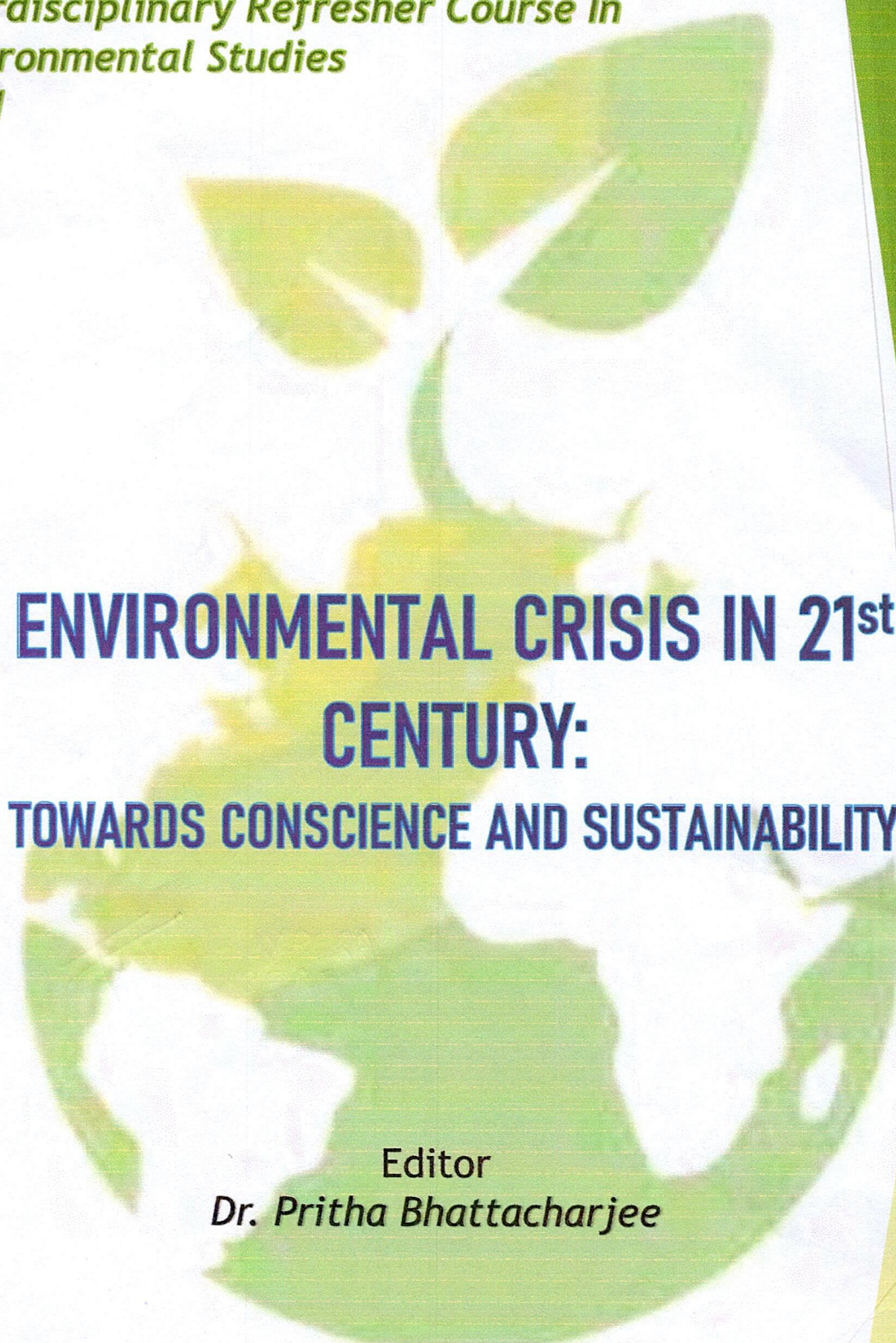


UGC-HRDC, University of Calcutta
Interdisciplinary Refresher Course In
Environmental Studies
2021



ENVIRONMENTAL CRISIS IN 21st CENTURY: TOWARDS CONSCIENCE AND SUSTAINABILITY

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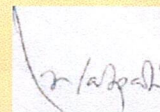
27 March 2021

Foreword

This is to acknowledge the kind support rendered by the Department of Environmental Science, University of Calcutta, for organizing the UGC sponsored Inter/Multidisciplinary Refresher Course (IRC) in Environmental Studies through online mode during March 13-27, 2021 under the aegis of UGC-Human Resource Development Centre (HRDC), University of Calcutta. I am really grateful to all the faculty members and staffs of the Department, and also to the various authorities of the University for successful completion of the Course.

I am delighted to know that proceedings of IRC are going to be published in the form of seminar papers presented by the participants, who have joined in the programme to represent various domains of knowledge. Given the trends of environmental issues affecting our daily lives, multidisciplinary approach of research and pedagogy needs to be inculcated among the academics for better preparedness against any kind of adversity. I am sure that the contributions published in this book will of great interest for its readers, who may find new agenda to work upon.

Personally, as well as on behalf of UGC-HRDC, University of Calcutta, I congratulate the painstaking efforts taken by Dr. Pritha Bhattacharjee, Coordinator of the programme, and also its participants for bringing out the volume.



APR 2021
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A Kaleidoscope of Memories

Department of Environmental Science

The onset of a new millennium welcomed three new department as members of University of Calcutta. The Department of Environmental Science, Microbiology and Biotechnology were recognized as new members of academic family. The Department of Environmental Science was coordinated by Prof. S.K. Banerjee, Department of Biochemistry, University of Calcutta and was accommodated in the Ballygunge Science College campus of the university. Department of Environmental Science was born with two rooms on the fifth floor of Ballygunge Science College campus, adjacent to Department of Statistics. The department hosts sixteen students from different disciplines of science having chemistry as one of the subject at their bachelor's level. The department was initially supported by faculties of other science department with immeasurable contribution from Prof. A. B. Banerjee, Prof. A. K. Bhattacharya, Prof. N. C. Dutta, Prof. DJ Chattopadhyay, Prof. K. Chakraborty, Prof. P. Lahiri, Prof. C. Bhattacharya, Prof. A. Mondal and other faculties like Prof. A. Mookherjea, Prof. S.K. Chakraborty and many other faculties from other university departments. The academic standard was enriched by the contribution from many other experts from other Institutions and organizations.

After the first year of establishment of the department, the Academic Staff College initiated a Refresher Course on Environmental Studies in the years 2001-2002. Since its initiation, almost every year the department has organized refresher course, at times also in collaboration with other emerging departments. The first two faculties of Department of Environmental Science recruited in 2003. Prof. K. Chakraborty later served as coordinator of department from August 2004 to April 2006. Prof. A. Mukhopadhyay took charge of the department between 2006 and to 2016 and 2018-2020. Dr. P. Chaudhuri was in charge from 2016 to 2018. Dr. P. Bhattacharjee took the charge of the department in 2020.

In November 2006, the department was shifted to the first floor on the Hazra Road campus. The department started functioning from the Institute of Environmental and Atmospheric Science. This followed by the commencement of the PhD program in Environmental Science. Soon, Environmental Science (Honours) was introduced at Bachelor's level in many undergraduate colleges. In 2012, the department was joined by two assistant professors, one of whom later shifted to another university. Dr. Pritha Bhattacharjee who had joined in 2012 is now serving as a full time faculty. The department was again shifted to its new (present) facility on the newly constructed 7th (left wing) of the Ballygunge science college campus in May 2014. The department is now supported by a much bigger space and good instrumental facilities. Currently the department has five sanctioned teaching, two office, two laboratory and two library staff. The department acknowledges the contribution and cooperation of all staff for developing a well-integrated department that may be reckoned as a joint family.

Through the years of its establishment, the department has organized several seminars and out-reachment programmes. Students of the department have also participated in community out-reachment programmes like Environmental Awareness for students and common people. From Lab to Land undertaken by TEQUIP under University of Calcutta in



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Chronobiology

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Abstract:

This brief review is concerned with how human performance efficiency changes as a function at different points of time of a day. It presents an overview of some of the research that has been used to investigate circadian performance rhythms. The influence of homeostatic and circadian processes on performance regulation is discussed here. This review briefly presents about alertness that has been used to predict cognitive performance.

1. Introduction

Chronobiology is a field of biology that examines timing processes, including periodic (cyclic) phenomena in living organisms, such as their adaptation to solar- and lunar-related rhythms [1]. Chronobiology explores diurnal variations of the timing and also the duration of biological activity in living organisms that modulates many essential biological processes. Best rhythm that is studied in chronobiology is circadian rhythm, a roughly 24-hour cycle shown by physiological processes. It is regulated by circadian clocks. On our planet both humans and most of the animals are exposed to regular cyclical alternations of light and darkness. This alternation affects not only the social organization of behaviour but also human biological systems. The mode of alternating light and darkness is different at the equator, behind the polar circles and also at transitions across multiple time zones. Such effect of light modes is manifested in periodic changes in several physiological functions and biological rhythms exhibited in every living cells, tissues, organs and ultimately in various physiological systems. To adapt ever-changing unpredictable external environment, organisms need systems that directly respond to changing environments. However, there are also predictable changes resulting in specific planetary movements. For those changes, organisms have specific mechanisms who can generate endogenous biological rhythms corresponding directly to certain periodicities in the environment. They closely coordinate functions not directly depending on environmental rhythmicities but only using the periodic information from the environment to synchronize biological oscillations with cycles of environmental changes.

2. Biological rhythms and homeostasis

Biological rhythms are sequence of repeated phenomenon over time in the same manner and interval. Biorhythms of organisms are the result of adaptation to changes in the environment. Chronobiology is the science investigating and quantifying the mechanisms of biological time structure, as well as the rhythmic manifestations of life functions.

Because medicine is based on homeostatic principles, following scheme may be regarded as representative. Survival of animal in a highly intricate periodic "day-night" environment depends on the appropriate timing of its reactions. Physiological systems must integrate and influence the responses of each system according to variations in different times of the day. So, the traditional concept of homeostasis began to change. Old concept of homeostasis usually states that physiological variables are maintained at a relatively constant level within a narrow physiological range throughout the day which is essential for health, but the new concept of homeostasis states that oscillation of physiological variables are also very much essential for health and optimal functioning of all organs of the body to maintain these constant conditions.

1. Distribution of biological rhythms

Exogenous rhythms: It is oscillations of passive system that depend on periodic stimulus in which the organism synchronizes with these rhythmical changes. They are observed within the circadian periodicity of the social or climatic environment.



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