



वार्षिक प्रतिवेदन
एवं
परीक्षित लेखा विवरण
2020-2021

ANNUAL REPORT
&
AUDITED STATEMENT OF ACCOUNTS
2020-2021



साहा इंस्टिट्यूट ऑफ न्युक्लियर फिजिक्स

SAHA INSTITUTE OF NUCLEAR PHYSICS

सेक्टर-1, ब्लॉक-एएफ, विधाननगर, कोलकाता-700 064

SECTOR-1, BLOCK-AF, BIDHANNAGAR, KOLKATA-700 064

cell biology, Hydrophobic mismatch, Membrane asymmetry and lipid polymorphism, Membrane cholesterol and its relevance in health and disease

Techniques in membrane biology

Structures of membrane proteins, How membranes shape protein structures? Lipid-protein interactions, Ion channels and Transporters, G-protein coupled receptors (GPCR).

Books:

1. Biomembranes : A Molecular approach by R.B. Gennis, Springer-Verlag.
2. Membrane Structural Biology – with biochemical and biophysical foundations by Mary Luckey, 2nd edition, 2014, Cambridge University Press.

(ii) Introduction to Synthetic Biology (Sangram Bagh)

What is Synthetic biology? How it is different than conventional biotechnology and genetic engineering? Application of engineering principles in molecular biology? Synthetic Genetic Toggle Switch. Synthetic Genetic Oscillator. Higher ordering information processing using synthetic genetic circuits in living cells. Applications of synthetic biology in Medicine, Material Science, Pharmaceutical Industry, and space Technology.

(iii) Drug Discovery: Modern Day Approach (Subhabrata Majumder)

Pre 20th century drug discovery. Drug discovery pipeline, drug targets and target validation. Methods of lead identification and optimization. Early prediction of ADMET (Absorption, Distribution, Metabolism Excretion and Toxicity). QSAR (Quantitative Structure Activity Relationship) predictions. Lipinski rule of 5. Polar surface area. Blood brain barrier crossing model. Predicting toxicity. Introduction to drug docking and pharmacophore modeling.

(iv) Nanobiomaterials (Dulal Senapati)

Principles of bio-inspired nanomaterials, common biologically active molecules as suitable ligand for nanomaterials synthesis, separation procedure of different biological components from organic-mass and bio-mass, principles and function of gel electrophoresis & qPCR, concept of antigen and antibody, antigen specific aptamers, what is cancer? Different pathogens, surface modification of nanomaterials for highly specific targeting, biomarker detection and quantification for early stage detection, different therapeutic methods: photon, photodynamic, micro pH and photothermal therapy and their advantages over chemo and radiation therapy. PET scan, Magnetic separation, complete blood count (CBC), blood protein testing, tumor marker testing along with spectroscopic (UV-vis, Fluorescence and Raman techniques) and imaging techniques (TEM and AFM). Bi-metallic nanomaterials with programmable crystal defects for bacterial cytoskeleton targeting.

T3. Projects/Review Topics (Third Semester) May-August

Essential Course for Students of Theoretical Physics, Experimental Physics & Biophysical Sciences:

Research Methodology Course (RM) - Prof. Abhijit Chakraborty and Prof. Kumar Sankar Gupta

Summer & Undergraduate Associateship (UGA) Programme

In view of the Covid-19 pandemic, these programmes were not conducted this year.