



# UNIVERSITY OF CALCUTTA

## Notification No. CSR/ 12 /18

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The above shall be effective from the academic session 2018-2019.

SENATE HOUSE  
KOLKATA-700073  
The 4<sup>th</sup> June, 2018

*Tapas Kumar Mukherjee*  
Principal & Secretary  
Governing Body Mahatma Nandy Mahavidyalaya  
Jangipara, Hooghly

*Paul*  
4/6/18  
(Dr. Santanu Paul)  
Deputy Registrar

## University of Calcutta

*Under Graduate Curriculum under Choice Based Credit System (CBCS)*

Syllabus for Ability Enhancement Compulsory Course-2 (AECC-2) in  
**Environmental Studies**

Semester-2

**Total Marks-100(Credit -2)**

(50 Theory-MCQ type + 30 Project + 10 Internal Assessment + 10 Attendance)

[Marks obtained in this course will be taken to calculate SGPA & CGPA]

### Theory

<b>Unit 1</b>	<b>Introduction to environmental studies</b>	<b>2 lectures</b>
	<ul style="list-style-type: none"><li>•Multidisciplinary nature of environmental studies;</li><li>•Scope and importance; Concept of sustainability and sustainable development.</li></ul>	
<b>Unit 2</b>	<b>Ecology and Ecosystems</b>	<b>6 lectures</b>
	<ul style="list-style-type: none"><li>•Concept of ecology and ecosystem, Structure and function of ecosystem; Energy flow in an ecosystem; food chains, food webs; Basic concept of population and community ecology; ecological succession.</li><li>•Characteristic features of the following:<ul style="list-style-type: none"><li>a) Forest ecosystem</li><li>b) Grassland ecosystem</li><li>c) Desert ecosystem</li><li>d) Aquatic ecosystems (ponds, streams, lakes, wetlands, rivers, oceans, estuaries)</li></ul></li></ul>	
<b>Unit 3</b>	<b>Natural Resources</b>	<b>8 lectures</b>
	<ul style="list-style-type: none"><li>• Concept of Renewable and Non-renewable resources</li><li>• Land resources and land use change; Land degradation, soil erosion and desertification.</li><li>•Deforestation: Causes, consequences and remedial measures</li><li>•Water: Use and over-exploitation of surface and ground water, floods, droughts, conflicts over water (international &amp; inter-state).</li><li>•Energy resources: Environmental impacts of energy generation, use of alternative and nonconventional energy sources, growing energy needs.</li></ul>	
<b>Unit 4</b>	<b>Biodiversity and Conservation</b>	<b>8 lectures</b>
	<ul style="list-style-type: none"><li>•Levels of biological diversity: genetic, species and ecosystem diversity;</li><li>• Biogeographic zones of India; Biodiversity patterns and global biodiversity hot spots</li><li>•India as a mega-biodiversity nation; Endangered and endemic species of India</li><li>•Threats to biodiversity: Habitat loss, poaching of wildlife, man-wildlife conflicts, biological invasions;</li><li>•Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.</li><li>•Ecosystem and biodiversity services: Ecological, economic, social, ethical, aesthetic and Informational value.</li></ul>	
<b>Unit 5</b>	<b>Environmental Pollution</b>	<b>8 lectures</b>
	<ul style="list-style-type: none"><li>• Environmental pollution: concepts and types,</li><li>• Air, water, soil, noise and marine pollution- causes, effects and controls</li><li>• Concept of hazards waste and human health risks</li><li>• Solid waste management: Control measures of Municipal, biomedical and e-waste.</li></ul>	

Tapas Kumar Paul

Principal & Secretary  
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<b>Unit 6 Environmental Policies and Practices</b>	<b>7 lectures</b>
<ul style="list-style-type: none"> <li>•Climate change, global warming, ozone layer depletion, acid rain and their impacts on human communities and agriculture</li> <li>•Environment Laws: Wildlife Protection Act; Forest Conservation Act. Water (Prevention and control of Pollution) Act; Air (Prevention &amp; Control of Pollution) Act; Environment Protection Act; Biodiversity Act.</li> <li>•International agreements: Montreal Protocol, Kyoto protocol and climate negotiations; Convention on Biological Diversity (CBD).</li> <li>•Protected area network, tribal populations and rights, and human wildlife conflicts in Indian context.</li> </ul>	
<b>Unit 7 Human Communities and the Environment</b>	<b>6 lectures</b>
<ul style="list-style-type: none"> <li>•Human population growth: Impacts on environment, human health and welfare.</li> <li>•Case studies on Resettlement and rehabilitation.</li> <li>• Environmental Disaster: Natural Disasters-floods, earthquake, cyclones, tsunami and landslides; Manmade Disaster- Bhopal and Chernobyl.</li> <li>•Environmental movements: Bishnois, Chipko, Silent valley, Big dam movements.</li> <li>•Environmental ethics: Role of gender and cultures in environmental conservation.</li> <li>•Environmental education and public awareness</li> </ul>	
<b>Project/ Field work</b>	<b>Equal to 5 lectures</b>
<ul style="list-style-type: none"> <li>•Visit to an area to document environmental assets: Natural resources/flora/fauna, etc.</li> <li>•Visit to a local polluted site-Urban/Rural/Industrial/Agricultural.</li> <li>•Study of common plants, insects, fish, birds, mammals and basic principles of identification.</li> <li>•Study of ecosystems-pond, river, wetland, forest, estuary and agro ecosystem.</li> </ul>	
<b>Total</b>	<b>50 Lectures</b>

### Suggested Reading:

- Asthana, D. K. (2006). *Text Book of Environmental Studies*. S. Chand Publishing.
- Basu, M., Xavier, S. (2016). *Fundamentals of Environmental Studies*, Cambridge University Press, India
- Basu, R. N., (Ed.) (2000). *Environment*. University of Calcutta, Kolkata
- Bharucha, E. (2013). *Textbook of Environmental Studies for Undergraduate Courses*. Universities Press.
- De, A.K., (2006). *Environmental Chemistry*, 6th Edition, New Age International, New Delhi.
- Mahapatra, R., Jeevan, S.S., Das, S. (Eds) (2017). *Environment Reader for Universities*, Centre for Science and Environment, New Delhi.
- Masters, G. M., & Ela, W. P. (1991). *Introduction to environmental engineering and science*. Englewood Cliffs, NJ: Prentice Hall.
- Odum, E. P., Odum, H. T., & Andrews, J. (1971). *Fundamentals of ecology*. Philadelphia: Saunders.
- Sharma, P. D., & Sharma, P. D. (2005). *Ecology and environment*. Rastogi Publications.

*Tapas Kumar Mukhi*

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**CC – 12 (Semester 5)**  
**Statistics In Education**

**Objectives:**

- To develop the concept of statistics and to develop skill in analyzing descriptive measures
- To be acquainted with the concept of Normal Probability Curve and its uses in education
- To develop a concept of measures of relationship
- To develop the ability to organize relevant educational data and to represent educational data through graphs and to develop skill in analyzing and displaying data

**Unit: 1 = Concept of Statistics and Descriptive Statistics**

- Concept of Statistics. Uses of Statistics in Education, Organization and presentation of data – tabulation, graphical representation( Frequency Polygon, Histogram, Ogive, Pie)
- Meaning & measures of Central Tendency- Arithmetic Mean, Median and Mode-their Properties, Calculation and Application.
- Meaning & measures of Variability- Range, Standard Deviation and Quartile Deviation - their Properties, Calculation and Application
- Percentile and Percentile Rank - Definition, Calculation, Application, Graphical Determination

**Unit: 2 = Normal Distribution and Derived Score**

- Concept of Normal Distribution- Properties
- Uses of NPC in Education
- Divergence from Normality- Skewness and Kurtosis.( Concept and Calculation)
- Derived Scores- Z-Score, T Score and Standard Score (Concept, Calculation and Uses).

**Unit: 3 = Measure of Relationship**

- Bi-variate Distribution- Concept and types of Linear Correlation
- Scatter Diagram (only Concept)
- Uses of Correlation
- Computation of Co-efficient of Correlation by Rank Difference method and Product Moment method, Interpretation of Co-efficient of Correlation

**Unit:4 = Statistics (Practical)**

- **Students are expected to collect relevant data** (Bi-variate educational data) from their college or neighbourhood ( minimum sample size must be 50) with the objective of
  - describing the nature and characteristics of the two distributions,
  - comparing two distributions and
  - finding association between two sets of data by applying the following:

**Method:** i) Tabulation of data

ii) Determination of central tendencies and variability (standard deviation)

iii) Graphical Representation- Bar graph, Frequency Polygon, Cumulative frequency graph.

iv) Determination of the type of association between two sets of data by drawing scatter diagram



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