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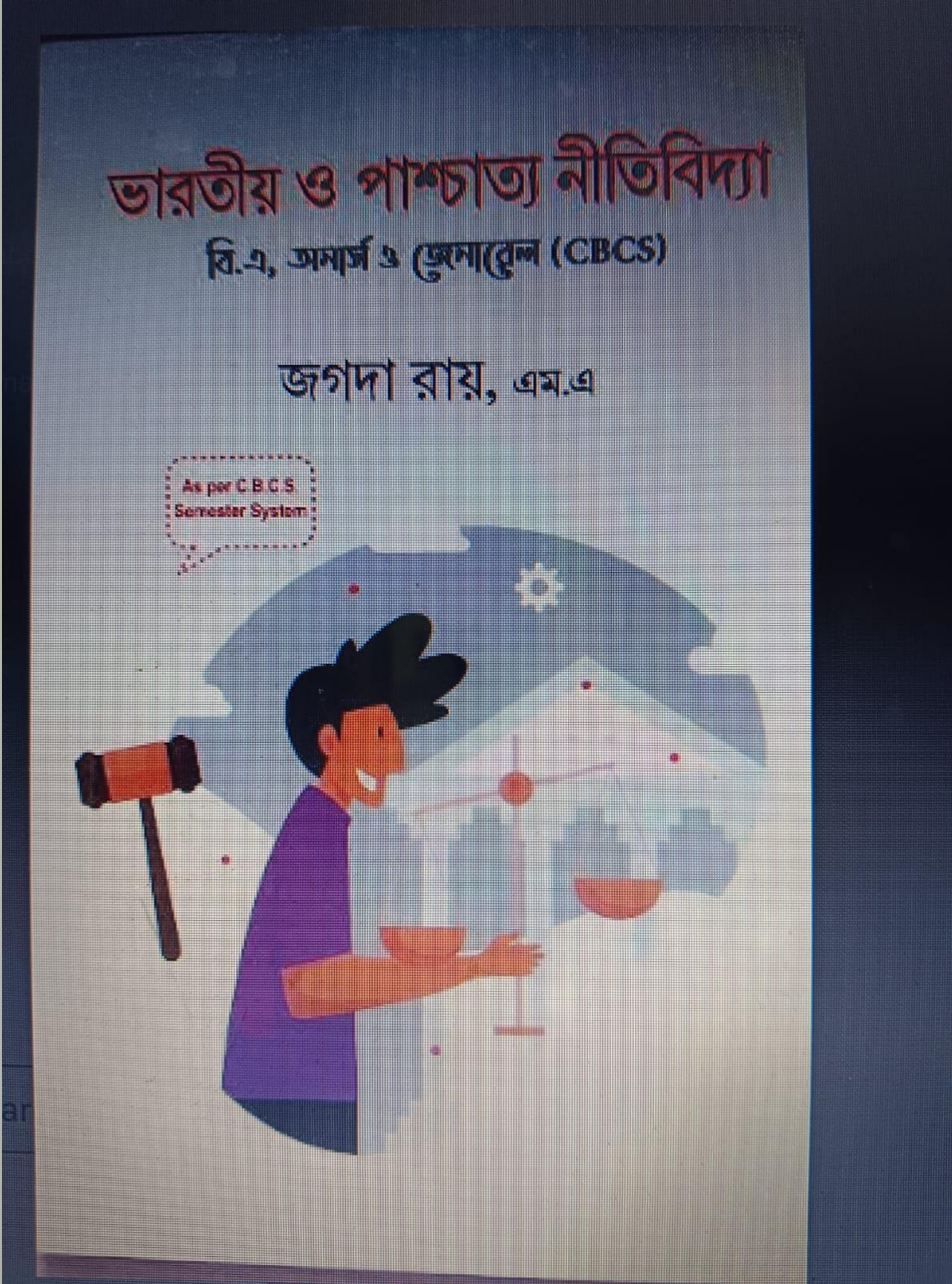
Ref.

Date 20

Year: 2022

Name of the teacher: Mr. JAGODA ROY

Title of book/chapter/paper: ভারতীয় ও পাশ্চাত্য নীতিবিদ্যা



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Ref.

Date 20

Year: 2022

Name of the teacher: DR. SAMIRAN MONDAL

Title of book/chapter/paper: Application of Quantum Dots in
Biology and Medicine: Recent Advances

Puspendu Barik
Samiran Mondal *Editors*

Application of Quantum Dots in Biology and Medicine

Recent Advances

 Springer

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Date 20

Year: 2022

Name of the teacher: DR. SAMIRAN MONDAL

Title of book/chapter/paper: Introduction to Quantum Dots

Introduction to Quantum Dots



Samiran Mondal

Abstract Quantum dots (QDs) or luminescent semiconductor nanocrystals possess size-tunable elegant electro-optical properties, broad absorption spectra, and narrow emission ranging from UV to NIR region, high fluorescent quantum yields, fluorescence intermittency, resistance to photobleaching, and significant Stoke shift, which are the prerequisites for the application in vitro and in vivo bioimaging, biomarker, molecular pathology, drug delivery, and many more. The suitable applicability of QDs in the biomedical field needs to understand the science behind the QDs and their fundamental properties, which are most relevant to biology and medicine. In recent years, QDs have shown a wide variety of possibilities in the biomedical field due to their recent development of synthetic procedures and biocompatibility. The chapters will focus on the fundamentals of QDs. The chapter also includes a brief description of chapters in the book, which may help readers understand the topics' overview.

Keywords Quantum dots (QDs) · Fundamentals and applications of QDs · Biomedical field

QDs are nanometer-scale (typically 2–10 nm in diameter) semiconductor nanocrystals composed of Groups II (e.g., Zn, Cd),-VI (e.g., Se, S) or III (e.g., Ga, In),-V (e.g., N, P) or IV (e.g., Pb)-VI (e.g., Se, S) elements of Mendeleev periodic table that exhibit size-dependent optical properties, including absorbance and photoluminescence [1, 2]. Unique optoelectronic, catalytic, and semiconductor properties of QDs are arising due to their three-dimensional quantum confinement regime, i.e., the size of the QDs in the range of exciton Bohr radius [3, 4]. Valence and conduction bands are separated by a band gap in the semiconductor material. On photon absorption, electrons from the lower electronic energy state (valence band) are promoted to the higher electronic energy state (conduction band), producing a hole in the valence band. Bandgap energy becomes higher for the smaller QDs, and

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P. Barik and S. Mondal (eds.), *Application of Quantum Dots in Biology and Medicine*,
https://doi.org/10.1007/978-981-19-3144-4_1

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Date 20

Year: 2022

Name of the teacher: DR. SAMIRAN MONDAL

Title of book/chapter/paper: The Underlying Mechanism of Quantum Dot-Induced Apoptosis: Potential Application in Cancer Therapy

The Underlying Mechanism of Quantum Dot-Induced Apoptosis: Potential Application in Cancer Therapy



Jishu Mandal, Mriganka Mandal, Tamanna Mallick, and Samiran Mondal

Abstract Quantum dots (QDs) are a popular agent to use in a wide range of scientific and industrial applications because the molecules consist of an excellent biophysical and optical property, later varies with the compositions from a wide range of visible to infrared wavelength. Being an established fluorescent probe QDs are useful in the long-term, multiplexed and quantitative imaging and detection is governed wonderfully by QDs. Here we represent the present trends of the multidimensional use or applications of QDs in the field of biological science to achieve disease diagnostics, control over it and in particular cancer treatments and cellular mechanisms induced by QDs. The QDs are small in size with a high surface ratio, capable of potentially changing the therapeutic and pharmacological efficacy towards a good dimension of disease management. These are unique anti-cancer activities like apoptotic cell death and autophagy cell death, different types of molecular path-ways and mechanism of apoptosis has been focused hereafter application of quantum dots in various cell lines of malignant cells of mice and humans.

Keywords Quantum dots · Apoptosis · Cancer therapy

Jishu Mandal, Mriganka Mandal—Both the authors have equal contributions.

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P. Barik and S. Mondal (eds.), *Application of Quantum Dots in Biology and Medicine*,
https://doi.org/10.1007/978-981-19-3144-4_7

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Year: 2022

Name of the teacher: DR. SAMIRAN MONDAL

Title of book/chapter/paper: Present Status and Future Perspective

Present Status and Future Perspective



Samiran Mondal

Abstract The present chapter illustrates an overview of the application of quantum dots (QDs) and enlightens the future perspective on their potentiality in biology and medicine. The chapter highlights the critical aspects of QDs and the present state-of-the-art applications, both in vitro and in vivo.

Keywords Quantum dots (QDs) • Present status • Future perspective

The concept of artificial atoms or quantum dots (QDs) comes from the reduced dimensionality of semiconducting crystals, i.e., the size of semiconductor particles controls optical and electronic properties called the quantum size effect. QD synthesis, characterization, and applications are still highly active fields of interest to researchers despite being part of mature technologies. During the last three decades, researchers have synthesized QDs by improving monodispersity and size tunability to ameliorate the overall optical properties by exploring different reaction conditions such as solvents, salts, pH, and temperature. The size-dependent tunable emission is attractive for biomedical research since luminescence is commonly used in cell, tissue, and animal experiments, supporting biomedical researchers with many precursors for building tools to address important questions and diagnose and treat diseases. Many researchers convincingly described many optical advantages of QDs over organic fluorophores or dye molecules for biomedical research, owing to their high quantum yield, broad absorption spectra, large Stoke shift, and highly stable. The widely increased interest in QDs has been established as a technological revolution by the tremendous efforts of scientists in chemistry, physics, biology, medical engineering, and pharmaceutical sciences.

QDs present a versatile tool to obtain a series of remarkable results in the fields of cell labeling, cell migration tracking, multiplexed imaging, flow cytometry, fluorescence in situ hybridization, targeted tracing in living cells and animals, real-time in vivo and cellular process imaging, genomic and proteomic detection, pathogen

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P. Barik and S. Mondal (eds.), *Application of Quantum Dots in Biology and Medicine*,
https://doi.org/10.1007/978-981-19-3144-4_13

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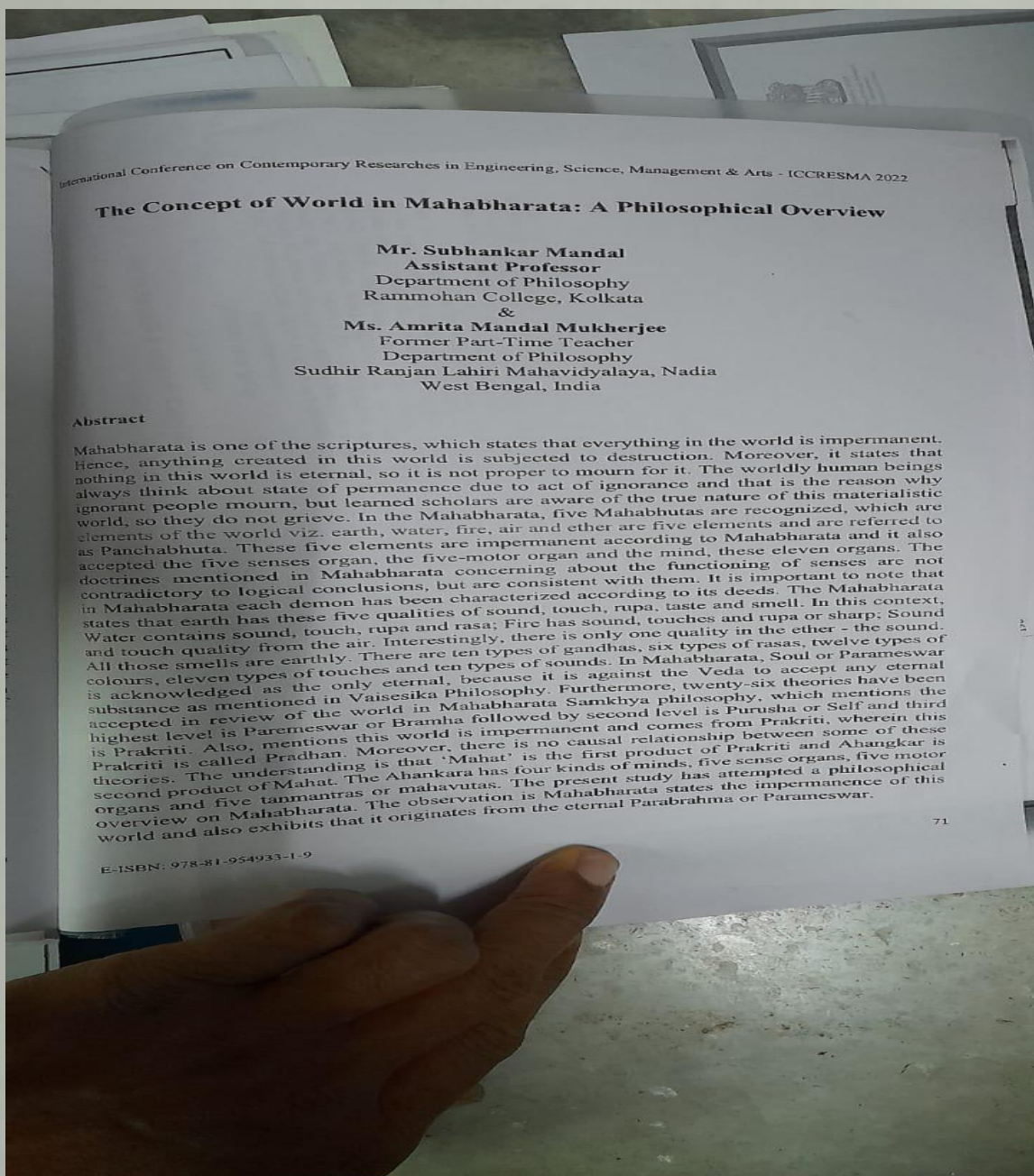
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Year: 2022

Date 20

Name of the teacher: Dr.Subhankar Mandal

Title of book/chapter/paper: The Concept of World in Mahabharata: A Philosophical Overview (pp. 71 & January 2022)



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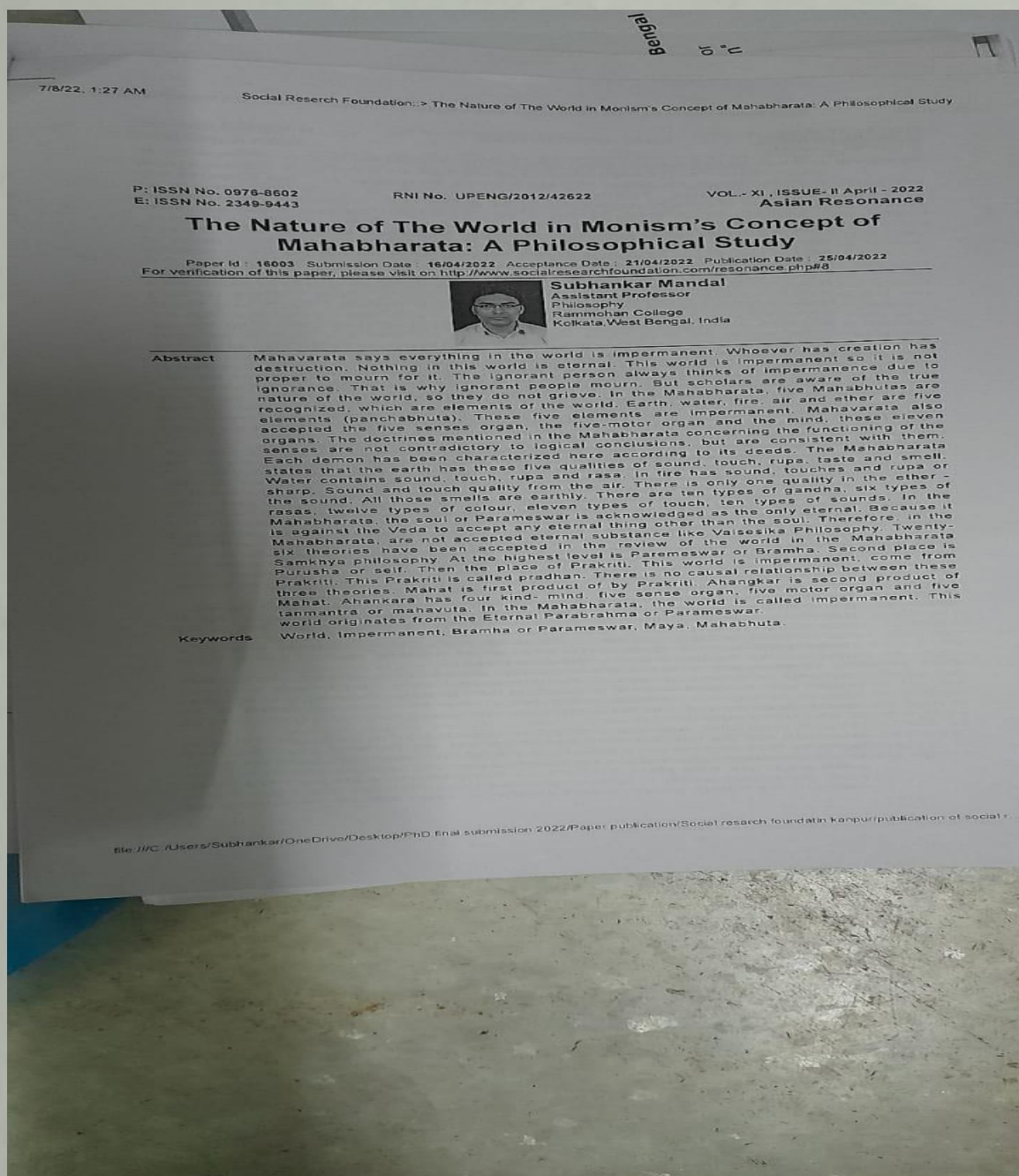
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Year: 2022

Date 20

Name of the teacher: Dr.Subhankar Mandal

Title of book/chapter/paper: The Nature of The World in Monism's concept of Mahabharata: A Philosophical Study (1-7)



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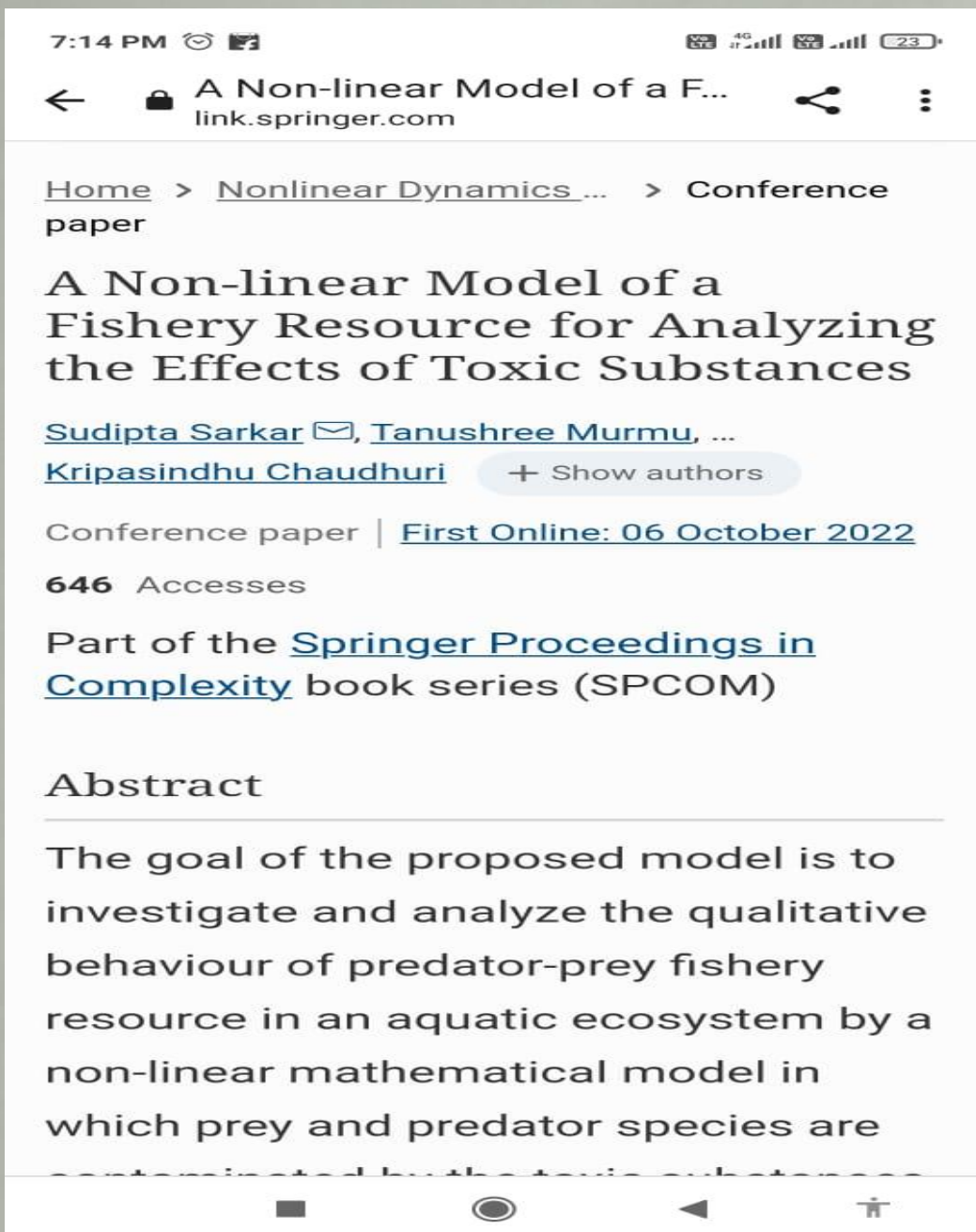
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Date 20

Year: 2022

Name of the teacher: Tanushree Murmu

Title of book/chapter/paper: A non-linear model of a fishery resource for analyzing the effects of toxic substances



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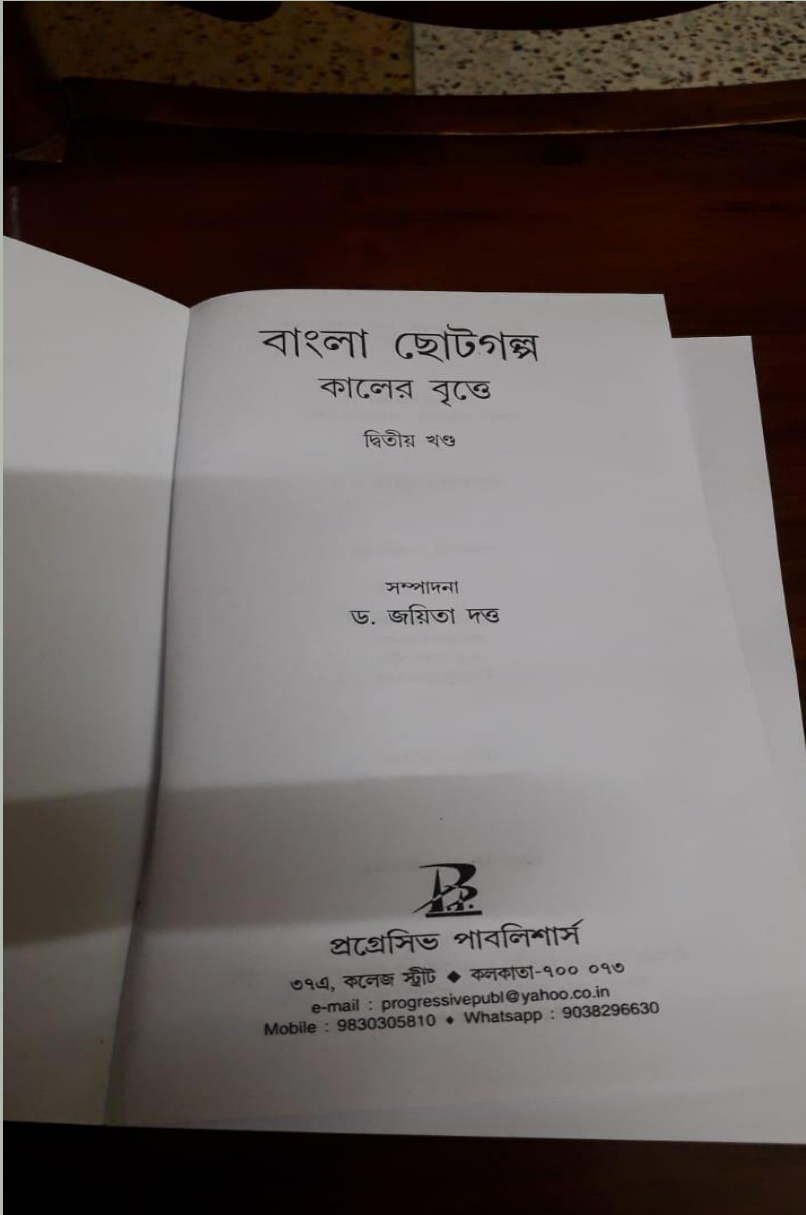
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Date 20

Year: 2022

Name of the teacher: Dr. Sumita Das Majumdar

Title of book/chapter/paper: বাংলা ছোটগল্প
কালের বৃত্তে : দ্বিতীয়
খণ্ড(পয়লানম্বর)



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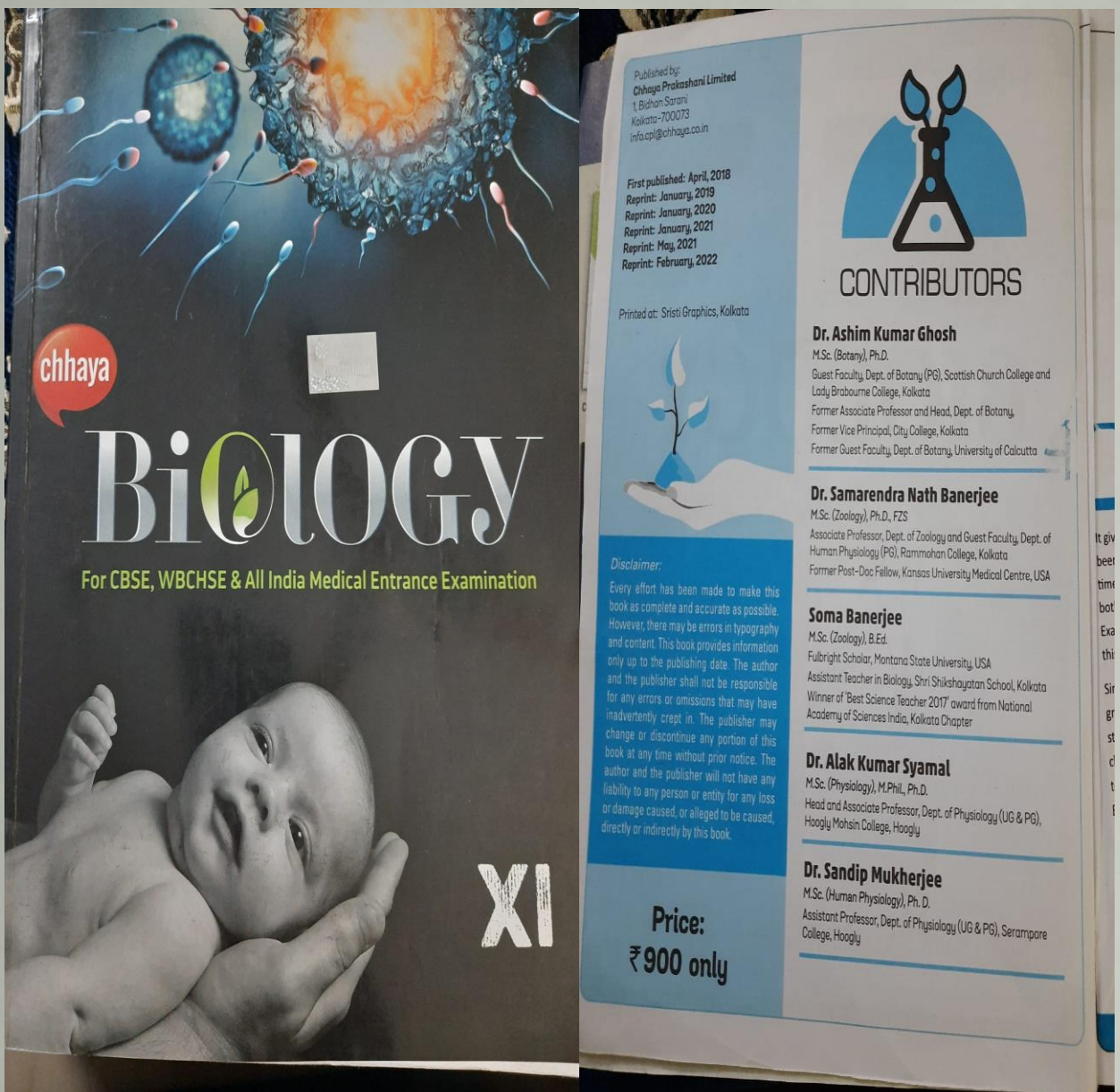
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Year: 2022

Name of the teacher: Dr. Samarendra Nath Banerjee

Title of book/chapter/paper: Text Book on Biology (Editions: 2018-22)



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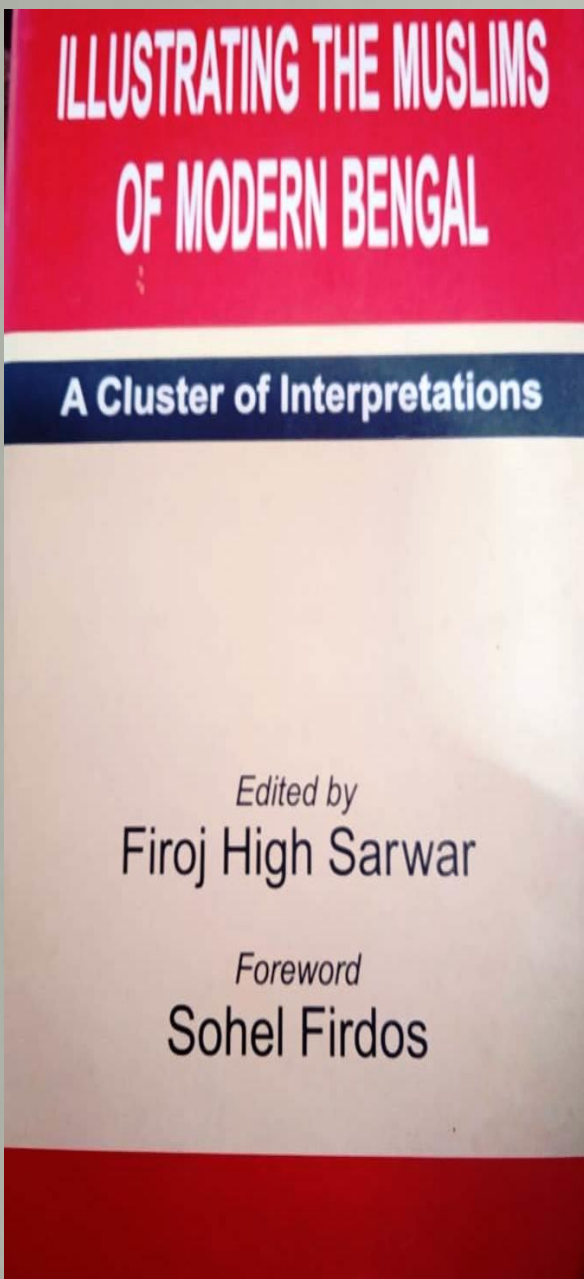
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Year: 2022

Name of the teacher: Dr. Mahfuz Alam

Title of book/chapter/paper: Education & Work Participation of Muslim Women in Murshidabad District: An Empirical Study



Education and Work Participation of Muslim Women in Murshidabad District : An Empirical Study
Rakibul Islam & Mahfuz Alam

Murshidabad has been always very important name in the history of India. The end of medieval age and the beginning of modern age in India was started from the soil of Murshidabad. The present territorial shape of Murshidabad has been sketched out in 1879, on the basis of administrative ground. Geographically, Murshidabad is situated in between the north and south Bengal in the latitude of $23^{\circ}43''$ - $24^{\circ}52''$, and in the longitude of $87^{\circ}49''$ - $88^{\circ}44''$. According to 2011 census, the total area of Murshidabad is about 5324 sq.km, total population is 7103407 and literacy rate is 66.69 percent.¹ On the basis of socio-economic development, Ministry of Panchayati Raj has marked Murshidabad as a backward area in 2006. Issues like unemployment, illiteracy has a high impact on the Muslim community in the Murshidabad district. Due to poverty, the students are compelled to leave their study. The customs of child marriage and the illiteracy of girl child are very much common in these areas. The age long negligence of the government, and the subsequent people's apathy towards education made this district backward. Even, after almost seventy years of Independence, people of Murshidabad are still thriving for a fully functional university in their homeland. Though, the Central and State Government have taken many steps to develop the position of this backward community, but there are still many issues which needed to be taken care of. In Murshidabad, Muslims, in general, are more backward than the other communities of the district. Among the Muslims, the women are the most neglected portions of the community. They are lagging behind their men on every aspect like education, health and employment -which is obviously not encouraging factor for total progress of the country.

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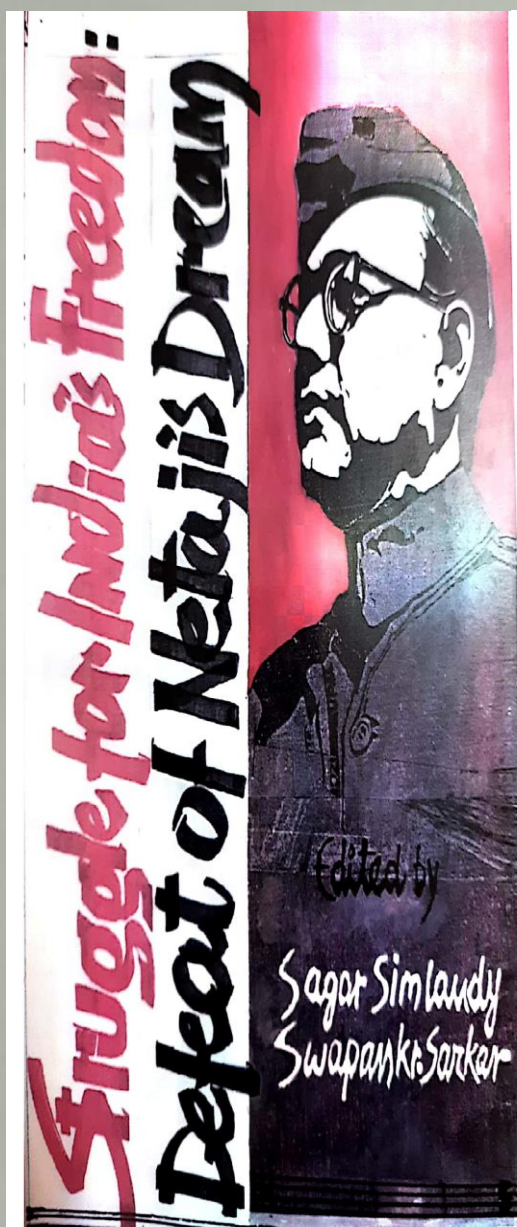
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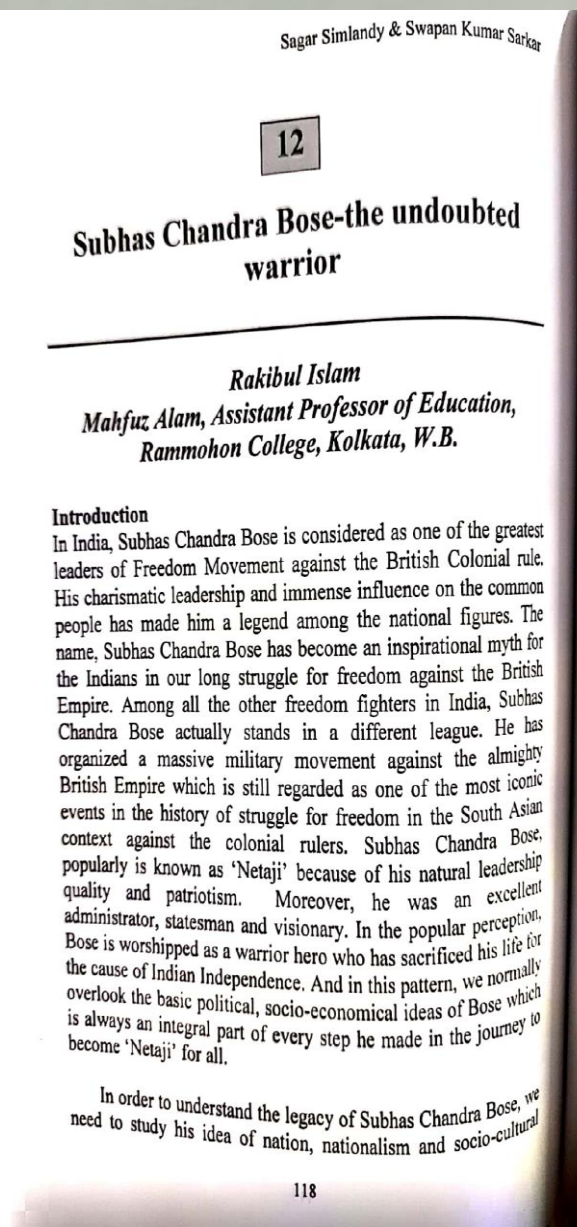
Year: 2022

Name of the teacher: Dr. Mahfuz Alam

Title of book/chapter/paper: Subhas Chandra Bose-the undoubted warrior



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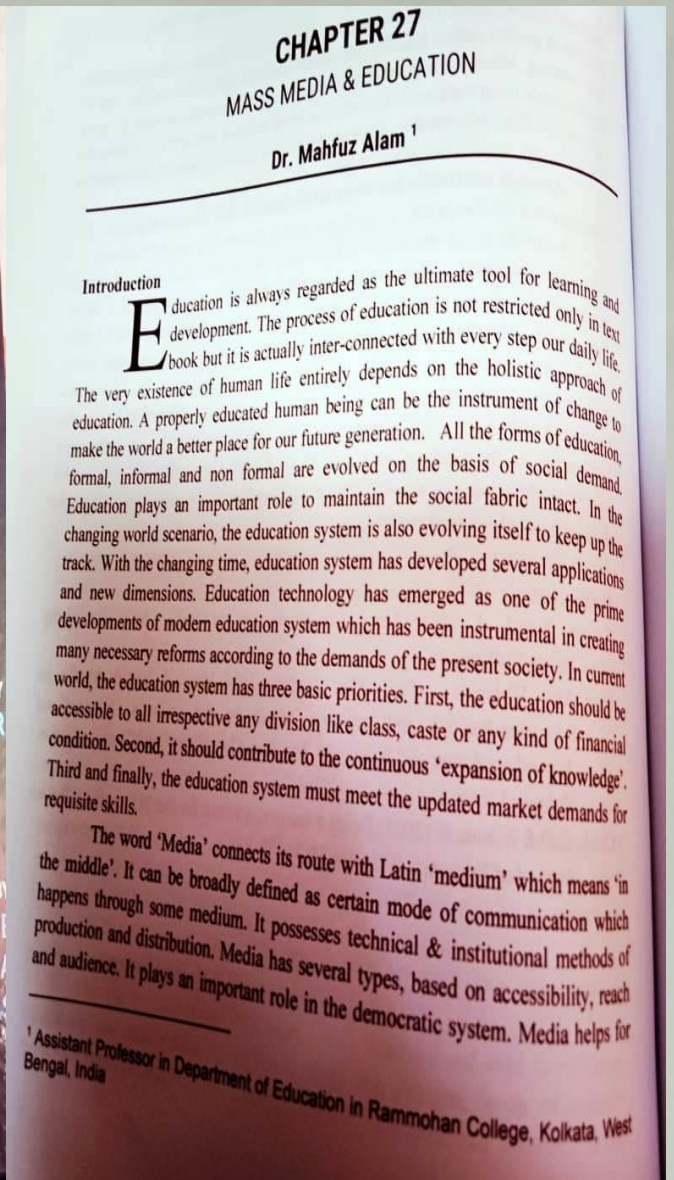
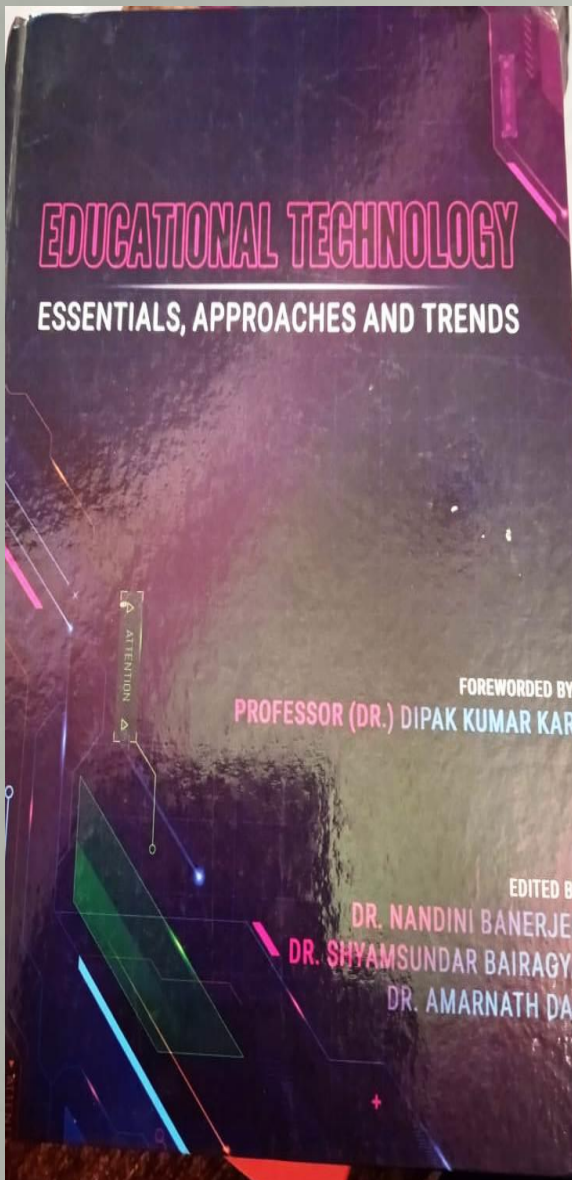
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Name of the teacher: Dr. Mahfuz Alam

Title of book/chapter/paper: Mass Media & Education



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Name of the teacher: Dr. Mahfuz Alam

Title of book/chapter/paper: Self-instructional Strategies



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Self-Learning Materials

for

M.A. (EDUCATION)

(Under CBCS)

Semester

4

C.E.C

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Units

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Printed at East India Photo Composing Centre
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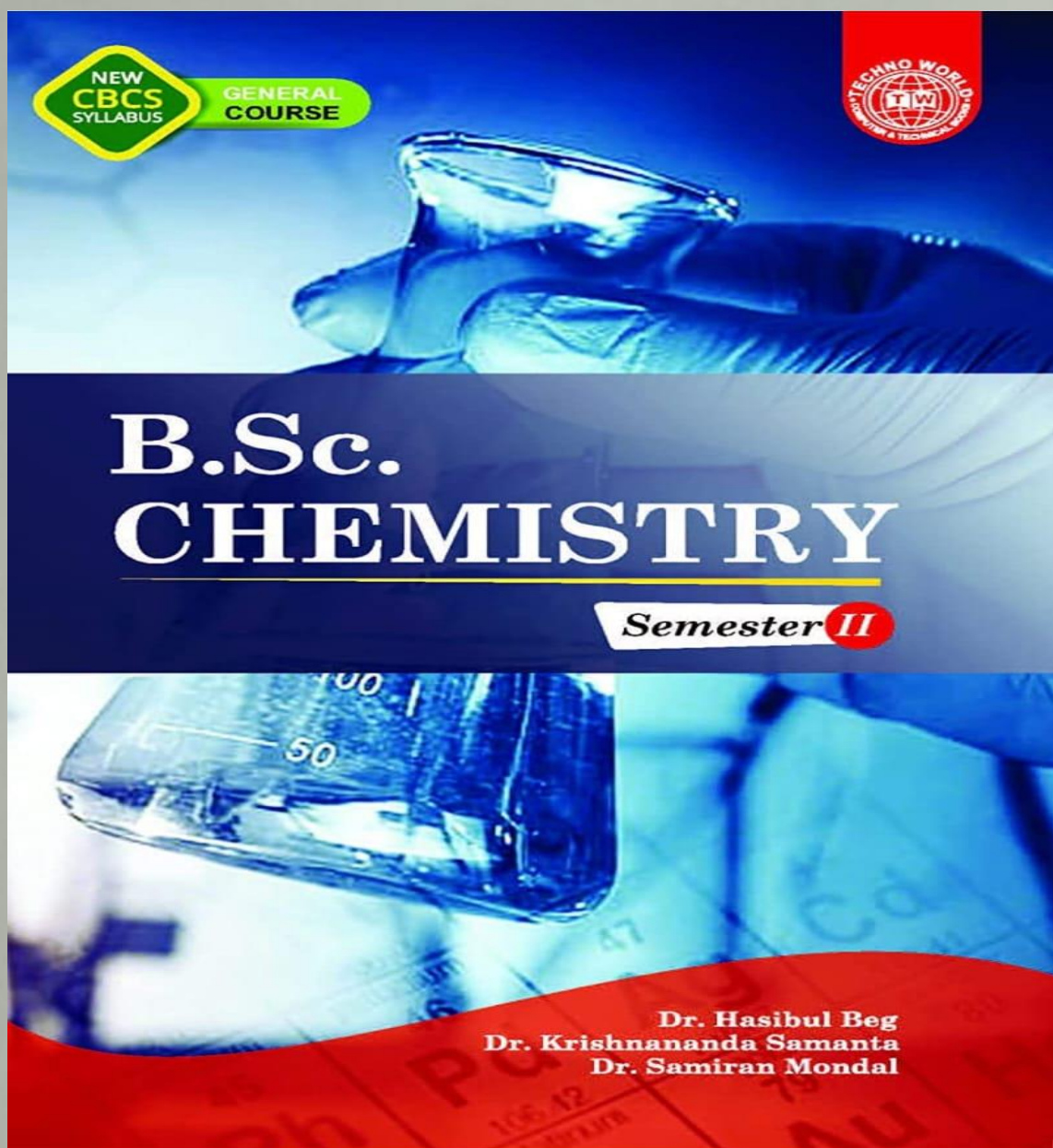
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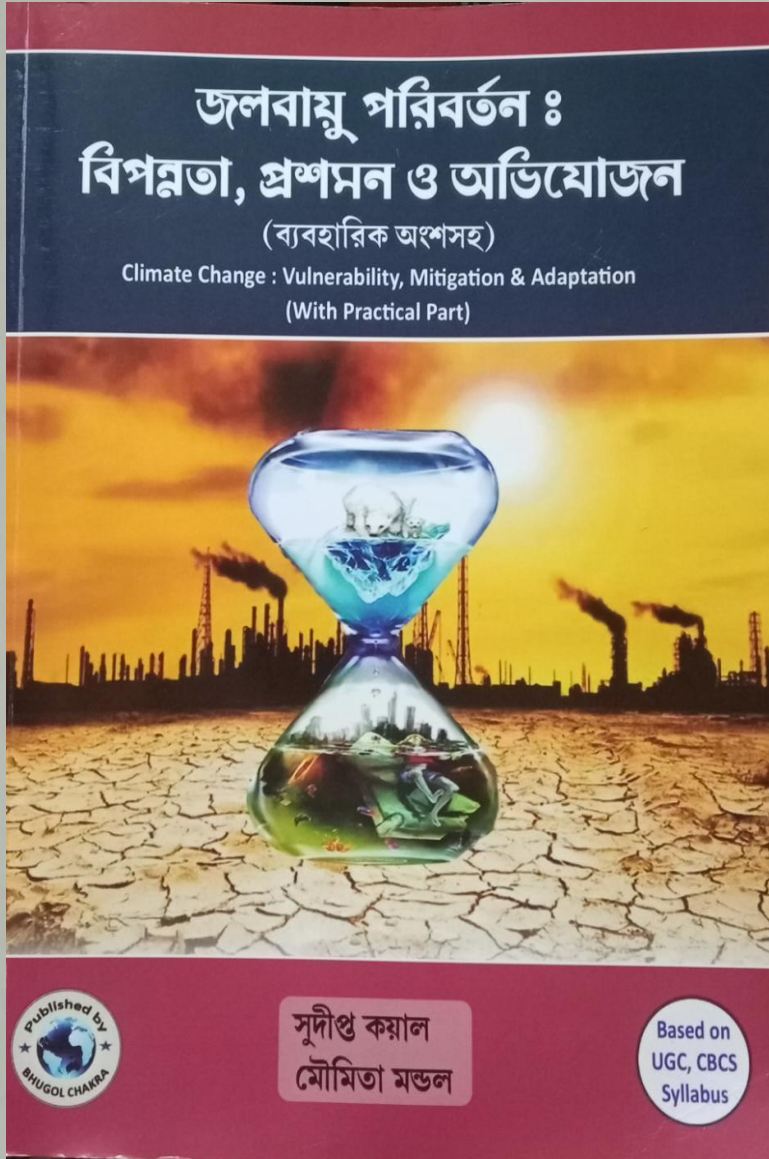
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Year: 2023

Name of the teacher: Moumita Mondal

Title of book/chapter/paper: Jalavayu Poriborton: Biponnota, Proshomon o Abhijojon (Climate Change: Vulnerability, Mitigation and Adaptation)



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Title of book/chapter/paper: *Amorphophallus campanulatus*:
An Untold Story of a Potent Nutraceutical- Part I

Chapter 14

Print ISBN: 978-81-961090-5-9, eBook ISBN: 978-81-961090-3-5

***Amorphophallus campanulatus*: An Untold Story of a Potent Nutraceutical- Part I**

Subhashree Basu ^a, Moumita Das ^b and Gouriprosad Datta ^{c*}

DOI: 10.9734/bpi/cops/v2/3878B

ABSTRACT

The study aims to analyze the proximate composition, mineral and vitamin content as well as active components present in the popularly consumed tuber of West Bengal, *Amorphophallus campanulatus*. Medicinal plants are potential sources of biomolecules and their analogues have great relevance in the preparation of modern medicines. They are also good source of essential nutrients and minerals that contribute to the wellbeing of an individual. On proper supplementation through diet, they can acquire, convert, allocate, distribute and pave way for proper utilization of all the essential components in the biological system. So this popular tuberous crop of south-east Asia that has its mention in the Indian ancient medicinal system, Ayurveda, is taken into consideration to analyze its nutritional components. The plant species were collected from farmers of Santragachhi, Howrah district and authenticated by Botanical Survey of India, Howrah district, West Bengal, India. Fresh tubers were analyzed for their content of crude proteins, total carbohydrate, soluble carbohydrate, fat, fibre, ash, moisture, carotenoids and vitamins. With the aid of an inductively coupled plasma atomic spectrometer, the ash's mineral content was analyzed. Phytochemical constituents were separated using gas chromatography and components detected by mass spectrometry. According to the study, *Amorphophallus campanulatus* tubers have high levels of crude protein, moisture, fibre, ash, and vitamins E and C. In addition, the tuber contains practically all of the necessary macro- and micronutrients. It's fascinating that the tuber is a significant supplier of salt, potassium, and calcium. Additionally, the tuber is devoid of heavy metals including arsenic, lead, cadmium and mercury. None the less the tuber also contains several nutraceutical components that have several health benefits. Thus, the study's findings make a significant contribution to our understanding of the full nutritional profile of this tuber, which may encourage increased use for the maintenance of a healthy lifestyle and future attention to its therapeutic potential.

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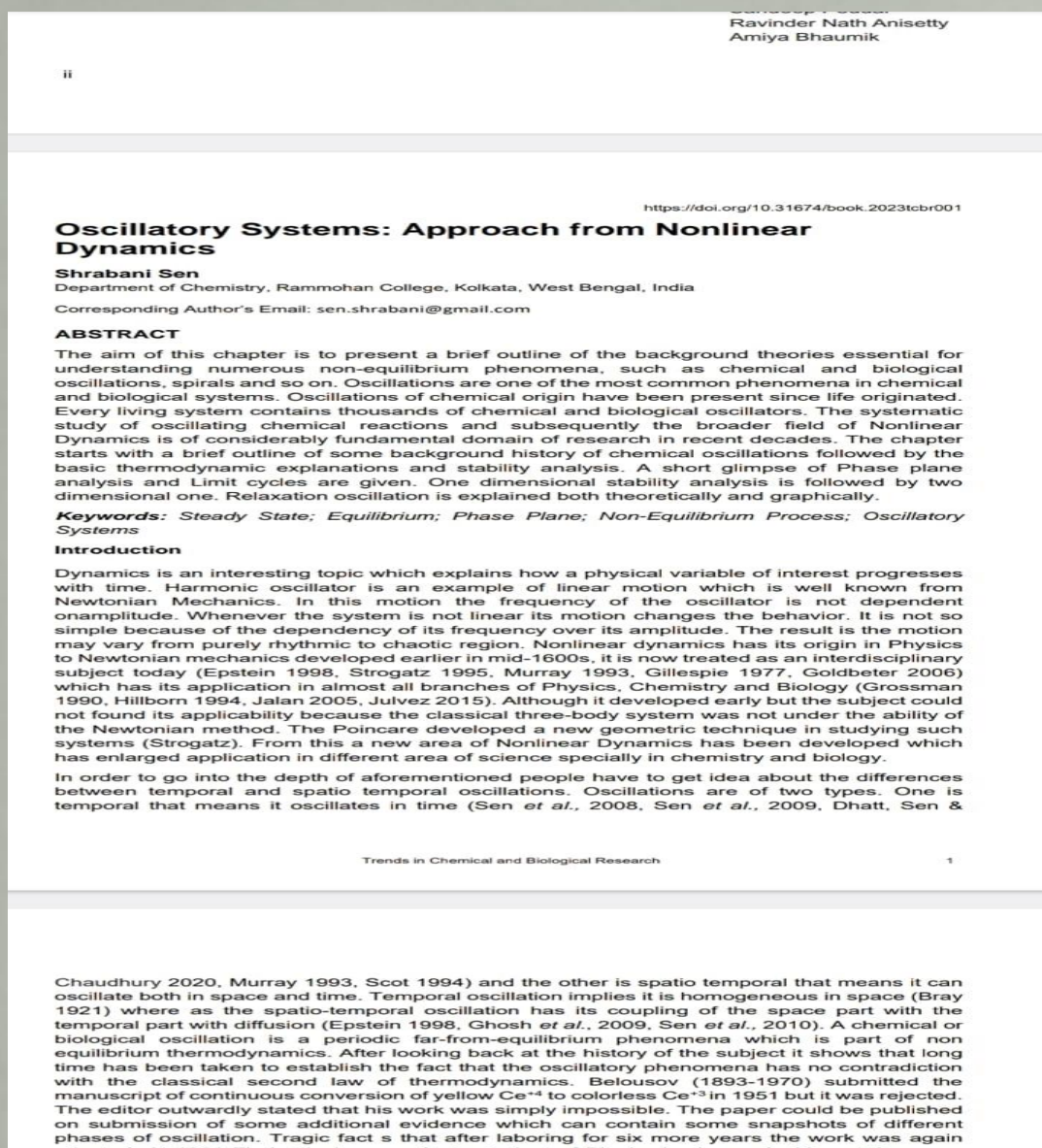
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Name of the teacher: Dr. Shrabani Sen

Title of book/chapter/paper: Oscillator systems, Approach from Nonlinear Dynamics



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Date 20

Year: 2023

Name of the teacher: Dr. Samarendra Nath Banerjee

Title of book/chapter/paper: Cyclophosphamide – its medical and mechanism with side effects.

Chapter 3

Cyclophosphamide: Medical Uses, Mechanism of Action and Side Effects

Samarendra Nath Banerjee*, PhD

Department of Zoology, Rammohan College, Kolkata,
West Bengal, India

Abstract

Cyclophosphamide (CP) is an alkylating agent of the nitrogen mustard type, has been well studied and has shown anti-proliferative, antineoplastic and apoptotic functions in various cancers. Therefore, it is used to treat different types of cancer, such as ovaries, breast, blood, lymph system, multiple myeloma and retinoblastoma (eye cancer mainly in children). In addition, CP or Cytosan is also used to treat certain cases of nephrotic syndrome (kidney disease) in children. But it induces undesirable, adverse side effects and toxicity, such as nausea, vomiting, cytological and hematopoietic abnormalities. The cancerogenic potentiality of cyclophosphamide has also been reported because it induces both primary and secondary cancers in humans.

Combination therapy is often more effective in treating cancer than single therapy. Interestingly, it is known that low-dose chemotherapy (such as CP) combined with an anti-angiogenic drug (such as 2-Methoxyestradiol) induces significant apoptotic and anti-tumour effects. The effects of combination treatment on tumour chromosomes also provide valuable information for better monitoring of cancer treatment.

Moreover, CP is a potent clastogen known to cause different types of chromosomal abnormalities (i.e., structural and numerical abnormalities) and sister chromatid exchanges in many mammalian and

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In: Advances in Biology. Volume 3
Editor: Charles D. Grant
ISBN: 979-8-88697-779-0
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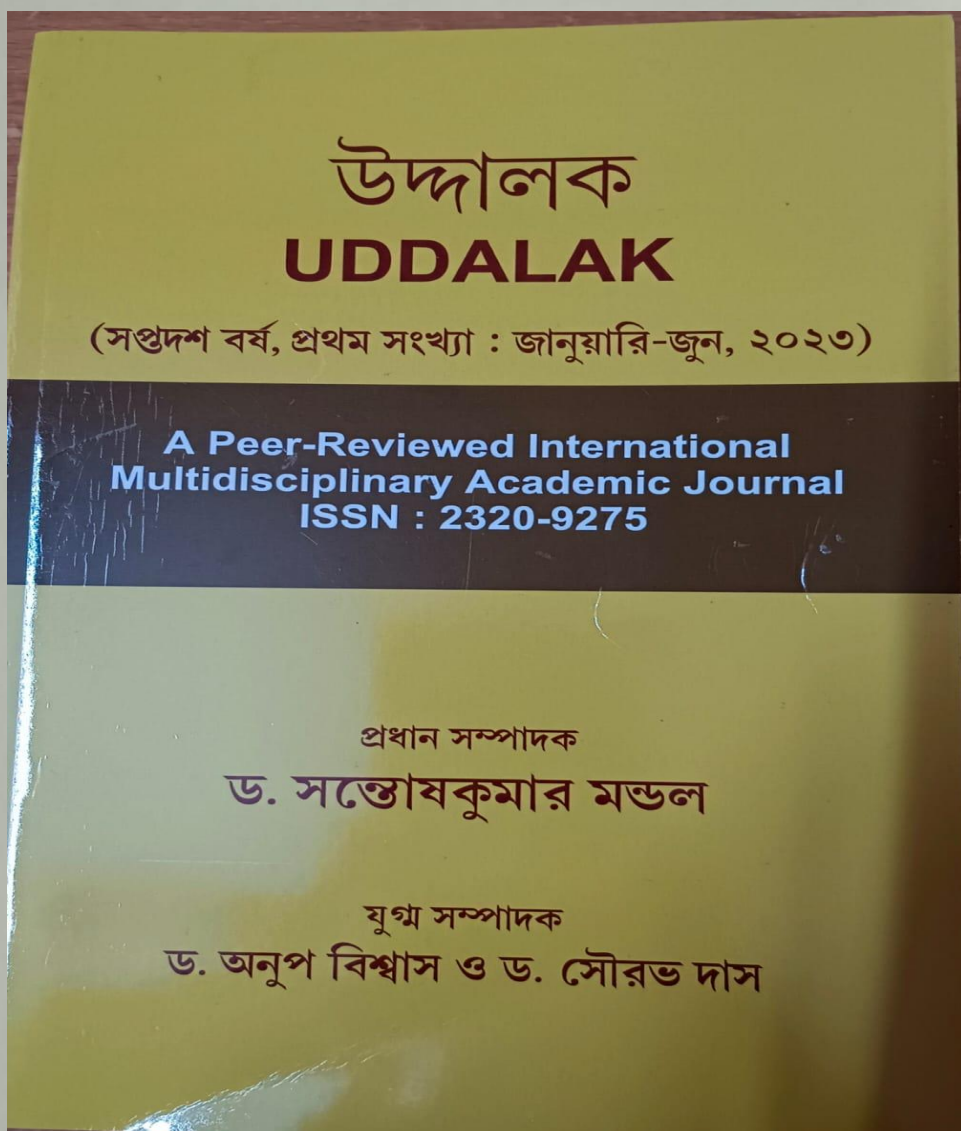
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Year: 2023

Date 20

Name of the teacher: Mrs. Anima Roy

Title of book/chapter/paper: শিক্ষা সম্পর্কে স্বামী বিবেকানন্দের দৃষ্টিভঙ্গি এবং
এর বর্তমান প্রাসঙ্গিকতা



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Year: 2023

Date 20

Name of the teacher: Dr. Samik Acharjee

Title of book/chapter/paper: In-silico Structural Prediction of Melanocyte- Stimulating Hormone (MSH) and Melanocortin 1 Receptor (MC1R) of African Clawed Frog (*Xenopus laevis*) by Homology Modeling (Recent Trends in Science, Platinum Jubilee Series)



Samik Acharjee

In-silico Structural Prediction of Melanocyte-Stimulating Hormone (MSH) and Melanocortin 1 Receptor (MC1R) of African Clawed Frog (*Xenopus laevis*) by Homology Modeling

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Abstract:

Melanocyte stimulating hormone (MSH) binds to Melanocortin 1 receptor (MC1R) for controlling pigment dispersion in dermal melanophores during background adaptation of amphibians. MSH-MC1R binding is a kind of protein-protein interaction, which depends on the 3-dimensional (3D) structure of the receptors and its ligand molecule. But, species specific evaluation of MSH and MC1R structures are not available till date. Therefore, an attempt was taken to understand the 3D structure of MSH and MC1R of *Xenopus laevis* by accessing the sequence data from NCBI. The MSH and MC1R protein sequences were analyzed via ExPASy's protparam server, SOPMA and SWISSMODEL/Workspace. The results suggested that MSH is an unstable, hydrophilic and basic nature of protein; whereas MC1R is an unstable, hydrophobic and slightly basic in nature. The secondary structure of MSH showed the presence of alpha helix 30.55%, extended strands 8.36% and 1.09% beta turns along with random coiling of 60.00%, whereas in MC1R alpha helices are 54.26% followed by 16.72% of extended strands, beta turn with 28.4% along with random coiling with 26.18%. The predicted 3D structure by homology modeling was then validated by RAMPAGE server. Such predicted 3D structure can also be utilized for molecular docking and simulation studies in future.

Key words: Homology modeling; In-silico; MSH-MC1R; *Xenopus laevis*.

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