Separation of Powers, Representation: Proportional and Majoritarian Representation, and Consociationalism	Lecture Assignment	CLO3
6	Political party: Origin and development of Political parties, Coalition Politics, Functions of Pressure Groups, Difference between Political Parties and Pressure Groups, Bureaucracy and Pressure Groups	Lecture Assignment	CLO1 CLO2
7	Public Opinion: Its Meaning, and Significance State and Civil Society, Governance, Good Governance	Lecture Assignment	CLO3

List of Books

- Ball, A.R., & Peters, B.G. (2000). *Modern politics & government*. Seven Bridges Press, New York.
- Lijphart, A. (1977). *Democracy in plural societies: A comparative exploration*, Yale University Press, New Haven.
- Lijphart, A. (2008). *Thinking about democracy: Power sharing and majority rule in theory and practice*. Routledge, Abingdon.
- Laski, H. J. (1967). *A grammar of politics* (5th ed.). Harper Collins Publishers Ltd, New York.
- March, J. G., & Olsen, J. P. (1989). *Rediscovering institutions: The organizational basis of politics*. Free Press, New York.
- Wilson, J. Q. (1995). *Political organizations*. Princeton University Press, Princeton.
- Colomer, J. M. (2003). *Political institutions*. Oxford University Press, Oxford.
- Islam, M. (2005). *Constitutional law of Bangladesh*. BILIA, Dhaka.
- আহমেদ, এম. (১৯৯৪). *গণতন্ত্রের ভবিষ্যৎ*. বাংলা একাডেমি, ঢাকা।
- নাথ, বি. র. (১৯৯৭). *রাজনৈতিক তত্ত্ব ও সংগঠন*. বুক সোসাইটি, ঢাকা।
- ভূইয়া, মোঃ. আ. ও. (১৯৯৫). *রাষ্ট্রীয় সংগঠন*. আজিজিয়া বুক ডিপো, ঢাকা।

Paper Code:	213407	Marks: 100	Credits: 4	Class Hours:60
Paper Title:	Basic Psychology			

Course Description

This course provides an introduction to psychology, covering the various approaches, subfields, and methods in the discipline. Students will explore the biological foundations of behavior, sensation and perception, learning, memory, language, and problem-solving. The course also delves into theories of motivation, emotion, personality, and intelligence, providing a broad understanding of psychological concepts and processes. It will offer a foundation for understanding human behavior from both a scientific and practical perspective.

Course Learning Outcomes (CLOs)

After going through the course, students will be able to learn the following outcomes:

CLO1	Define the key concepts of psychology, including its nature as a science, and explain the different approaches to the study of psychology (neurobiological, behavioral, cognitive, psychoanalytic, and humanistic approaches).
CLO2	Analyze the biological bases of behavior, including the structure and function of the nervous system, neural transmission, and the major divisions of the nervous system
CLO3	Apply principles of sensation and perception to real-world scenarios, understanding sensory thresholds, attention, and depth perception
CLO4	Demonstrate an understanding of the learning process, including classical and operant conditioning, and apply these theories to human behavior and cognitive development

Mapping CLOs with PLOs

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PL O 10	PL O 11	PL O 12
CLO 1	✓	✓										✓
CLO 2	✓						✓	✓				
CLO 3		✓		✓	✓							

CLO 4			✓	✓						✓	✓	
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Course Contents

Module No.	Contents	Teaching-Learning Strategies	CLOs
1	Introduction to Psychology: Definition and nature of psychology, Psychology as a science, Approaches to the study of psychology, The subfields of psychology: experimental and physiological psychology, clinical and counseling psychology, industrial, personnel and engineering psychology, school and educational psychology, social psychology, developmental psychology, personality psychology; The methods of psychology: experimental method, observational method, archival research, case history, survey method	Lectures, handouts, power point presentations, seminar presentation	CLO1
2	Biological Bases of Behavior: Cells, tissues, organs and systems of the body, Basic units of nervous system: neurons, Divisions of nervous system: the central nervous system, the peripheral nervous system-somatic and autonomic system, Glands: exocrine and endocrine glands; genetic influences of behavior	Multimedia lecture, group activity on cosmic timeline, guided Q&A	CLO1
3	Sensation and Perception: What is sensation? Visual auditory and other senses, The nature of perception, Selectivity in perception, Form perception: figure and ground, contour perceptual organization, Perceptual constancy-size and brightness constancy, Depth perception-monocular and binocular cues to depth perception	PPT-based lecture, discussion, solar system model interpretation, visual quiz	CLO2

4	Learning: Definition of learning, Classical conditioning: processes in classical conditioning, Operant conditioning: processes on operant conditioning, Latent learning, Insight learning, Observational learning	Diagram demonstration, 3D globe activity, interactive lecture, problem-solving	CLO2
5	Memory and Forgetting: Defining memory, Types of memory: sensory memory, short-term memory, long term memory, Memory dysfunction, Improving memory, Why do we forget? interferences, decay, retrieval failure, repression	Lesson plans, class lectures, handouts, PowerPoint presentations, seminar presentations	CLO2
6	Motivation: Defining motivation, Classification of motives: biological motives, social motives, Motivational cycle, Activity and stimulation needs, Motivation and behavior	Timeline construction, comparative charting, calendar workshop, case-based learning	CLO3
7	Emotion: Defining emotion, Physiological correlates of emotion, The brain and emotions, Primary emotions	Case studies (real-life emotional responses), video-based observation and analysis of emotions, role-play to demonstrate theories, group discussion on emotional experiences, lecture with multimedia animation	CLO3

8	Personality: Defining personality, Determinants of personality, Measuring personality	Interactive lectures, personality test demonstrations, group discussions, case study analysis, self-reflection exercises	CLO4
9	Intelligence and Creativity: Definition of intelligence, Measurement of intelligence, Representative intelligence tests, Creativity and intelligence	Demonstration of IQ tests, group problem-solving tasks, creative thinking workshops, case studies on giftedness, interactive lectures, brainstorming sessions	CLO4

List of Books

Crider, A.B., Goethals, G.R., Roberts, D. Kavanaugh, R.D., Solomon, P.R. (1993).

Psychology. New York: Harper Collins college publishers.

Coon. D. and Martini, T. S. (2018). *Introduction to Psychology: Gateways to Mind and Behavior*. Cengage Learning.

Feldman, R. S. (2019). *Understanding Psychology*. New York: McGraw Hill Education.

Morgan, C.T. (2007). *Introduction to Psychology*. New York: McGraw-Hill Publishing Company Limited.

উদ্দিন, আ. (২০০২). *সাধারণ মনোবিজ্ঞান*. রাজশাহী বিশ্ববিদ্যালয় প্রকাশন বোর্ড, রাজশাহী।

ছিদ্দিক, আ. ব. (২০২৩). *সাধারণ ও পরীক্ষণ মনোবিজ্ঞান*. প্রত্যয় পাবলিকেশন্স, ঢাকা।

মন্ডল, যো. কু. (২০০৮). *সাধারণ মনোবিজ্ঞান*. হাসান বুক হাউস, ঢাকা।

সাইফুদ্দীন, ক. (২০০৭). *সাধারণ মনোবিজ্ঞান*. আবির্ পাবলিকেশন্স, ঢাকা।

সরকার, নি. (১৯৯০). *মনোবিজ্ঞান ও জীবন*. জ্ঞানকোষ প্রকাশনী, ঢাকা।

হক, ম. আ. (২০১৯). *সাধারণ মনোবিজ্ঞান ও পরীক্ষণ*. হাসান বুক হাউস, ঢাকা।

Course Code:	212209	Marks:100	Credits: 4	Class Hours: 60
Course Title:	Principles of Economics			

Course Objective

This course provides students with fundamental economic principles covering microeconomic and macroeconomic concepts, including supply and demand analysis, consumer behavior, production theory, market structures (perfect competition and monopoly), national income accounting, international trade, money and inflation, and government finance. Students will develop analytical skills to understand economic decision-making at individual, firm, and national levels, while examining contemporary economic issues and Bangladesh's economic context.

Course Learning Outcomes (CLOs)

CLO1	Explain core economic concepts including scarcity, opportunity cost, and production possibilities
CLO2	Analyze market forces using supply-demand models and elasticity concepts
CLO3	Apply utility theory to explain consumer choice and calculate consumer surplus
CLO4	Differentiate between short-run and long-run production costs and analyze production functions
CLO5	Compare market structures (perfect competition vs monopoly) and their equilibrium outcomes
CLO6	Calculate key macroeconomic indicators (GDP, GNP) and explain national income accounting
CLO7	Evaluate arguments for free trade vs protectionism using comparative advantage theory
CLO8	Distinguish between economic growth and development, identifying measurement challenges
CLO9	Explain monetary concepts (money supply measures, inflation) and their economic impacts
CLO10	Analyze government budgets, tax systems, and fiscal policy implications

Mapping of CLOs with PLOs

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12
CLO1	✓	✓						✓				
CLO2	✓	✓	✓					✓	✓	✓		
CLO3	✓	✓			✓							
CLO4	✓	✓	✓		✓							✓
CLO5	✓	✓	✓			✓		✓		✓		✓
CLO6	✓	✓	✓		✓						✓	✓
CLO7	✓	✓	✓	✓		✓		✓		✓	✓	
CLO8	✓	✓	✓			✓		✓	✓	✓	✓	✓

CLO9	✓	✓	✓		✓			✓	✓	✓	✓	✓
CLO10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Course Contents

Module No.	Contents	Teaching Learning Strategies	CLOs
1	Fundamentals of Economics: Definition, Nature and Scope of Economics, Scarcity of Resources, Various forms of Economic Organization, Three Fundamental Problems of Economics, Production Possibility Frontier, Opportunity Cost, Efficiency and Equity, Informal Economics,	Lecture and Assignment	CLO1
2	Supply and Demand: Demand and Quantity Demanded, Determinants of Quantity Demanded, Demand Schedule, Demand Curve, Supply and stock, Quantity Supplied, Determinants of Supply, Supply Schedule, Supply Curve, Equilibrium of Supply and Demand, Movement along the Supply and Demand Curve and Shift of Supply and Demand Curve and Its Effects on Equilibrium Price and Quantity. Elasticity of Supply and Demand; Determinants of Elasticity of Demand, Cross Elasticity of Demand.	Lecture, Group Discussion, Problem Solving and Assignment	CLO2 & CLO5
3	The Theory of Consumer Behavior: Cardinal and Ordinal Utility Analyses, Total and Marginal Utility; Law of Diminishing Marginal Utility, Equi-Marginal Utility; Consumer Surplus.	Lecture, Problem Solving, Tutorial and Assignment	CLO3
4	Production and Cost: Production Function and Technology; Production with One Variable Input; Production with Two Variable Inputs; Returns to Scale; Costs in the Short-run; Costs in the Long-run, LAC, SAC, LMC, SMC.	Lecture, Group Discussion and Tutorial	CLO4
5	Market Analysis: i) Perfect Competition: Definition of Market, Characteristics of Perfect Competition; Average and Marginal Revenue; Short-run equilibrium of a competitive firm Long run Equilibrium under Perfectly Competitive Market, Causes of Disequilibrium Condition. ii) Monopoly: Characteristics of Monopoly Market,	Lecture, Problem Solving, Group Discussion and Assignment	CLO2 & CLO5

	Average and Marginal Revenue; Supply Curve of the Monopolist; Equilibrium Position of a Monopolist. Compare between Perfect Competitive Market and Monopoly Market.		
6	Overview of Macro Economics: Objective and Instruments of Macroeconomics, Methods of National Income Accounting, Gross Domestic Product (GDP), Problem of Double Counting, Net Domestic Product, Gross National Product (GNP), From GDP to Disposable Income.	Lecture, Practical Example and Assignment	CLO6
7	International Trade: Domestic Vs. International Trade-Balance of Trade Vs. Balance of Payment-Trend of Changes in International Trade of Bangladesh. Free Trade Vs. Protection, Absolute Advantage Theory, Comparative Advantage Theory.	Lecture, Group Discussion and Assignment	CLO7
8	Growth and Development: Economic Development and Economic Growth, Measurement of Economic Development, Obstacles to Economic Development, Contemporary Concept of Development.	Lecture, Group Discussion, and Assignment	CLO8
9	Money: Definition and Functions of Money-Importance of Money in Modern Economy-Different Concepts of Money (M1, M2, M3)-Value of Money. Concept, Causes and Effects of Inflation and Deflation.	Lecture, Group Discussion, and Assignment	CLO9
10	Government Revenue and Expenditure: Difference between Public Sector and Private Sector finance, Different Sources of Govt. Revenues, Taxation and Different Kinds of Taxes, Direct and Indirect Taxation, Definition of Revenue Budget, Development Budget, Revenue Budget Vs. Development Budget, Surplus, Deficit and Balanced Budget.	Lecture, Group Discussion, Practical Example and Assignment	CLO10

List of Books

Case, K. E., & Fair, R. C. (2020). *Principles of economics* (13th ed.). Pearson.

Mankiw, N. G. (2021). *Principles of economics* (9th ed.). Cengage Learning.

Parkin, M. (2022). *Economics* (13th ed.). Pearson.

Samuelson, P. A., & Nordhaus, W. D. (2021). *Economics* (20th ed.). McGraw-Hill.

Course Code:	219901	Marks: 100	Credits: 4	Class Hours:60
Course Title:	History of Bangladesh: Language, Culture and Identity			

Course Objective

This course is designed to help undergraduate students from diverse academic backgrounds develop a comprehensive and nuanced understanding of the historical development of Bangladesh, with a particular focus on its language, culture, and identity. By critically examining a variety of historical events, socio-political movements, and cultural shifts from ancient times to the contemporary period, students will have the opportunity to trace the evolution of the Bengali nation. The course aims to foster informed citizenship through an exploration of the Liberation War, identity formation processes, cultural heritage, the lives and contributions of key political figures, and the roles of ethnic minorities. Ultimately, the objective is to equip learners with the intellectual tools necessary to contextualize current national debates and to recognize the role of youth and globalization in shaping the future of Bangladesh.

Course Learning Outcomes (CLOs)

At the end of the course, learners will be able to:

CLO 1: Recall key historical events, dates, movements, personalities, and cultural developments that contributed to the emergence of Bangladesh from the pre-colonial period to the present day.

CLO 2: Demonstrate an understanding of the socio-political, linguistic, and cultural influences that shaped Bengali identity and nationalism, emphasizing the Language Movement, Liberation War, and subsequent democratic uprisings.

CLO 3: Apply their historical and cultural understanding to interpret contemporary national issues and debates relating to identity, political reform, and cultural transformation in Bangladesh.

CLO 4: Analyze how historical events, political ideologies, and social changes are interconnected in shaping the current socio-political landscape of Bangladesh, with a particular emphasis on the roles of movements, minorities, and the youth.

Course Contents

Contents	Teaching Learning Strategy	CLOs
1. Pre-colonial Era - Life and Culture of the People in Ancient Bengal - Bengal Under Muslim Rulers: Society, Culture, and Religion - Role of the Sufis in Preaching Islam and Impacts of Sufism on the Bengali Society - Bengali Society and Culture in the Writings of Foreigners	Interactive lectures	CLO 1-2
2. Colonial Era (18th and 19th Century) - The Battle of Plassey (1757) and the Beginning of British Colonialism - Bengal Renaissance - Reforms in Hindu Society - New Forms in Bengali Literature and Culture - The Muslim Response to Western Education	Interactive lectures, reading, and assignments	CLO 1-2
3. Colonial Era (First Half of the 20th Century) - Partition of Bengal (1905) - Hindu-Muslim Disagreements - Formation of the All-India Muslim League (AIML) - Muslim Shahitya Samaj - Buddhir Mukti Andolan: The Urge for Rational Thinking in Bengali Muslim Society - Growth of Religion-based Identity - Politics of Hindutva and the Two-Nation Theory - Spread of Communalism in Society - The Partition of India and Bengal	Interactive lectures and group discussions	CLO 2-3
4. Post-Partition Era (1947-1971) - Language Movement - Political, Economic, and Cultural Aspects - Growth of Vernacular Nationalism - Cultural Activism	Interactive lectures and group discussion	CLO 2-3

5. Changing Bengali Identity • The Evolution of Bengali Identity in the Context of Language, Culture, and Religion • From Ancient Times to the Present • The Role of the Bengali Language in Shaping Identity • The Language Movement of 1952 and Its Long-term Impact on National Consciousness • The Influence of Religion on Bengali Identity • The Impact of Socio-political Movements on Identity Formation • The Liberation War of 1971 • Contemporary Debates on Bengali Identity • The Role of Youth in Redefining Identity • The Influence of Globalization	Interactive lectures and thematic assignments	CLO 2-3
6. Liberation Movement of 1971 and Mass Uprising till 2024 • The Political and Economic Exploitation of East Pakistan by West Pakistan • Six (6) Points Movement, Uprising of 1969 • The 1970 General Elections • The Non-cooperation Movement and the Declaration of Independence • The Role of AK Fazlul Haque, Huseyn Shaheed Suhrawardy, Maulana Bhashani, Sheikh Mujibur Rahman and Ziaur Rahman • The Liberation War of 1971 • Genocide and Resistance • The Role of the Mukti Bahini • Post-independence Challenges • Nation-building • Political Instability • Mass Uprisings and Democratic Movements • The Anti-autocracy Movement of the 1980s • The 1990s Movement for Democracy and Afterwards • The 2024 Movements for Political and Social Reforms	Interactive lectures, group discussions, and thematic assignments	CLO 1 CLO 3-4

7. History of Other Ethnic Groups • The Indigenous Communities of Bangladesh • Historical Presence • Cultural Practices • Land Rights and Cultural Assimilation • Contributions and Sacrifices • Political Representation of Ethnic Minorities	Interactive lectures and group discussions	CLO 4
8. Cultural Heritage and Modern Transformations • The Evolution of Bengali Culture • From Ancient Traditions to Modern Expressions • The Role of Literature, Music, and Art in Shaping Bengali Identity • Contributions of Rabindranath Tagore, Kazi Nazrul Islam, and Other Cultural Icons • The Impact of Globalization on Bengali Culture • The Revival of Traditional Arts • The Role of Youth in Cultural Innovation Urbanization • Environmental Changes • The Commodification of Culture	Interactive lectures, documentary screening, and thematic assignments	CLO 1-4

List of Books

- Ahmed, M. (1979). *Bangladesh: The constitutional quest for autonomy*, Dhaka: University Press Limited.
- Ahmed, R. (1981). *The Bengal Muslims 1871-1906: A quest for identity*. Oxford University Press.
- Alavi, H. (1972). *The state in post-colonial societies: Pakistan and Bangladesh*. In K. Gough & 11. P. Sharma (Eds.), *Imperialism and revolution in South Asia* (pp. 145-178). New York, NY: Monthly Review Press.
- Bernier, F. (2023). *Travels in the Mogul Empire: A.D. 1656-1668*. Chennai: Atlantic Publishers.
- Bleie, T. (2005). *Tribal peoples, nationalism, and the human rights challenge*. The Adivasis of Bangladesh. University Press Limited.
- Bosc, S. (2011). *Dead reckoning Memories of the 1971 Bangladesh war*. Hurst & Company.
- Eaton, R. M. (1996). *The rise of Islam and the Bengal frontier. 1204-1760*. Berkeley: University of California Press.

- Gilmour, D. (2019), *The British in India: Three centuries of ambition and experience*. London. Penguin.
- Habib, L. (1982). *Cambridge economic history of India*. Cambridge. Cambridge University Press.
- Halim, S., Amanullah, A. S. M., & Nasir, R. 1. (Eds.). (2024). *Society and sociology in Bangladesh: A South Asian perspective*. The University Press Limited.
- Hashmi, T. (2021). *Fifty Years of Bangladesh, 1971-2021 Crises of Culture, Development, Governance and Identity*. Switzerland: Palgrave Macmillan.
- Huq, M. E. (1975). *History of Sufism in Bengal*. Dhaka. Bangladesh Asiatic Society
- Husain, 1. (2014). *Karl Marx on India*. New Delhi: Tulika Books.
- Jahan, R. (1972). *Pakistan: Failure in national integration*. New York, NY: Columbia University Press.
- Maniruzzaman, T. (1988). *The Bangladesh revolution and its aftermath (2nd ed.)*. Dhaka: University Press Limited. (Original work published 1980)
- Mascarenhas, A. (1986). *Bangladesh: A legacy of blood*. London: Hodder and Stoughton.
- Rashid, H. O. (2015). *The foreshadowing of Bangladesh: Bengal Muslim League and Muslim politics* (3rd ed.). Dhaka: University Press Limited.
- Roy, A. (1984). *The Islamic syncretistic tradition in Bengal*. Princeton. NJ: Princeton University Press.
- Sen, A. (2006). *Identity and violence: The illusion of destiny*. W. W. Norton & Company.
- Umar, B. (2022). *The Emergency of Bangladesh: A History of East Pakistan*. Dhaka: Bangla Gobeshona.

Course Code	219903	Marks: 75	Credits: 3
Course Title:	Information and Communication Technology		

Course Objectives:

The main objective of the course is to develop students' understanding and skills in using, managing, and applying technology to solve problems and enhance various aspects of life and work. Key areas of focus include understanding ICT systems, software, hardware, networks, and their applications.

Course Learning Outcomes: The student will be able to:

CLO 1	Explain foundational ICT concepts, including the information processing cycle.
CLO 2	Operate standard computer hardware and software systems effectively.
CLO 3	Use office productivity tools (Word, Excel, PowerPoint) for academic and professional tasks.
CLO 4	Apply safe internet practices and use internet tools for communication and information retrieval.
CLO 5	Understand and explain the concepts of Data Analytics, Artificial Intelligence (AI), and Machine Learning (ML)
CLO 6	Understand the concept of free-lancing

Course Contents:

Unit	Specific Objectives	Content	Teaching and Learning Approach
Unit 1: Introduction to Information and Communications Technology (ICT) and Computer System	The student will be able to: • Explain the concept of ICT and its related terminologies. • Describe the information processing cycle. • Analyze the impact of ICT on educational, social and economic development. • Identify career	Definition of ICT, basic concepts and terminologies. Data, Information Application of ICT, Advantages and Disadvantages of ICT, Impact of ICT Career opportunities in ICT education Information Processing Cycle. Classification of Computers The Vital Components of the Systems Unit.	Classroom Lectures

	opportunities in ICT education. • Differentiate among the classes of computers and the usages of them. • Identify the vital components of the Systems Unit.		
Unit 2: Computer Hardware and Software	The student will be able to: • Describe the categories of Computer Hardware. • Describe the commonly used Input and Output devices • Identify the main processing devices, storage devices and media. Identify the main communication devices. • Identify types of Software packages. • Distinguish between an Operating System and Application software. • Identify different types, examples and uses of Operating Systems and Application software • Distinguish between Open Source and Proprietary Software.	Categories of Computer Hardware: Input devices, Processing devices, Output devices, Storage devices Communication devices, Main Processing Devices: The Processor, Control Unit and Arithmetic and Logic Unit Software Packages, Operating Systems, Types and uses of Operating Systems, Types and uses Application Software: Educational software, Games software, Graphics software Browsers: Internet explorer, Google chrome, Mozilla Firefox, Opera, Internet explorer, Mozilla Firefox; Proprietary and Open-Source Software	Classroom lectures and Lab
Unit 3: Introduction to Word Processing Application	• The student will be able to: • Identify Word Processing packages. • Create and save a document using the Word Processor. • Format a Word document using formatting tools. Demonstrate the ability to perform collaborative	Word Processing Packages and Their Uses. Introduction of Microsoft Word Software. File creation and saving: New, Save, Open, Save As. Editing: Copy/Cut, Paste, Undo, Redo, Find, Replace, Clipboard, Sub-Headings and Paragraphs, Text Correction, Wrapping Text, Text Orientation	Classroom Lectures, Lab, and Hands-on Practice

	editing. • Insert tables in a Word Processing document. • Insert symbols and pictures in Word Processing documents. • Use layout techniques in document creation. • Inserting headers and footers. • Print documents using the various print options.	Formatting: Font: Style, Size, Color, Bold, Underline, Italic, Superscript, Subscript, Shadow, Strikeout. Paragraph: Alignment, Bullet & Numbering, Indent, Line Spacing, Table Border Insert: Table, Picture, Shape, Smart Art, Chart, Header, Footer, Page Number, WordArt, Drop Cap, Symbols, Equations, Hyperlink, Comment. Page Design: watermark, page border Layout: Page setup, print	
Unit 4: Spreadsheet Application	• The student will be able to: • Identify Spreadsheet Packages. • Explain the importance of the Spreadsheet application in data management. • Explain related concepts and terminologies in the Spreadsheet. • Identify features in the Spreadsheet application window. • Create and save a Workbook. • Construct and insert simple formulae and functions. • Format the worksheet using formatting tools. • Printing a worksheet.	Spreadsheet Packages, e.g. Excel. Importance of Spreadsheet application in Data Management, Related Concepts and Terminologies (e.g., cell(s), rows, columns, worksheet, workbook) Excel Tool Bars: Formatting Bar, Standard Bar, Formula Bar. Types of Data and Their Uses (e.g., number, date, text, currency), Creating and Saving a Workbook, Formula and Functions, Sorting, filtering, validation, creating pivot table. Formatting Worksheet Using Formatting Tools. Draw Graph/chart, Printing Worksheet.	Classroom Lectures, Lab and Hands-on Practice
Unit 5:	• The student will be able	Presentation Applications	Classroom

Presentation Application	to: • State the importance of the Presentation application. • Identify the commonly used features of a Presentation application while prepare a presentation. • Create and save presentations using a template, Add new slide(s). Edit text, Format text, Insert objects, images and pictures, Run slide show, Apply transition, animation effects to slides • Select the print option for printing. • Prepare a presentation on a selected topic and present it.	Packages, Devices used for Presenting, Importance of Presentation Application, Principles for Designing Presentations, Terminologies in Presentation Application (eg, Slide transitions, Slide show, etc.), Commonly Used Features of Presentation Application Window: Toolbars, Different presentation view modes Prepare a Presentation: Slide creating, editing, theme, background, inserting elements (image, audio, video hyperlink, table, smart art, graph, etc.) and formatting slides, Slide Layout, slide Show, slide transition, animation Effects. Selection of Print Option: Entire presentation, Specific slides, Handouts, Notes pages, outline view of slides.	Lectures, Lab and Hands-on Practice
Unit 6: Privacy and Security	The student will be able to: • Understand the basics of digital security • Use some security tools. • Understanding digital ethics.	Introduction to Information Security, cybercrime, DoS and DDoS Attack, Key Management, Digital Signature and Certifications, privacy, Data Security, Vulnerability, Threat and Risk, Malware, Social Engineering, Hacking, Plagiarism, Fishing, Software Piracy, Worms and Viruses, Spam, Adware, Malware, Spyware, Antivirus Software Ethics in the digital world	Classroom Lectures, Lab and Hands-on Practice
Unit 7: Using The Internet to Communicate and Accessing	• The student will be able to: • Explain basic concepts, requirements, and	Internet, Intranet, Extranet, IP Address, Masking, MAC Address, Internet Services, OSI Reference Model, TCP/IP	Classroom Lectures, Lab and Hands-on Practice

Information	terminologies of the Internet • Apply the rules and regulations in the use of the internet. • Using email • Use the internet social network to communicate. • Use Uniform Resource Locators (URLs) to access Information. Use search engines to access information • Upload files to virtual drives and work on it.	protocol stack, IPv4, IPv6, subnet Masking, MAC Address, Internet Services, Network Configuration and Troubleshooting, Wi-Fi, Broadband, Email Usage. Rules and Regulations in the Use of the Internet: Spam- Unsolicited Emails, People's Privacy, Intellectual Property Rights, etc. E-mail: Creating an Email Account, Sending, Accessing Email Messages, Attaching Documents to Email Messages, Using the Internet: Social Networks to Communicate, Uniform Resource Locators (URLs) to Access Information, Using Search Engines, Downloading Information from the Internet. Transferring Information from the Internet to a Different Application Intellectual Property Rights, ICT Policy, Software Piracy etc. Using Cloud Space: Google Drive, Google Workspace, OneDrive, Dropbox, etc.	
Unit 8: Emerging Technologies: Data analytics, Artificial intelligence, Machine learning	• Define Data Analytics, Artificial Intelligence (AI), and Machine Learning (ML). • Understand how data is collected, processed, and used for decision-making. • Recognize the role of AI and ML in everyday life. • Explain basic	Introduction to Data Analytics: Define Data, Types of Data, Define Data Analytics, Basic Steps in Data Analytics, Applications of Data Analytics, Common Tools of Data Analytics (Excel, Tableau, Power BI, Python, SQL, etc.). Artificial Intelligence (AI): Define AI, Objectives of AI, AI capabilities, AI	Classroom Lectures, Lab and Hands-on Practice

	differences between AI and ML. • Discuss benefits and challenges of these technologies. • Recognize current trends and career opportunities in these fields.	applications (NLP, Image Recognition, Predictive Analytics, Recommender Systems, Robotics, etc.); AI Tools: OpenAI GPT, TensorFlow, PyTorch, Keras, Scikit-learn, etc.), AI in daily life (Voice assistants, facial recognition, GPS route suggestions, chatbots, etc.) . Machine Learning (ML): Define Machine Learning (ML), How It Works, Classification of ML, applications of ML, and common ML platforms (Teachable Machine, TensorFlow, PyTorch, Microsoft Azure Machine Learning, etc.). Relationship Between Data Analytics, AI, and ML Benefits & Challenges of Data Analytics, AI, and ML. Future Trends & Career Paths.	
Unit 9: Introduction to Freelancing	The student will be able to: • Define and explain the fundamental concept and significance of freelancing in the global context. • Identify and categorize various online marketplaces and professional fields. • Develop professional profiles, portfolios, and proposals suitable for freelancing platforms.	Introduction and Basic Concepts, Fields of Freelancing, Essential Skills and Preparation, Introduction to Freelancing Marketplaces, Creating Profile and Portfolio, Earning and Transaction Process, Building a Freelancing Career, Challenges and Solutions.	Classroom Lectures, Practical Demos, Assignments, Discussions

	• Demonstrate the use of online payment systems and financial transaction methods. • Analyze and evaluate strategies for career development and effectively apply techniques to overcome freelancing challenges.		
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List of Books:

Norton, P. (2008). *Introduction to computers* (9th ed.). The McGraw-Hill.

Comer, D. E. (2018). *The internet book: Everything you need to know about computer networking and how the internet works* (5th ed.). Chapman and Hall/CRC Press.

Lambert, J., & Frye, C. (2015). *Microsoft Office 2016 step by step*. Microsoft Press.

Hassan, N. A., & Hijazi, R. (2017). *Digital privacy and security using Windows: A practical guide*. Apress.

Maheshwari, A. (2024). *Data analytics made accessible*. Jay Cobb.

Russell, S. J., & Norvig, P. (2020). *Artificial intelligence: A modern approach* (4th ed.). Pearson.

Alpaydin, E. (2020). *Introduction to machine learning* (4th ed.). MIT Press.

Course Code	219904	Marks: 25	Credit: 1
Course Title:	Lab: Information and Communication Technology		

Course Objectives:

The main objective of the course is to teach the students' understanding and skills in using, and applying technology to solve problems and enhance various aspects of life and work. It includes assembling hardware, installing software, preparing PPT slides, and producing Word and Excel documents.

Course Learning Outcomes:

The student will be able to:

CLO 1	Learn assembling hardware
CLO 2	Prepare, edit and print Word documents and excel
CLO 3	Prepare Power Point presentation.
CLO 4	Access information from Internet, e-mail
CLO 5	Installation of anti-virus software
CLO 6	Data collection, Prediction, Pattern recognition, classification
CLO 7	Exploring markets, Proposal writing, Simulation strategies

List of Experiments

CLO Addressed	Unit	Experiments	Teaching Learning Approach
CLO1	1-4	- Assemble different hardware - Install different software - Operate the computer - Drive, folder and file management - Maintenance	Lab and Hands-on Practice
CLO 2	3	Word - Prepare a Word document on a specific topic (e.g, routine, question paper, CV, reports, applications) - Formatting the document (Alignment, table, border, watermark, etc.), e.g., newspaper article, academic report, or documentation used in daily life, book, poster - Print documents with different paper and printers	Lab and Hands-on Practice
CLO 2	4	Excel - Prepare a grade sheet - Prepare a family expenditure - Prepare a business expenditure report - Prepare payroll management, with a report - Create graphs on the given data - Print Excel files	Lab and Hands-on Practice

CLO 3	5	Power point • Prepare an academic presentation on a specific topic. • Formatting the slides & using different tools. • Apply animation and transition • Print PPT files in different modes: Hand note, Slides shorter, outline	Lab and Hands-on Practice
CLO4	6	• Install antivirus software, e.g., Norton Antivirus, McAfee, Kaspersky, Avast.	Lab and Hands-on Practice
CLO5	7	1. Use of email 2. Access information from the internet, use a search engine. 3. Use of virtual drive for collaboration 4. Google Meet	Lab and Hands-on Practice
CLO6	8	• Data Collection and Visualization (Excel) • Simple Prediction (Excel) • Pattern recognition (Teachable Machine) • Classification (Teachable Machine)	Lab and Hands-on Practice
CLO7	9	Free lancing • Marketplace exploration and portfolio creation • Proposal writing • Payment simulation	Lab, Hands-on, Group Work, Discussion

Instructions for the Lab:

1. Lab sessions should be hands-on, with students engaging in tasks like assembling hardware, installing software, and using office tools.
2. Software like Microsoft Word, Excel, PowerPoint, and Teachable Machine will be used for document creation, data analysis, and basic machine learning.
3. Labs also include antivirus installation, email use, and online collaboration via Google Meet and Drive, emphasizing teamwork and problem-solving.

Instructions for the Lab exam:

1. The lab exam is individual. Students must answer two out of seven questions.
2. Marks distribution: Experiment (20 marks, 10 for each) for practical tasks, Viva-Voce (5 marks) for oral assessment. Total: 25 marks.

List of Books:

Comer, D. E. (2018). *The internet book: Everything you need to know about computer networking and how the internet works* (5th ed.). Chapman and Hall/CRC Press.

Lambert, J., & Frye, C. (2015). *Microsoft office 2016 step by step*. Microsoft Press