

MULTI DISCIPLINARY COURSES (MDC)

Gauhati University::NEP-2020::FYUGP::

Multi Disciplinary Courses:

Semester-1: MDC-1

Semester-2: MDC-2

Semester-3: MDC-3

Disciplines:

1. Natural and Physical Sciences
2. Mathematical Sciences
3. Library, Information and Media Sciences
4. Commerce and Management
5. Humanities and Social Sciences
6. Information and Communication Technologies
7. Life Sciences
8. Earth Sciences

- Generic in nature-Content
- Three papers in the pipeline
- Credit: 3 each
- No practical Components

Discipline wise Paper Names::

1. Natural and Physical Sciences

MDC-1: Introduction to Natural and Physical Sciences

MDC-2: Natural and Physical Sciences in Everyday Life

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

2. Mathematical Sciences

MDC-1: Foundations of Mathematical Sciences- I

MDC-2: Foundations of Mathematical Sciences - II

MDC-3: Foundations of Mathematical Sciences - III

3. Library, Information and Media Sciences

MDC-1: Foundations of Library and Information Science

MDC-2: Information Sources and Services

MDC-3: Fundamentals of Mass Media Studies

4. Commerce and Management

MDC-1: Basics of Commerce & Management

MDC-2: Personal Financial Management

MDC-3: Personal Income-tax Planning

5. Humanities and Social Sciences

MDC-1: Humanities & Social Sciences-I: Makers of Modern Assam

MDC-2: Humanities & Social Sciences- II: Democracy and Peoples' Rights

MDC-3: Humanities & Social Sciences- III: Understanding Globalization

6. Information and Communication Technologies

MDC-1: Information and Communication Technologies-I

MDC-2: Information and Communication Technologies-II

MDC-3: Information and Communication Technologies-III

7. Life Sciences

MDC-1: Basics in Life Sciences

MDC-2: Life Sciences and Environment

MDC-3: Bioresources and Traditional Knowledge

8. Earth Sciences

MDC-1: Understanding Physical Formations of the Earth

MDC-2: Understanding the Changing Environment

MDC-3: Land and People of Assam

Syllabus::

1. Natural and Physical Sciences

MDC-1: Introduction to Natural and Physical Sciences

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

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

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

MDC-2: Natural and Physical Sciences in Everyday Life

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

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

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

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

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

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

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

2. Mathematical Sciences

MDC-1: Foundations of Mathematical Sciences- I

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

No of contact hours: 10

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

No of contact hours: 13

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

No of contact hours: 11

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

No of contact hours: 11

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

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

Text Books:

1. Dinesh Khattar, The Pearson Guide to Objective Arithmetic for Competitive Examinations, Pearson 2nd Edition 2008.
2. S.C. Gupta, V.K. Kapoor, Fundamentals of Mathematical Statistics, S. Chand and Sons, 11th Ed 2002.

Reference Books:

1. R.V. Praveen, Quantitate Attitude and Reasoning, 7th Edition, PHI 2013.
2. A.M. Goon, M.K. Gupta and B. Dasgupta, Fundamentals of Statistics, Vol. I & II, 8th Edn. The World Press, Kolkata, 2002.
3. Irwin Miller Marylees Miller, John E. Freund's Mathematical Statistics with Applications, 8th Edition, Pearson 2014.

MDC-2: Foundations of Mathematical Sciences – II

UNIT-I: Mathematical reasoning: Meaning of mathematical statements, Negation, Compound statements, Quantifiers, Converse and Contrapositive of the statement, Implications, Validating statements. Sequence and Series (AP, GP), Logical reasoning: Odd man out and series, Blood relations, Coding Decoding, Logical sequence, Logical matching, Logical thinking, missing numbers, Logic puzzles.

No of contact hours: 11

UNIT-II: Factorial notations, Permutation & Combination (basic definition and everyday problems), Pigeonhole principle, Mathematical Induction, Binomial theorem (for positive index), Principle of Inclusion and Exclusion, Derangements, Inversion formulae, Inequalities, Solution of inequations, Trigonometry, problems based on height and distances. Mensuration, area, volume, surface area and perimeter.

No of contact hours: 12

UNIT-III: Measures of Dispersion - Range, Inter-quartile Range, Quartile deviation, Mean Deviation, Standard Deviation, Coefficient of variation. Ideal measures of Dispersion. Idea of Skewness and kurtosis (without moments). Idea of Moment and Moment generating function.

No of contact hours: 12

UNIT-IV: Bivariate distribution, Scalier diagram, Correlation and regression, Karl Pearson's Correlation coefficient and its properties. Two regression lines (without derivation), principle of least squares and fitting of polynomials, Relation between correlation coefficient and regression coefficients.

No of contact hours: 10

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

- (i) understand the truth and false of a logical statement and solve logical problems of real-life situation

- (ii) learn combinatorial ideas to solve algebraic and real life problems
- (iii) learn techniques to solve daily life problems.
- (iv) develop aptitude for applications of statistical techniques in Social sciences & Humanities.

Text Books:

1. Seymour Lipschutz, Theory and problems of Set Theory and Related Topics, 2nd Edition, Schaum's Series, McGraw Hill, 1998.
2. Dinesh Khattar, The Pearson Guide to Objective Arithmetic for Competitive Examinations, Pearson 2nd Edition 2008.
3. Richard A. Brualdi, Introductory Combinatorics, 5th Edition Pearson Education Inc., 2009.
4. S.C. Gupta, V.K. Kapoor, Fundamentals of Mathematical Statistics, S. Chand and Sons, 11th Ed 2002.

Reference Books:

1. Ajit Kumar, S. Kumaresan, Bhaba Kumar Sarma, A foundation Course on Mathematics, Alpha Science International Ltd, Oxford, UK. First Edition 2018.
2. R.V. Praveen, Quantitate Attitude and Reasoning, 7th Edition, PHI 2013.
3. A.M. Goon, M.K. Gupta and B. Dasgupta, Fundamentals of Statistics, Vol. I & II, 8th Edn. The World Press, Kolkata, 2002.
4. Irwin Miller Marylees Miller, John E. Freund's Mathematical Statistics with Applications, 8th Edition, Pearson 2014.

MDC-3: Foundations of Mathematical Sciences – III

UNIT-I: Set theory and its simple applications, Types of sets and their notations, Subsets, Classes of Sets, Power Sets, Venn diagrams, Operations on sets, Ordered pairs, Cartesian product of two sets. Finite sets, Fundamental Principle of Counting, sum rule and product rule of counting. Relations & Functions (definitions, examples and solution techniques).

No of contact hours: 10

UNIT-II: Matrices and determinants: Addition, Subtraction and Multiplication of matrices with their properties (only upto third order). Determinants with properties and solution of systems of linear equations with the help of determinant (only upto third order) problems related to economics and business.

No of contact hours: 10

UNIT-III: Differential Calculus: Basic concept of limit and continuity of a function; derivative of a function, Rule of differentiation, Derivative as a Rate of Change, Product Rule, Quotient Rule, Chain Rule, Derivatives of Logarithmic Functions, Exponential Functions, Elasticity of Demand and supply. Second Order Derivatives, Maxima and Minima of function related to cost, revenue and profit functions.

No of contact hours: 14

UNIT-IV: Probability: Idea of Probability generating function and characteristic function and its utility in statistics. Random Experiments, sample space, events and algebra of events. Classical, statistical, and axiomatic of Probability. Conditional Probability, laws of addition and multiplication, independent events, theorem of total probability, Random variables: discrete and continuous random variables.
No of contact hours: 13

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

- (i) Have knowledge and critical understanding, visualization, of basic concepts, terms of sets
- (ii) Know about counting principle
- (iii) Learn about relation and functions
- (iv) Learn matrices and determinants, solving systems of linear equations through determinants
- (v) Learn about derivative of different type of functions and application of derivative in economics
- (vi) Know about sample spaces, basic ideas of probability and its application in practical problems

Text Books:

1. Seymour Lipschutz, Theory and problems of Set Theory and Related Topics, 2nd Edition, Schaum's Series, McGraw Hill, 1998.
2. C.E. Cullis, Matrices and Determinants, Vol 3, Cambridge University Press, 2013.
3. E. Haeussler, R. Paul and R. Wood, Introductory Mathematical Analysis for Business, Economics, and the Life and Social Sciences, Pearson, 13th Edition, 2014
4. S.C. Gupta, V.K. Kapoor, Fundamentals of Mathematical Statistics, S. Chand and Sons, 11th Ed 2002.

Reference Book:

1. A.M. Goon, M.K. Gupta and B. Dasgupta, Fundamentals of Statistics, Vol. I & II, 8th Edn. The World Press, Kolkata, 2002.
2. Irwin Miller Marylees Miller, John E. Freund's Mathematical Statistics with Applications, 8th Edition, Pearson 2014.

3. Library, Information and Media Sciences

MDC-1: Foundations of Library and Information Science

Course Objectives: To make the learners aware of the Library and Information Science subject, libraries in general and its relation and contribution to society.

Graduate Attributes: After completion of this course, you will be able to:

- Get acquainted with the library and information science subject and its different dimensions;
- Explain the different types of libraries and their functions;
- Describe the role played by different organisations in the development of libraries;
- Grasp the role of ILA, IASLIC, ALA and other library associations in the promotion of libraries; and
- Get acquainted with the information and library related rules, regulations and acts.

Detailed Syllabus

Unit 1 Library and Information Science: Library and Information Science (LIS) as a subject, LIS as a profession, Professional skills and competencies, professional ethics, and academic status of a librarian; library as a social institution, linkage of LIS with other subjects, LIS education in India, Career prospect in LIS, Librarians' Day and National Library Week, World Book Day.

Unit 2 Basics of Library: Definition, types. Concept, functions, authority, collection, personnel, finance, services of academic, public, special, national, school, archives, museum and oriental libraries. Library Acts in India; RRRLF. Libraries for differently abled persons, children, women and aged people. Library of Congress, National library of India; Depository Libraries. Libraries under Ministry of Culture, Govt. of India.

Unit 3 Library and its Promoters and Associations: UNESCO, National Knowledge Commission, India and National Mission on Libraries, India, Library and Information Policy. Library associations at international (ALA, CILIP, IFLA), national (ILA, IASLIC, IATLIS), state levels (ALA, ACLA).

Unit 4 Library and Information related Regulations: The Press and Registration of Books Act, 1867; the Delivery of Books 'and Newspapers' (Public Libraries) Act, 1954 and 1956; [Information Technology Act, 2000](#), Right to Information Act, 2005. Commissions and Committees in relation to LIS.

MDC-2: Information Sources and Services

Course Objectives: To make the learners aware of the different sources of data and information and make acquaintance with the different services provided by

libraries and knowledge resource centres as well as to give an introduction to the correlation between information services and media.

Graduate Attributes: After completion of this course, you will be able to:

- Describe the structure of different kinds of documentary sources useful and accessible to a variety of users;
- Describe the need, use and functions of bibliographies;
- Grasp the process involved in providing reference and information services;
- Comprehend the sources for different types of information;
- Enumerate different types of abstracting & indexing periodicals with examples; and
- State the process involved in rendering biographical information services.
- Evaluate the different types of information sources and its application in media
- Apply analytical thought during reception of information.

Detailed Syllabus

Unit 1: Basics of Reference and Information Sources: Nature of information, characteristics, types and formats, non-documentary sources of information, Documentary sources of information: Primary, Secondary and Tertiary, reference sources of information, Evaluation of Reference Sources. Misinformation, Disinformation, Fake news- identification and precautions for media persons, Fact checking in media, issues of credibility.

Unit 2: Types of Reference and Information Sources: Dictionary, Thesaurus, Encyclopaedia, Biographical, Geographical and Statistical sources of information; Abstracting and Indexing, Citation Index and Bibliographical Sources. Definition, features, types and origin; Different databases of E-resources. Information sources for media persons.

Unit 3: Reference Service: Concept, types, functions, Reference enquiry, Reader's profile, Fact finding, Referral service, Alerting Services: CAS and SDI services, interlibrary loan, Document Delivery Service; Documentation Service,

Unit 4: Digital Reference Services: Concept, Definition, Characteristics, Importance, and Types – Asynchronous and Synchronous; Web 2.0 and 3.0 services - Social Networking Services, Social tagging, Social Bookmarking, RSS Feeds. Privacy and Security, Surveillance society, Media Convergence, Digital media ethics, Digital content creation, Digital Literacy.

MDC-3: Fundamentals of Mass Media Studies

Course Objectives: To introduce various aspects of mass media studies and its implication and modifications in order to adapt to changing dynamics of the media world.

Graduate Attributes: After completion of this course, learners will be able to:

- Comprehend different types of mass media
- Comprehend appropriate use of mass communication tools
- Describe the need, use and functions of ethical values related to the mass media;
- Enumerate different tools and terms associated with mass media; and
- Express thoughts and ideas strategically

Detailed Syllabus

Unit 1: Basics of Mass Media Studies: Definitions of Mass Communication, Mass Media: Types and Characteristics (Print, Electronic, Advertising, Public Relations, Cinema, Traditional and Alternative media), Use of Mass media for social development and social change: case studies (including gender, children and sustainable development)
Understanding types of audience in Mass Media.

Unit 2: Indian Society and Mass Media: Indian society: Nature, Meaning and Definition, Role of media in freedom struggle, post independent development (economic and political history) and media, Foundations of the Indian Constitution; Freedom of speech and expressions, Nation building in India: problems and prospects from journalistic point of views

Unit 3: Mass Media and Assam: Mass Communicators of Assam (Srimanta Sankaradeva, Lakshminath Bezbaroa, Jyotiprasad Agarwala, Bishnu Prasad Rabha and Dr. Bhupen Hazarika). Contribution of press in language and literature development in Assam (with focus on *Arunudoi*, *Jonaki*, *Abahan*, *Ramdhenu* and post *Ramdhenu* era till contemporary period). Traditional and community media in Assam

Unit 4: Foundations in Mass Media: Content generation (News, Letters to the Editor, Articles, Features) for various media platforms (Print, electronic and on-line platforms including blog, vlog, shorts etc.), Art of Anchoring, Qualities of a successful mass media communicator, Basics Genres of film, understanding the use of photography and documentary films in documentation, Ethics in Media practise. Careers in Mass Media

4. Commerce and Management

MDC-1: Basics of Commerce & Management

Unit-1: Foundations of Business- Business, Trade and Commerce; Forms of Business Organization; Private, Public and Global Enterprises; Business Services; Emerging modes of business, Social Responsibilities of Business. (15 hrs)

Unit 2: Business Environment: meaning and features, Importance of business environment; Dimensions of business environment – Economic environment, Social environment, Technological environment, Political environment and Legal environment ; Economic environment in India- Impact of Government Policy changes on business and industry. (15 hrs)

Unit 3: Management – Meaning and Significance of management, Principles of Management; Functions of Management- Production Management, Financial Management, Human Resource Management and marketing Management; Process of Management - Planning, Organizing, Staffing, Directing, Coordinating and Controlling. (15 hrs)

Recommended Books:

1. Business Organisation and Management by P.C. Tulsian , Pearson Education.
2. Business Environment by [V. C. Sinha & Ritika Sinha](#), SPBD Publishing House.
3. Business Environment by Amit Kumar, Sahitya Bhawan Publications.
4. Principles and Practice of Business Management by L M Prasad, Sultan Chand & Sons.

MDC-2: Personal Financial Management

Unit 1: Basics of Personal Finance: Financial Goals – Short-term and long term, Income and Expenditure Planning, Life-time financial planning, Investment Goals, Return and Risk in Investment, Avenues of Investment – Investment in Physical Assets and Financial Assets, Fixed income investments, investment in New Issue Market and stock market, Investment in Insurance, annuities and Pension funds, Investment in Gold and Bullions, Investment in Real Assets. (15 hrs)

Unit 2: Financial Markets and Instruments: Money Market, Capital Market, Forex Market and Derivative Market; Money Market Instruments and features, Capital Markets and Features, New Issue Market and Stock Market; New Issue market- Issue Mechanism, Market Players, Understanding and Analyzing a Prospectus, Secondary Market – Equity and Debentures, BSE and NSE, Index and its uses; Basics of Insurance and Mutual Funds. (15 hrs.)

Unit 3: Stock Market Investment: Fundamental Analysis- Economic Analysis- Industry Analysis and Company Analysis; Technical Analysis – Tools of technical

analysis, Understanding various types of charts and patterns, Interpretation of charts and investment decisions. (15 hrs.)

Recommended Books:

1. The Investment Game: How to Win, Prasanna Chandara, tata McGrawHill.
2. Security Analysis and Portfolio Management, S. Kevin, Prentice Hall India.
3. Fundamentals of Insurance, Inderjit Singh, Rakesh Kayal, S kaur and S Arora, Kalyani Publishers.
4. Principles of Insurance, C Krishnaswamy, Excel Books.
5. Indian Financial System, Bharati Pathak, Pearson Education.

MDC-3: Personal Income-tax Planning

Unit 1: Personal Tax Planning- Meaning, Scope and importance, Different types of taxes- Direct Taxes and Indirect taxes, Direct Taxes- Income tax and Wealth Tax, Income-tax Act 1960 and its scope, Meaning of Income, Basis of Charge-Person, Assessment and Previous Year, Assessee, Framework for Calculating Personal Tax Liability- Different Heads of Income, Residential Status for the purpose of Income Tax, Method of Accounting Recognized under Income tax Act. (10 hrs.)

Unit 2: Computation of Income: Income under the Head 'Salaries' - Meaning and scope of Salary, Different forms of salary and taxability, Income under the 'Head House Property' - Tax Chargeability, Computation of Income from House property, Let out property and Self Occupied Property, Income under 'Capital Gains' - Basis of Charge, Computation of Short-term and Long-term Capital Gains, Income-tax under the Head 'Income from Other Sources'- Interest income, dividend, Clubbing of Income, Gross Total Income, Permissible Deductions- Sec 80C to 80U, Tax Liability. (20 hrs.)

Unit 3: Tax Planning and Filing Returns: Contribution to Recognised Provident Funds, Deemed Self Occupied Property, Reduction through Deductions- Health Insurance premium, Pay Rent and Save Tax, Tax-saving Investments, Medical Expenses of Senior Citizen Dependents, Deduction on Home Loan Interest and Principal Repayments, Old tax Regime and New Tax Regime, Senior Citizen Tax Payers, 26 AS and Annual Information System, Filing Returns in due time, Consequences of Not Filing Returns. (15 hrs.)

Recommended Books:

1. Students Guide to Income Tax by V. K. Singhania, Taxman.
2. Principles of Income Tax Law & Practice by Dr. Naveen Mittal, Cengage Learning India Pvt. Ltd.
3. Swamy Income Tax on Salaries by Muthuswamy, Brinda, Sanjeev, Swamy Publications.

5. Humanities and Social Sciences

MDC-1: Humanities & Social Sciences-I: Makers of Modern Assam

Unit I: Language, Literature & Culture

- a. Architects of modern Assamese language & literature
AnandaramDhekiyalPhukan, LakshminathBezbaruah&BanikantaKakati
- b. Architects of modern Assamese music & culture
Jyoti Prasad Agarawala, Bisnhu Prasad Rabha&Dr.Bhupen Hazarika

Readings:

AnandaramDhekiyalPhukan:

AmalenduGuha, *Impact of Bengal Renaissance on Assam 1825-1875*, The Indian Economic and Social History Review, 1972.

Anandaram Dhekiyal Phukan, *A Few Remarks on the Assamese Language and vernacular education in Assam*

Gunabhiram Barua, *AnundaramDhekiyalPhukanarJivanCharitra.*, Publication Board Assam, 1971

Hiren Gohain, *Origins of the Assamese Middle Class*, Social Scientist, 1973

Maheswar Neog, *AnandaramDhekiyalPhukan: Plea for Assam and Assamese.*, Assam Sahitya Sabha, 1977

Nanda Talukdar (ed), *Ananda Ram DhekiyalPhukanarRachanaSangrah* (9th Edition): published by Khagendra Narayan Dutta Barua, Lawyers Book Stall, 1999

Prafulla Mahanta, *AsomiyaMadhyabittaShrenirItihas.*, Purbanchal Prakash, Guwahati, 2021.

LakshminathBezbarua:

Hiren Gohain, *Origin of the Assamese Middle class*, Social Scientist, 1973

Lakshminath Bezbarua, *Mur Jivon Sowaran.*, Lawyers Book Stall, 1999

Madhumita Sengupta, *Becoming Assamese: Colonialism and New Subjectivities in Northeast India*, Routledge, 2016

Maheswar Neog, *Lakshminath Bezbarua; The Sahityarathi of Assam.*, Gauhati University, 1972

Maheswar Neog, *Lakshminath Bezbarua: An Introduction*, Assam Sahitya Sabha, 1968

Prafulla Mahanta, *Asomiya Madhyabitta Shrenir Itihas.*, Purbanchal Prakash, Guwahati, 2021.

TilottamaMisra, *Literature and Society in Assam*, Bhabani Books, Guwhati, 2019

BanikantaKakati:

MaheswarNeog, *Banikanta Rachanvali* (2nd Edition), Publication Board Assam, 2002

Jagat Chandra Kalita (ed), *Assamese: Its Formation and Development* (4th Edition): BanikantaKakati, LBS Publications

Jyoti Prasad Agarwala

Akhil Ranjan Dutta, *Jyoti Prasad Agarwala: A Revolutionary Cultural Architect of Twentieth century Assam*, Social Change, 2012

Arup Kumar Dutta, *Jyotiprasad: Prince of Beauty*,Anwasha, 2003

Anil Roychowdhury, *Axamiya Bhashar Darshan*, AankBaak, 2016.
Dayananda Pathak, *JyotiprasadAgarwala: Man and Mission*, Publication Board of Assam, 2007
Hiren Gohain (ed), *JyotiprasadRachanavali* (6th edition), Publication Board Assam, 2003
SurjyaKanta Hazarika, *Bhupen Hazarika Rachanavali*(Vol 1, 2, 3), S.H Educational Trust, 2008

BishnuRabha

Anil Roychowdhury, *AxamiyaBhashar Darshan*,AankBaak, 2016.
ArupjyotiSiakia, *A Century of Protests: Peasant Politics in Assam Since 1900*, Routledge, New Delhi, 2014.
Ismail Hussain, *Bishnu Rabhar Jivon Aru Darshan (2nd Edition)*, JyotiPrakashan, 2000
Rava Rachanavali Prakasan Sangha, *Bishnuprasad RabhaRachanaSamahar*, 2008
Surjya Hazarika (ed), *Bhinnajanar Dristit Bishnu Prasad Rabha*, S.H Educational Trust, 2008

Bhupen Hazarika:

AkhilRanjan Dutta, *Forcing Prison Doors: Socio-Cultural Mission of Bhupen Hazarika*, Social Change, 2012
Tarun Kalita, Manik Chandra Nath (eds), *Dr. Bhupen Hazarika: A Multifaceted Personality*, TTN College Publication Board
Surjya Kanta Hazarika, *Bhupen Hazarika Rachanavali* (Vol 1, 2, 3), S.H Educational Trust, 2008

Unit: Framers of the Political Foundations

- a. Initial foundation: *AsomChatraSanmilian& Assam Association*
- b. Consolidating the foundation: *Tarun Ram Phukan&GopinathBardoloi*
- c. Tribal consciousness and their rights: *Kalicharan Brahma &BhimbarDeori*

Readings

Asom Chatra Sanmilian and Assam Association:

Devabrata Sharma, *AsomiyaJatigathanPrakriya Aru JatiyaJanagosthigataAnusthanSamuh*,EkalavyaPrakashan, 2022
Manorama Sharma, *Student Power and Nationalism: An Assessment of the Assam ChatraSanmilian, 1916-1939*, in *Student power in Northeast India: Understanding Student Movements*, Apurba K. Baruah (ed), Regency Publications, New Delhi, 2002.
PrafullaMahanta, *AsomiyaMadhyabittaShrenirItihas:*, Purbanchal Prakash, Guwahati, 2021.
Shiela Bora, *Trends in the Rise of Student Power in Assam 1916-1947*, in *Student power in Northeast India: Understanding Student Movements*, Apurba K. Baruah (ed), Regency Publications, New Delhi, 2002.

Tarunram Phukan:

LaxmiNathTamuly, *GopinathBordoloi (2nd Edition)*, Publication Board Assam, 2003

TarunramPhukanRachanvali: AxamPrakashanParishad, 2015

Gopinath Bordoloi:

Bordoloi Committee Report/ Sub-committee on the Northeast Frontier (Assam) Tribal and Excluded Areas.

LaxmiNathTamuly, *GopinathBordoloi (2nd Edition)*, Publication Board Assam, 2003

Nirode K Barooah,*GopinathBordoloi, The Assam Problem and Nehru's Centre*,Bhabani Publications, 2010

Nirode Kumar Barooah, *GopinathBordoloi Aru Assam: Tetia Aru Etia*, 2010

UdayonMisra, *Burden of History*, Oxford University Press, 2018

Kalicharan Brahma:

B. Narzary, M. Mitra,*Journey Towards Enlightenment: Gurudev and Bodo Society*, GBD Publishers, 2004

Devendranath Sharma, *GurudevKalicharan Brahma*, Assam Sahitya Sabha, 1983

KumudRanjanBasumatary, *GurudevKalicharan Brahma: The Emergence of Bodo Ethnic Consciousness in early 20th century*, International Journal of Humanities and Social Sciences, 2017

M.K Brahma, *GurudevKalicharan Brahma: His Life and Deeds*, N.L Publications, 2001

Sujit Choudhury, *The Bodos: Emergence and Assertion of an Ethnic Minority:*

BhimbarDeuri

Dr.RatneshwarDeuri, *JononetaBhimbarDeuri*, Publisher AnjanliDeuri, 2018

IndibarDeori,*JonogosthiyoSamasya: Atit, Bartaman Aru Bhabishyat*, Bandhab, 2015

MadhabjyotiDeuri, *AxomorTrankortaBhimbarDeuri*, SamannayPrakashan, 2009

Munindra Das, *AxamarNrigosthiyaUttaranarItihash: Samashya- Sangram- Praptil*, Banalata, 2020

Unit 3: Women Education, Politics and Literature

- a. Baptist Missionaries & women education
- b. ChandraprabhaSaikiani, AmalPrabha Das & Raja Bala Das
- c. AsomLekhikaSamaroh

Baptist Missionaries and Women Education:

American Baptist work in Assam, India, 1926.

Anupama Ghosh,*Evangelism in Assam: Schools and Print Culture 1830s-1890s*, Indian History Congress, 2014.

ArchanaChakravarty, *History of Education in Assam 1826-1919*, Mittal Publications, 1989

Lakshahira Das, *Development of Secondary Education in Assam*,Omsons Publications, 1990

Milton S Sangma, *History of American Baptist Mission in North-East India (Vol 2)*, Mittal Publications, New Delhi, 1992

Suryasikha Pathak, *Missionary Wives in the Evangelical Project in Colonial Assam: Life and Times of Mrs P.H Moore*, ICHR, Guwhati, 2008

Chandrabhabha Saikiani

Aparna Mahanta, *Chandrabhabha Saikiani: Swadhinatapurba Asam or Stri Sikshaaru Nari Jagaran*, Anwasha Publications, 2014.
Hiranya Borah, *Chandrabhabha: The Iron Lady of Assam*, Bluerose publishers, 2021
Madhurima Goswami (ed), *Chandrabhabha Saikiani: A Force in History*, DVS Publishers, 2020
Nandana Dutta (ed), *Communities of Women in Assam: Being, Doing and Thinking Together*, Routledge, London, 2016
R Doley, N Choudhury, *Agnikanya Chandrabhabha Saikiani: A Collection of Articles*, Tezpur University, 2014.

Amal Prabha Das

Smaranika: A Souvenir of Amal Prabha Das Birth Centenary Celebration, Sarania Ashram, Guwatai, 2011
Samiran Das, *Amalprabha Das: A Biographical Work*, Kasturba Gandhi National Memorial Trust, Guwahati, 2004/2011

Rajabala Das

Rajabala Das, *Three Score Years and Ten: One Life Many Memories* (An autobiography of Rajabala Das translated by Aditi Choudhury), Handique Girls' College, Guwahati, 2017
Pori Hiloidari, *Assamese Women: The Pathbreakers*, Handique Girls' College, Guwahati

Asom Lekhika Samaroh:

Nandana Dutta, *Communities of Women in Assam: Being, Doing and Thinking Together*, Routledge, London, 2016

MDC-2: Humanities & Social Sciences- II: Democracy and Peoples' Rights

Unit 1: Debates on Democracy

Is democracy only about elections & procedures?

Peoples' rights and democracy

Dissent in democracy

Reading list:

Bhargava, Rajeev and Ashok Acharya. (2008). *Political theory: An Introduction*. New Delhi: Pearson.
Heywood, Andrew. (2015). *Political Theory*. New York: Palgrave.
Gauga, O. P. (2021). *An Introduction to Political Theory*. New Delhi: Macmillan.
Ramaswamy, Sushila. (2014). *Political Theory: Ideas and Concepts*. New Delhi: Macmillan.
Abbas, Hoveyda and R. Kumar. (2012). *Political Theory*. New Delhi: Pearson.
Held, David. (1989). *Political Theory and the Modern State: Essays on State, Power and Democracy*, New Delhi: Maya Polity.
Held, David. (1991). *Political Theory Today*. California: Stanford University Press.
Dahl, Robert. (1989). *Democracy and its critics*. London: Yale University Press.

- Mckinnon, Catriona(ed). (2008). *Issues in Political Theory*. New York: Oxford University Press.
- Thapar, Ramila. (2020). *Voices of Dissent: An Essay*. New Delhi: Seagull Books.
- Merriam, Charles E. (1941). The Meaning of Democracy. *The Journal of Negro Education*. Vol. 10, No. 3.
- Saffon, M.P. and Nadia Urbinati. (2013). Procedural Democracy, the Bulwark of Equal Liberty. *Political Theory*. Vol. 41, No. 3
- [Wegner](#), G. (2009). Substantive versus Procedural Liberalism: Exploring a Dilemma of Contemporary Liberal Thought. *Journal of Institutional and Theoretical Economics*. Vol. 165, No. 3
- Kampelman, [Max M. \(1970\)](#). Dissent, Disobedience, and Defense in a Democracy. *World Affairs*. Vol. 133, No. 2.
- [Shiffrin](#), S. (2011). Dissent, Democratic Participation, and First Amendment Methodology. *Virginia Law Review*, Vol. 97, No. 3

Unit 2: Constitution, Citizenship & Federalism

Constitution as a fundamental law

What is all about citizenship under democracy?

Why federalism matter in a plural society?

Reading list:

- Bhargava, Rajeev and Ashok Acharya. (2008). *Political theory: An Introduction*. New Delhi: Pearson.
- Rajeev Bhargava, Rajeev. (2008). *Politics and Ethics of the Indian Constitution*. New Delhi: Oxford University Press.
- Heywood, Andrew. (2005). *Political Theory*. New York: Palgrave.
- Gauga, O. P. (2021). *An Introduction to Political Theory*. New Delhi: Macmillan.
- Kymlicka, Will. (2002). *Contemporary Political Philosophy: An Introduction*. New York: Oxford University Press.
- Heywood, A. (2002). *Politics*. New York: Palgrave.
- [Levinson](#), B. (2005). Citizenship, Identity, Democracy: Engaging the Political in the Anthropology of Education. *Anthropology & Education Quarterly*. Vol. 36, No. 4.
- Young, Iris M. 1989. 'Polity and Group Difference: A Critique of the Ideal of Universal Citizenship' *Ethics*. Vol. 99, No.2.
- Watts. R. (2008). *Comparing Federal Systems*. Montreal: McGill Queen's Univ. Press.

Unit 3: Democracy and Peoples' Rights in India

Right to livelihood: MGNREGA

Right to Information & Education

Right to Food

Reading List:

- Laxmikanth, M. (2021). *Governance in India*. New Delhi: McGraw Hill.

- Basu, R. (2015). *Public Administration in India Mandates: Performance and Future Perspectives*. New Delhi: Sterling Publishers
- Singh, [R.K.](#) (2017). MGNREGA: The History of an Idea. *Proceedings of the Indian History Congress*. Vol. 78, pp. 1070-1077
- Pole, [Kantrao P.](#) (2015). The Role of MGNREGA in Rural Development: A Study of Maharashtra. *The Indian Journal of Political Science*. Vol. 76, No. 3
- [Khanwalker](#), V. (2011). The Right to Information Act in India: Its Connotations and Implementation. *The Indian Journal of Political Science*. Vol. 72, No. 2
- [Srivastava](#), P. and [Claire Noronha](#). (2014). Institutional Framing of the Right to Education Act: Contestation, Controversy and Concessions. *Economic and Political Weekly*. Vol. 49, No. 18
- [Krishnan](#) P. and [Mangala Subramaniam](#). (2014). Understanding the State: Right to Food Campaign in India. *The Global South*. Vol. 8, No. 2.
- Ray, B. (2019). *Rethinking Good Governance: Holding to Account India's Public Institutions*. New Delhi: Rupa Publications.
- [Chakrabarti](#) R. and [k. Sanyal](#). (2016). *Public Policy In India*. New Delhi: Oxford University Press.
- Sharan, A., Upadhyaya and Ashild Kolas and Ruchita Beri (2023). *Food Governance in India: Rights Security and Challenges in the Global Sphere*. New Delhi: Routledge.

MDC-3: Humanities & Social Sciences- III: Understanding Globalization

Unit 1: Globalization: The Context

- a. Disintegration of the Soviet Union & collapse of the socialist economy
- b. Washington Consensus
- c. Neoliberal approach to development

Reading List:

- Scheuermann, William. (2014). Globalisation. In Stanford *Encyclopedia* of Philosophy. Retrieved from <http://www.bibme.org/citation-guide/apa/website/>
- Steger, Manfred B. (2003). *Globalisation – A Very Short Introduction*. Oxford: OUP.
- Ritzer, George. (2010). *Globalisation: A Basic Text*. Sussex: Wiley Blackwell
- Lockwood, David (2000). *The Destruction of the Soviet Union: A Study in Globalization*. Palgrave Macmillan
- Lechini, Gladys (2006). *Globalization and the Washington Consensus: Its Influence on Democracy and Development in the South*.
- Nedeveren Pieterse, Jan. (2017). Neoliberal Globalization and the Washington Consensus. 10.4324/9781315092577-5.

Unit 2: The Drivers of Globalization

- a. IMF & the World Bank
- b. Multinational Companies
- c. Structural Adjustment Policies of the National Governments

Reading List:

- Ritzer, George. (2010). *Globalisation: A Basic Text*. Sussex: Wiley Blackwell
- Stiglitz, Joseph (2002). *Globalization and its Discontents*. W. W. Norton & Company.
- Heywood, Andrew. (2011). *Global Politics*. Palgrave Macmillan
- Oatley, T. (2006). *International Political Economy: Interests and Institutions in the Global Economy*. New York: Pearson-Longman.
- Frieden, J. A. and D. A. Lake. 2000. *International Political Economy: Perspectives on Global Wealth and Power*. New York: Bedford/St. Martin's.

Unit 3: Emerging Concerns under globalization

- a. UN and SDGs
- b. Gender Equity
- c. Climate Crisis

Reading List:

- Ritzer, George. (2010). *Globalisation: A Basic Text*. Sussex: Wiley Blackwell
- Held, David & McGrew, Anthony. (2002). *The Global Transformations Reader An Introduction to the Globalization Debate (Second Edition)*. Polity Press.
- Newell, Peter. (2013). *Globalization and Environment: Capitalism Ecology and Power*. Polity Press.
- Lee, Kelly. (2003). *Globalization and Health: An Introduction*. Palgrave and Macmillan.
- Lingard, Bob. (2021). *Globalization and Education*. Routledge Publications.
- Beneria, Lourdes, Berik, Günseli, & Floro, Maria. (2016). *Gender, development and Globalization: Economics as if all people mattered*. Routledge Publications.

Further readings:

- Sandbrook, R. (2000). Globalization and the Limits of Neoliberal Development Doctrine [Review of *Development as Freedom*, by A. Sen]. *Third World Quarterly*, 21(6), 1071–1080. <http://www.jstor.org/stable/3993558>
- Beck, Ulrich. (1992). *Risk Society: Towards a New Modernity*. London: Sage.
- Giddens, Anthony. (1999). *Runaway World: How Globalisation is Reshaping our Lives*. London: Profile Books Ltd.
- Stiglitz, Joseph (2007). *Making Globalization work*. W.W. Norton & Company
- Fernandez, John S. (1994). Globalization: Processes of Integration and Disintegration. *International Journal of Politics, Culture, and Society*, Vol. 8, No. 2, pp. 203-223 (21 pages)

- World Bank: World Development Indicators (WDI) and poverty data:
<http://databank.worldbank.org/ddp/home.do?Step=12&id=4&CNO=2>
<http://povertydata.worldbank.org/poverty/home>
- IMF data: <http://www.imf.org/external/data.htm>
- OECD statistics: <http://stats.oecd.org/>
- WTO trade and tariffs statistics:
<http://www.wto.org/english/ress e/statis e/statis e.htm>
- Data on financial openness (Chinn & Ito Index)
http://web.pdx.edu/~ito/Chinn-Ito_website.htm
http://web.pdx.edu/~ito/trilemma_indexes.htm
- Economic sanctions episodes:
<http://www.piiie.com/research/topics/sanctions/sanctions-timeline.cfm>
- Foreign aid statistics:
 OECD:
http://www.oecd.org/document/49/0,3746,en_2649_34447_46582641_1_1_1_1,00.html
- World Bank's WDI:
<http://databank.worldbank.org/ddp/home.do?Step=12&id=4&CNO=2>
- UN peace operations: <http://www.un.org/en/peacekeeping/>

6. Information and Communication Technologies

MDC-1: Information and Communication Technologies-I

Early History of Computer, Evolution of computing system, Generations of Computer, Types of Computer.

Components of Computer System, Functionalities of a computer, Basic I/O devices: Point and draw devices, Data Scanning device, Voice Recognition Devices, Digitizers. Introduction to number system. Different computer software and types, Classification of software, classification based on task, source and licence, quality of a good software.

Introduction to IT revolution, Overview on development in the field of Information Technology, Hardware and software development, Recent development in Information Technology, Application of ICT in various disciplines, Basic concept on innovation.

Concept of Internet; Uses of Internet; connecting to internet; ISP; Basics of internet connectivity. World Wide Web and Websites; Web Browsing softwares, Search Engines; Searching information in web. Understanding URL; Domain name; IP Address; Basics of electronic mail; Email account; Sending and receiving emails; Accessing sent emails; Email attachment.

Introduction to Storage Systems: Overview of storage hierarchy and storage technologies, Characteristics of primary, secondary, and tertiary storage. Introduction to cloud storage models (e.g., S3, Azure Blob Storage), Data durability, availability, and scalability in cloud storage. Emerging Trends in Storage: Flash-based storage technologies (e.g., SSD, NVMe).

MDC-2: Information and Communication Technologies-II

Concept of Digital Technology, Logic and Flow Chart; Networks, Examples of Programming Languages.

Concept of Digital Technology: Number Systems, Digital Information Representation and Transmission, Codes including UNICODE, Logic and Flow Charts, concept of algorithm.

Computer Networks, LAN, WiFi and interconnected networks. Physical Media, Network Devices. Chat and Video Conference over internet.

Programming concepts, programming languages.

MDC-3: Information and Communication Technologies-III

Social Media platforms, Cyber Ethics, Cyber Laws, Databases, App, AI and ML Major Social Media platforms and their important functional and security attributes. Cyber Ethics, Cyber Laws.

Definition and importance of DBMS, Evolution of data management systems, Advantages and disadvantages of using DBMS, Conceptual, logical, and physical

data models. Database Security and Integrity, User authentication and authorization, Concept of Data encryption and access control, Roles and responsibilities of a database administrator, Backup and recovery strategies, Big Data and data analytics.

Introduction to Apps and App Development, mobile operating systems (iOS, Android, etc.), User Interface (UI) Design.

Definition and basic concepts of AI and ML, Historical overview of AI and ML, Applications of AI and ML in various disciplines. Ethical and Social Implications of AI, Impact of AI and ML on creativity, authorship, and artistic expression, Cultural and societal implications of AI and ML in the society.

7. Life Sciences

MDC-1: Basics in Life Sciences

Course objectives:

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

Learning outcomes:

By completing the paper, students will -

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

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

Unit 1: Basics of Plant science

No. of Contact Classes:12

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

Unit 2: Basics of Anthropology

No. of Contact Classes:10

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

Unit3:Basics in Economic Zoology

No. of Contact Classes:13

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

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

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

Unit4: Applications of life science

No. of Contact Classes:10

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

Reading list:

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

MDC-2: Life Sciences and Environment

Course objectives:

This paper will provide a comprehensive understanding of environmental science, from the fundamental principles and composition of different environmental components to the application of biotechnology in addressing environmental challenges.

Learning outcomes:

Upon successful completion of the paper, students will:

1. Understand the definition, principles, and scope of Environmental Science; comprehend the structure and composition of the atmosphere, hydrosphere, lithosphere, and biosphere.
2. Recognize the interaction between Earth, Man, and the environment; grasp the concept of sustainable development.
3. Appreciate the importance of environmental education and awareness and understand the principles of environmental ethics.
4. Gain knowledge of the fundamentals of Environmental Chemistry.
5. Be familiar with the biochemical aspects of heavy metals; understand air pollution and its major regions; chemical reactions; air pollutants; and their effects.
6. Understand ecology as an interdisciplinary science, gain knowledge about the origin of life and speciation, and learn about human ecology and settlement.
7. Understand ecosystem structure and functions; comprehend biogeochemical cycles, ecological succession, niches, and ecosystem stability.
8. Learn about population ecology, including characteristics, carrying capacity, and population growth; understand community ecology, including definitions, types, and interactions.
9. Understand the gene-environment interaction and the impact of climate change on living beings; comprehend the concepts of epigenetics, the evolution of pathogenic microbes, and emerging diseases in animals, plants, and humans.
10. Learn about the role of biotechnology in pollution control, bioremediation, phytoremediation, bioenergy, biofuels, and restoration of degraded lands; and understand the conversion of waste to wealth and waste treatment using biotechnology.

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

Unit 1: Fundamentals of Environmental Sciences

No. of Contact Classes: 10

Definition, Principles, and scope of Environmental Science; Structure and composition of atmosphere, hydrosphere, lithosphere, and biosphere; Interaction between Earth, Man and Environment; Concept of sustainable development; Environmental education and awareness; Environmental ethics.

Unit 2: Environmental Chemistry

No. of Contact Classes: 12

Fundamentals of Environmental Chemistry: Classification of elements, Hydrological cycle, Concept of DO, BOD and COD; Inorganic and organic components of soils; Biogeochemical cycles - nitrogen, carbon, phosphorus and sulphur; Biochemical aspects of heavy metals (Cd, Pb, Cr); PAN, VOC and POP; Air Pollution: Major regions of atmosphere, chemical and photochemical reactions in atmosphere; air pollutants: types, sources, particle size and chemical nature; Photochemical smog; Ozone depletion; effects of air pollution on living organisms and vegetation; Greenhouse effect and Global warming; Water Pollution: sources and nature of water pollutants, Impacts of water pollution on hydrological and ecosystems.

Unit 3: Ecology and Environment

No. of Contact Classes: 15

Ecology as an inter-disciplinary science; Origin of life and speciation; Human Ecology and Settlement; Ecosystem Structure and functions: Structures - Biotic and Abiotic components. Functions - Energy flow in ecosystems, energy flow models, food chains and food webs; Biogeochemical cycles, Ecological succession; niche; Ecosystem stability and factors affecting stability; Ecosystem services; Biomes: concept, classification and distribution. Characteristics of different biomes: Tundra, Taiga, Grassland, Savanna, Tropical Rain forest; Population ecology: Characteristics of population, concept of carrying capacity, population growth and regulations; population fluctuations; Concept of 'r' and 'k' species; Community ecology: Definition, community concept, types and interaction - predation, herbivory, parasitism and allelopathy.

Unit 4: Environmental Biotechnology

No. of Contact Classes: 08

Gene environment interaction, impact of climate change on living beings, epigenetics, evolution of pathogenic microbes, deadly viruses, emerging diseases in animals, plants, humans; Biotechnology in pollution control, bioremediation, phytoremediation, bioenergy, biofuels, restoration of degraded lands, conversion of waste to wealth, waste treatment.

Reading list:

1. Bharucha E (2012) *Textbook of Environmental Studies for Undergraduate Courses*. University Grants Commission (UGC) - University Press (India), New Delhi, India
2. Manahan SE (2016) *Environmental Chemistry*. CRC Press, Boca Raton, FL, USA
3. Odum EP (2007) *Fundamentals of Ecology*. Cengage Learning, Belmont, CA, USA
4. Rajagopalan R (2010) *Environmental Studies: From Crisis to Cure*. Oxford University Press, New Delhi, India
5. Scragg A (2005) *Environmental Biotechnology: Principles and Applications*. Springer, Dordrecht, Netherlands.
6. Sharma BK, Misra AK (2019) *Environmental Chemistry: An Analytical Approach*. Springer, Singapore.
7. Sharma PD (2015) *Ecology and Environment*. Rastogi Publications, Meerut, India
8. Thakur IS, Ray M, Sharma P (2021) *Environmental Biotechnology: A Sustainable Approach*. CRC Press, Boca Raton, FL, USA

MDC-3: Bioresources and Traditional Knowledge

Course objectives:

This paper will provide a comprehensive understanding of biodiversity, conservation practices, bioresources, and traditional knowledge, emphasizing their significance and applications in various fields.

Learning outcomes:

Upon successful completion of the paper, students will:

1. Understand the concept, scope, and laws of biodiversity; identify biodiversity hotspots; and understand the classification of species based on their conservation status.
2. Recognize the direct and indirect uses of biodiversity.
3. Understand the role of Remote Sensing and GIS in biodiversity studies, the Wildlife Protection Act, and the significance of biosphere reserves, national parks, wildlife sanctuaries, wetlands, Ramsar Sites, and mangroves; identify international initiatives for biodiversity conservation, including the IUCN and CoP.
4. Recognize the role of biotechnology in biodiversity conservation, including global environmental facilities, biosafety levels, and cryopreservation.
5. Understand the nutritional value of food supplements from plants, endemic fishes, crustaceans, molluscs, reptiles, and social insects; the role of fermented food and beverages in traditional knowledge.
6. Recognize traditional conservation practices related to plants and pet animals, the role of traditional knowledge in bioprospecting and the issues of biopiracy.

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

Unit 1: Biodiversity

No. of Contact Classes: 15

Concept and scope; Laws of biodiversity, biodiversity hotspots, biodiversity classification (rare, threatened, vulnerable, endangered, critically endangered, flagship and keystone species), Levels of biodiversity— organisational (genetic, species and ecosystem), spatial (alpha, beta, and gamma); Biodiversity of northeast India; Valuing biodiversity - direct- and indirect use values; Role of Remote Sensing and Geographical Information System in biodiversity studies.

Unit 2: Conservation Practices

No. of Contact Classes: 10

International initiatives for biodiversity conservation (including IUCN, CoP), *In-situ* and *Ex-situ* conservation, Biological Diversity Act, National Biodiversity Action Plan (a brief summary), wildlife protection act, biosphere reserves, national parks, wildlife sanctuaries, wetlands and Ramsar Sites, Mangroves; role of biotechnology in biodiversity conservation (global environment facilities, biosafety levels, cryopreservation).

Unit 3: Bioresources

No. of Contact Classes: 12

Distribution, parts used and method of use, nutritive value – Food supplements [plants: Bora rice, Bamboo shoot, *Diplazium esculentum* (Dhokia sak), *Houttuynia cordata* (Masundari); Endemic fishes (carps, minnows, shads, barbs, murrels, eels, catfishes, perches, trouts), crustaceans, molluscs, reptiles (snakes and lizards), social insects (bees, wasps, ants)], Sources of beverages (Apong, Judima, Jumai, Sulai), Fibers (*Corchorus olitorius* – Mora paat), Timbers (Holong – *Dipterocarpus retusus*, *Bombax ceiba*), non-timber forest products (bamboos, canes, rattan, wild medicinal plants, wild fruits, lesser-known fruits, ferns, leaves, roots, cones, seeds, wild honey, mushrooms), sacred groves, large ponds and lakes.

Unit 4: Traditional Knowledge

No. of Contact Classes: 08

Cuisine diversity, food, ethnozoology, ethnobotany, ethnomedicine, food processing and preservation techniques, fermented food and beverages, conventional animal husbandry, milk and milk products, goods produced from animals; Role of traditional knowledge in bioprospecting; Biopiracy; Traditional Knowledge Digital Library (TKDL) - concept and importance. ITK in Biodiversity conservation, ITK & harvesting of Aquatic Resources.

Reading list:

1. Acharya D, Shrivastava A (2008) *Indigenous Herbal Medicines: Tribal Formulations and Traditional Herbal Practices*. Aavishkar Publishers Distributor, Jaipur, India.
2. Babu NS, Manickam S, Kumar SS (2019) *Biodiversity Conservation and Legal Perspectives*. Springer, Singapore.
3. Bebarta KC, Mohanty AK (2017) *Ethnobiology of India: Volume 1 - Eastern and Northeastern India*. CRC Press, Boca Raton, FL, USA.
4. Gaston KJ, Spicer JJ (2014) *Biodiversity: An Introduction*. Wiley-Blackwell, Chichester, UK.
5. Krishnan M (2008) *Plants That Heal*. Rupa Publications, New Delhi, India.
6. Primack RB (2018) *Essentials of Conservation Biology*. Sinauer Associates, Sunderland, MA, USA.
7. Pushpangadan P, Ramawat KG (2017) *Ethnobotany and Medicinal Plants: India and Nepal*. Springer, Cham, Switzerland.
8. Ramakrishnan PS, Saxena KG, Gupta U (2010) *Biodiversity: Conservation and Management*. Biotech Books publisher, Delhi, India.

8. Earth Sciences

MDC-1: Understanding Physical Formations of the Earth

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

Books Recommended:

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

MDC-2: Understanding the Changing Environment

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

	environments); Population growth and environmental changes; Impact of man on natural environment (Deforestation, soil erosion, soil degradation, depletion of mineral resources, air and water pollution)	
Unit-III Environmental changes and associated environmental problems	Global environmental changes: Global warming, Ozone layer depletion, Climate change Environmental problems: Sea level change; Extreme weather events; Land, air and water pollution; Desertification; Deforestation, biodiversity loss and man-animal conflicts	10
Unit-IV Environmental Management	Meaning of environmental management; Conservation of natural environment and its resources; Management of environmental problems; Concept of sustainable development	6

Recommended Books:

1. S. C. Santra (2011): Environmental Science, New Central Book Agency
2. Michael Allaby (2000): Basics of Environmental Science (2nd Ed.), Taylor & Francis
3. R. W. Jackson and J. M. Jackson (1998): Environmental Science – The natural environment and human impact, Longman
4. 4.D. D. Mishra (2019): Fundamental Concepts in Environmental Studies, S Chand Publication

MDC-3: Land and People of Assam

Unit	Contents	Lect.
Unit-I	Locational significance of Assam; Assam as an administrative division - Pre and Post-Independence Changes; Present administrative divisions	8
Unit II	Physical Characteristics (Relief, drainage, climate and vegetation) and associated problems (River-bank erosion, landslides and floods)	10
Unit-III	Natural resources (Forests, wildlife and biodiversity, mineral resources)	8

Unit-IV	Unit 4: Population (Trend of growth, spatial variation in growth, density, ethno-religious and linguistic composition, age composition, urbanization, literacy)	8
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Books Recommended:

1. Bhagabati, A.K., Bora, A.K. and Kar, B.K. (edited), 2022: *Geography of Assam*, Rajesh Publications, New Delhi (Revised & Enlarged Edition).
2. Bora, A.K. and Nath, M. (edited), 2022: *An Illustrated Geography of Assam*, EBH Publishers (India), Guwahati.
3. Dikshit, K.R. and Dikshit, J.K., 2013: *North-East India: Land, People and Economy*, Springer Science.
4. Taher, M. and Ahmed, P., 2007: *Geography of North-East India*, Mani ManilPrakash, Guwahati.