





School Internship Offering Program

School of Sciences & Technology The Neotia University

Link: https://docs.google.com/forms/d/1UfrqWpj_ZxjGwcFY7HPkKH0i4KviodcDa5cvndpeBDY/edit.



School Internship Offering Program,

School of Science and Technology, The Neotia University

The School of Science and Technology, TNU, is offering 8 weeks Internship certification programs to the students from the diverse academic streams at the various schools within the University. The primary purpose of doing the internship offerings from various units of SST is to better understand the theories, ideas, and practices in a interdisciplinary mode by actively engaging in a "hands-on," work-based, learning experience.



Objectives

- The opportunity to gain hands-on techno-commercial experience within the university campus on the various interdisciplinary subjects
- The interactive grooming sessions in as sociation with the talent acquisition team from industry to develop work habits and attitudes necessary for job success.
- The opportunity to get the corporate internship flavour within the University which may strengthen their confidence during live project engagement at industry.



Engagement Process

Students from the various disciplines across the university need to apply through the link given below and only one project will be allowed. The respective department from SST will select as per the intake capacity in their respective offerings.





Offering School	Offering Department
School of Science and Technology	Basic Science

1. Transmission of Elastic Waves in heterogeneous media

Name of the Faculty

Dr. Mostaid Ahmed

Contact Number

7870591051

Origin of the Research

Analysis of Elastic Wave transmission using Fractional Order Differentiation

Expected Outcome

To gather insights about the structures beneath the earth surface

Synthesis and study of eco-friendly and cost-effective 3D graphene-based materials (3DGBMs) for waste water decontamination

Name of the Faculty

Dr. Suchandra Goswami & Dr. Manashi Chakraborty

Origin of the Research

Synthesis of magnetic nanoparticle doped 2D graphene nanocomposites

Expected Outcome

change in magnetic properties of graphene so that it can be used in different spintronic applications



3. Studies on cryogen free magnetic cooling

Name of the Faculty .	
Dr. Kalyanashis De	
Contact Number	
8967208123	

Origin of the Research

The impact on the spin structure to introduce disorder in the sublattice by intermixing of Mn and Z on the compound will be carried out. Moreover, a thorough investigation will be done to how Mn-poor alloy diluted AFM mechanism in the compound $Ru_2Mn1\pm xZ1\pm x$.

Expected Outcome

- 1) Proper understanding of how the crystal zoographical and spin structure is responsible for the origin mechanism of the AFM in the compound $Ru_2Mn1\pm xZ1\pm x$.
- 2) Exploring the adequate explanation of the dependence of electronic structure and magnetism on magnetic (Mn) and nonmagnetic (Z = Sn, Sb, Ge, Si) elemental exchange in $Ru_2Mn1\pm xZ1\pm x$ with the range x = 0 to 0.3.

4. Biofuel Production from Agricultural Wastes

Name of the Faculty Dr. Abhijit Samanta Contact Number 9874177197

Origin of the Research _____

To overcome the current energy crisis and deterioration of environmental conditions, production of fuel from sustainable and renewable sources is the major goal for an energy-demanding society. Agricultural wastes are a major fraction of lignocellulose biomass and this resource can be utilized as feedstock for generation of biofuels (bioethanol, biogas, biohydrogen, and biodiesel). Agricultural wastes do not only include residues from cultivation but also waste generated from processing of agro products, managing livestock, and distribution of fruits and vegetables.



Expected Outcome

Based on the composition of agricultural wastes, a suitable route for biofuel production can be predicted. Different types of agricultural wastes can be utilized individually or in a mixer (as cosubstrate) to enhance the production of biofuel. The conversion of lignocellulosic biomass into biofuels can be carried out by both biochemical and thermochemical routes. The biochemical route is more environmentally friendly and the byproduct obtained from the biofuel production process can be utilized as valueadded product or further utilized as feedstock in the production of other biofuels

5. Nanotechnology-based water and wastewater treatment

Name of the Faculty _

Dr. Wasim Akram Shaikh

Contact Number _____

9955924632

Origin of the Research _____

Biogenic nanocomposite material has gained tremendous research interest over traditional materials because of several unique properties, including environment-friendly nature, chemical, and mechanical stability, inexpensive, high target specificity, high surface area, and most importantly. It is one of the new integrated engineered materials, will be designed (by combining biogenic matrix and nanoparticles) for water and wastewater treatment. The main advantage of the biogenic nanocomposites is the ability to hold two unique characteristics of nanoparticles and the biomatrix simultaneously, resulting in enhanced depollution efficiency. These biogenic nanocomposites will be a great opportunity for a wide range of environmental pollutants including, dye, antibiotic, heavy metal emerging contaminants, and microplastic.

Expected Outcome _____

Students will learn to synthesize nanoparticle and nanocomposite, various decontamination techniques, and to explore and use of varies softwares (related to nanoparticle synthesis and decontamination techniques). The most tangible outcome of the research project will be a number of good scientific publications.



6. Chemically Driven Water Oxidation Catalysis: A Molecular Approach

Name of the Faculty _

Dr. Animesh Kundu

Contact Number

9547878521

Origin of the Research _____

The lack of robust and efficient artificial water oxidation catalysts (WOCs) hampers the design of H2O splitting devices and has therefore been a hot topic for researchers to pursue. Therefore, a lot of research is needed to understand the factors that governs the reaction mechanism and the ones that derail the system to cause decomposition in order to develop better catalysts.

Expected Outcome

It is hoped that the outcomes of the internship will enrich the field of molecular water oxidation catalysis and may open new approaches and possibilities for water oxidation reaction. It will also help the students to learn different synthetic and analytical techniques.

7. Application of ML and DL in Mathematical Modelling of Groundwater Transport Through Porous Media

Name of the Faculty	
Dr. Ayan Chatterjee	
Contact Number	
8617681909	
Origin of the Research	
Agricultural impact on groundwater contamination and flow modelling.	

Expected Outcome

Students will able to understand that how mathematical modelling is used to model the real life senario and the application of ML and DL in this context.



- 8. (1) Environmental Intelligence: Application of AI for smart and sustainable solution for waste management.
 - (2) Fighting climate change with data science
 - (3) Green synthesis and characterization of metal nanoferrites.

Name of the Faculty _____

Dr. Chandra Mukherjee

Contact Number

8777243079

Origin of the Research _

- (1) Smat and sustainable solution to environmental problems (waste management)
- (2) Exploration of data science is helping to make the world a better place to live in as per recent climate change research. A recent study by NASA Technical Reports Server (NTRS) provides an in-depth look at how massive amounts of data can be leveraged and analyzed to generate viable solutions to the threat of climate change.
- (3) Metal nanoferrites (MNF) as room temperature VOC senser, MNFs are widely used in conventional electronic, electrical and magnetic devices. For the past two decades, since the discovery of the superparamagnetic nature of MNFs, their applications in biotechnology and biomedical sciences, cosmetics to drug delivery as well as in advanced electronics and microwave devices have gained immense attention.

Expected Outcome .

- (1) For better understanding of new generation emerging network of sensor technologies to track the environmental changes by sophisticated physical models.
- (2) Students will understanding the implications of the vast environmental datasets, a big data domain and deploying the right computational resources to build and deploy useful applications.
- (3) Students will learn to synthesize nanoparticle, nanocomposite and their charaterization. Able to explore nanotechnology as a solution tool to environmental challenges. Promising area of the research project and good scientific publications.



9. Exploring the potential of nanoengineered fertilizers and pesticides for sustainable agricultural applications

Name of the Faculty _

Dr. Manashi Chakraborty

Contact Number

8013523093

Origin of the Research _

We are here motivated to engineer the design and synthesis of topological structures (sizes and shapes) of established inorganic fertilizers and pesticides composed of nanocrystals for sustainable agriculture as a good approach of ecosystem, for long run enhancement of food quality and safety, reduction of agricultural inputs, enrichment of absorbing nanoscale nutrients from the soil, etc.

Expected Outcome

- Synthesis and characterization of nano fertilizers and pesticides with a variation of shape and sizes via nanoscale engineering.
- Proper understanding of application of size and shape dependent nanofertilizers and pesticides on sustainable agriculture.
- Innovative way outs to reduce the amount of spread chemicals, minimize nutrient losses in fertilization and increased yield through pest and nutrient management.



Offering School	Offering Department
School of Science and Technology	Computer Science and Engineering

1. (1) Case study-based application using Intermediate level Python

(2) Enterprise applications using Devops.

Name of the Faculty _

Sandipan Chakravorty

Contact Number _

9831889620

Origin of the Research

- (1) The following topics are meant for students who have already acquired the basic python skills. Topics to be covered are:
- 1. Recursive Functions, 2. Iterators and Iterables, 3. Generators and Iterators
- 4. Lambda Operator, filter, reduce and map, 5. Decorators and Decoration
- 6. Memoization and Decorators, 7. List Comprehension, 8. Currying in Python
- 9. Tests, DocTests, UnitTests, 10. Testing with Pytest, 11. Regular Expressions
- 12. Advanced Regular Expressions

***More may be added if and when required

- (2) Advance Java Topics or Syllabus
 - Basics of a Web application What is a web application? What is a web client and web server? How do client and server communicate? HTTP protocol basics HTML language basics What is a TCP/IP port, URL? Need for a Web Container
 - Web Container and Web Application Project Set up To set up Tomcat Container on a machine To set up a Servlets JSP project in Eclipse To configure dependency of Servlet JSP APIs Web application project structure



3. Servlets

What are Servlets? What can they do? Why are they needed? How do Servlets look in code? HTTP Methods; GET, POST, PUT, DELETE, TRACE, OPTIONS GET/POST request; differences between the two Servlet Lifecycle Servlet Context and Servlet Config Forwarding and Redirection of requests

4. Session Management

What is a session? Why is it required? How to get a session? Session information passing between client and server Session information passing mechanisms - Cookies, Rewriting How to destroy a session

5. JSPs

Introduction to JSP and need for JSPs Basic HTML tags JSP Lifecycle

6. JSP Elements

Scriptlets Expressions Declarations Significance of above elements and fitment into the JSP Lifecycle What are Directives in JSP? Page Directive Include Directives Taglib Directive

6. JSP Tag library JSP Standard Actions Expression Language

JSTL basics and it's usage Need for Custom Tag Library Custom Tag Library implementation Include Directives Taglib Directive



Expected Outcome

- (1) Students are expected to be adapt with the advanced concepts and algorithms of python that are not covered within the ambit of the normal python programming syllabus. Will help and aid students when exploring data science libraries and machine learning libraries in concurrence with data science.
- (2) Advanced Java is also a part of Java programming language that generally deals with online application like the website and mobile application.

At the end of this course student will:

- CO1) Implement web based applications using features of HTML and XML
- CO2) Develop reusable component for Graphical User Interface applications
- CO3) Apply the concepts of server-side technologies for dynamic web applications.
- CO4) Implement the web based applications using effective data base access with rich client Interaction.
- CO5) Implement CRUD operations within Enterprise level framework including MVC.

Remarks (if any)

- (1) CASE STUDY IMPLEMENTATION MAY BE INTER-DISCIPLINARY FOR WHICH ADDITIONAL LIBRARIES IN PYTHON MAY NEED TO BE CONSULTED DURING EXECUTION.
- **Candidates conversant with basic Python programming to opt for this course
- (2) **Candidates must be conversant with Core Java to opt for this course.



2. Fundamental of IoT and Personal Communication System

Name of the Faculty _____ Suman Haldar Contact Number 9830378118 Origin of the Research **Introduction to IoT:** Connection types, Physical topology, Network reachability **IoT Sensing and Actuation:** Sensor Characteristics, Sensorial Deviations, Scalar sensing, Hybrid sensing, Thermal or magnetic actuators, Shape memory polymers IoT Connectivity Technologies: IEEE, 802.15.4, Zigbee, WirelessHART, ISA100.11A, Wi-Fi, Bluetooth **IoT Data Protocols:** MQTT, CoAP, AMQP, XMPP, REST **IOT HANDS-ON:** Introduction to Arduino Boards, Arduino installation and setup, Hands on experiments with ATMEGA328 with integration of sensor and actuators. **IOT CASE STUDIES AND FUTURE TRENDS:** Agricultural IoT, Components of an agricultural IoT, Advantages of IoT in agriculture Introduction to personal communication system and different standard Public wide-area Wireless Networks Second Generation (2G) and Third Generation (3G) and 4G Wireless Networks Expected Outcome Students will be able to understand the fundamentals of networking topology and how to connect DTE and DCE. Students will be able to learn the fundamentals of analogue and digital sensors. Students will able to learn connectivity technology in IOT platform. Students will able to learn different IOT data protocol for publish and subscription of data. Students will able to learn the open source based embedded hardware design. Students will able to learn about the IOT application in agriculture. All wireless communication methods that are connected to the public switched telephone network, including mobile devices, will be taught to learners. Students acquire the fundamentals of wireless communication can Students will able to learn basic of modern 2G, 3G and 4G communication



Remarks (if any) _

Basic data connectivity hands on will be provided Sensor characteristics will be demonstrated The connectivity protocol will be demonstrated using an experimental test bed. Practical session will be conducted

3. A joy of learning Python towards machine learning based applications

Name of the Faculty	-
Sutapa Chatterjeesarkar	
Contact Number	

Contact Number

9831543575

Origin of the Research

Mobile network security

- 1. A brief introduction on data as well as dataset.
- 2. The steps of design flow.
- 3. Collection of data: A brief introduction to dataset for a targeted application.
- 4. Training Dataset: The sample of data used to fit the model.
- 5. Validation of Dataset: To introduce with model fit on the training dataset and validation
- 6. **Test Dataset:** The sample of data used to provide an unbiased evaluation of a final model fit on the training dataset with systematic visualization towards developing targeted application.
- 7. A Python based implementation methodology.

Expected Outcome

Students will able to know about basic of mobile security.

- 1. To get awareness for machine learning application domains.
- 2. A brief introduction about design flow for machine Learning based applications.
- 3. A Python based implementation of targeted application.



4. Case Study based implementation of Database Management System Concepts

Name of the Faculty

Dr. Deep Suman Dev

Contact Number ____

9674709542

Origin of the Research _____

Database Management System Fundamentals, Data Models, Database Languages, Design of Relational Database.

Introduction:

Concept & Overview of DBMS, Data Models, Database Administrator, Database Users.

Entity-Relationship Model

Basic concepts, Design Issues, Mapping Constraints, Keys, Entity-Relationship Diagram, Weak Entity Sets & Discriminator.

SQL and Integrity Constraints

Concept of DDL, DML, DCL. Basic Structure, Set operations, Aggregate Functions, Null Values, Domain Constraints, Referential Integrity Constraints, assertions, views, Nested Subqueries, Stored procedures and triggers.

Relational Database Design

Functional Dependency, Different anomalies in designing a Relational Database., Decomposition, Normalization using functional dependencies.

Hands-on Design and Implementation of Relational Database.

Expected Outcome

On completion of the course students will be able to

- 1. Understand the different issues involved in the design and implementation of a database system.
- 2. Understand and use data manipulation language to query, update, and manage a database.
- 3. Design and build a simple database system and demonstrate competence with the fundamental tasks involved with modelling, designing, and implementing a DBMS.

Pedagogy for Course Delivery:

The course will be taught using theory and practical assignments while giving special emphasis towards solving real life and industry oriented problems.



Offering School	Offering Department	
School of Science and Technology	Robotics	

- 1. (1) Modeling and Simulation of Smart mechatronic electronic throttle body through AI
 - (2) Designing of Robotics arm for detecting objects based on AI

Name of the Faculty _____

Dr. Prabin Kumar Jha

Contact Number _____

8107916565

Summary of Work _____

- 1. (1) Modelling and simulation of electronic throttle of Nissan-Ashokleyland Dost model in python.
 - (2) Applying AI and ML in the model based the real available data
 - (3) Testing of model
 - (4) Report writing in Latex
- 2. (1) Designing of robotic arm in Autodesk Inventor
 - (2) Simulation of the model in robo software
 - (3) Applying Al in the model
 - (4) Testing of model
 - (5) Report writing in Latex



Offering School	Offering Department
School of Science and Technology	BioTechnology

- 1. (1) Biological Data Mining
 - (2) Molecular evolutionary tree
 - (3) Comparative genomics study
 - (4) Protein structural model building and validation

Name of the Faculty _

Dr. Ranojit Kumar Sarker

Contact Number

9433664420

Origin of the Research _

- (1) Biological (Molecular as well as bibliographic) data is huge and the volume of data from this segment is increasing exponentially. Thus there is a significant requirement for electronic management of this data and its analysis. In this regard, a customized training is required to retrieve, process and further utilization of the explored data.
- (2) Identification and characterization of nobel or unexplored organisms through biochemical and microbiological experiments is time consuming and cost effective. Thus computational classification of organisms is the choice of the day. In this case molecular evolution (using DNA / RNA/ Protein) study is carried out and an evolutionary tree is generated. Analyzing the phylogenetic tree the putative classification of the organism can be carried out which can be further validated by designing a few laboratory experiments.
- (3) Due to the advancement in the genome sequencing projects, a number of genomic sequences are available in the genomic databases. As a result there is a need to identify the functional regions in the genome sequence as well as to predict the protein sequence related to the functional region and assign the function to the predicted protein. In this regard functions of nobel genes and proteins can be predicted through known genes and proteins.



(4) Due to advancement in the various molecular techniques these days genomic sequences are being sequenced rapidly. Subsequently, bioinformatics algorithms have been developed to predict the proteome of the genome which is the ultimate functional molecule in the cell. But unfortunately still we are lagging behind with the techniques to resolve the 3D structure of the protein molecule. In the current scenario most of the structure is solved through X-Ray crystallography and NMR technology. However these techniques are not cost effective and also require much time. Thus there is a huge gap in between the protein sequence and structure databases. In this context in Silico structure building through homology modelling can be a better alternative.

Expected Outcome

- (1) Students will learn the professional skills to mine data from various databases and its analysis.
- (2) Students can learn generation and analysis of phylogenetic trees by various algorithms.
- (3) Students will learn to explore and analyze various tools and algorithms for annotating function and structure of nobel genes and proteins.
- (3) Students will learn to explore and analyze various tools and algorithms to build and validate protein 3D structure.

2. Algal Biotechnology

Name of the Faculty _

Dr. Anirban Dasgupta

Contact Number _____

8777728167

Origin of the Research _____

Over the preceding years, a global scientific endeavour has emerged to mitigate the impact of climate change by microalgae cultivation through efficient CO2 capture and use of microalgae for production of alternative biofuel. The major bottleneck of this approach is the low production of microalgae biomass. Training in developing methods for enhancing biomass production coupled with photobioreactor operation, feedstock preparation is essential for the emerging algal biorefinery industry.

Expected Outcome _

Students will learn about algae culture maintenance, photobioreactor handling and operation, biomass production and harvesting and can explore the plethora of downstream applications of algal biomass.



3. Screening of potential ligands to receptor molecules

Name of the Faculty _____

Dr. Ranojit Kumar Sarker

Contact Number _____

9433664420

Origin of the Research

Molecular mechanism of drug - receptor binding is one of the most important parts of the drug discovery pathway. Thus understanding and expertization in using and data analysis is very much required.

Expected Outcome _____

Students will learn to explore and analyze various tools and algorithms to carry out molecular docking.

4. Antibacterial resistance and screening of modulators

Name of the Faculty	
Dr. Diwakar Singh	
Contact Number	

9415810547

Origin of the Research

Antimicrobial resistance is a persistent danger to treat common diseases due to the creation and spread of drug-resistant bacteria that have developed new resistance mechanisms. This study will try to modulate the antimicrobial resistance using chemical and biological ligands which may be required to fill the lacuna in current research.

Expected Outcome

Students will learn how to control antimicrobial resistance and its mechanisms. It is a fruitful and challenging area of study today



5. Screening of molecules having antimicrobial and antibiofilm activities.

Name of the Faculty _

Dr. Poulomi Chakraborty and Dr. Payel Paul

Contact Number _____

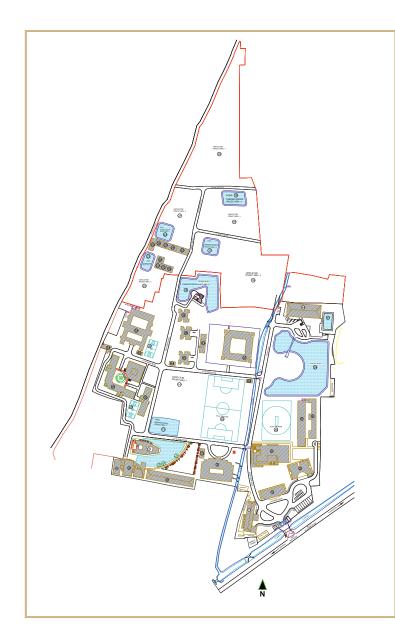
9038575194 & 8820958670

Origin of the Research

Microbial biofilm indicates a cluster of microorganisms having the competency to display drug resistance property, thereby increasing its proficiency in spreading diseases. The weakening of biofilm formation reduces the spread of virulence factors that could lead to restrict the pathogenesis. Thus, several strategies are now being adopted to manage the biofilm threats but so far the results are not satisfactory and demand lots of attention to explore new agents to deal with the same. Natural as well as synthetic molecules having antimicrobial and bioactive properties are getting privileged for the sustainable management of biofilm challenges.

Expected Outcome

Exploring natural and synthetic molecules and screening them for microbial biofilm inhibition might open a new avenue through which students can flourish their knowledge as well as attain hands on expertise on Microbiology.



LEGEND-BUILDING

A. ADMINISTRATIVE BLOCK

1. ADMINISTRATIVE BUILDING (G + V)

B. ACADEMICS BLOCK

- 2. SCHOLASTIC BUILDING 1 (G + III)
- 3. SCHOLASTIC BUILDING 2 (G + II)
- 4. SCHOLASTIC BUILDING 3 (G + III)
- 5. SCHOLASTIC BUILDING 4 (G + III)
- 6. SCHOLASTIC BUILDING 5 (G + III)
- 7. WORKSHOP BUILDING
- 8. NEW WORKSHOP BUILDING
- 9. NEW PHARMACY BUILDING (G + III)
- 10. PHARMACY BUILDING (G + III)
- 11. SHIP IN CAMPUS (G + III)

C. AGRICULTURE & FISHERY SCIENCE BLOCK

12. POLY HOUSE & NET HOUSE 13. FISHERY SCIENCE PROJECT AREA - 1 14. AGRICULTURE PROJECT AREA - 1 15. FISHERY SCIENCE PROJECT AREA - 2 16. AGRICULTURE PROJECT AREA - 2 17. FISHERY SCIENCE PROJECT AREA - 3 18. AGRICULTURE PROJECT AREA - 3 19. FISHERY SCIENCE PROJECT AREA - 4 20. AGRICULTURE PROJECT AREA - 4 21. AGRICULTURE PROJECT AREA - 5 22. FISHERY SCIENCE PROJECT AREA - 5 23. FISHERY SCIENCE PROJECT AREA - 6 24. AGRICULTURE PROJECT AREA - 6 25. MUSHROOM UNIT 26. FIELD LAB 27. STORE HOUSE 28. SERICULTURE UNIT 29. THRESHING FLOOR **30. BIO GAS PLANT 31. CATTLE SHED 32. VERMI COMPOST PIT**

33. BIO FERTILIZER PLANT

D. RESIDENTIAL BLOCK

34. BOY'S HOSTEL - 1 & 2 (G + III) 35. BOY'S HOSTEL - 1 & 2 (G + III) 36. BOY'S HOSTEL - 1 & 2 (G + III) 37. OLD STAFF QUARTERS (G + III) 38. NEW STAFF QUARTERS (G + III) 39. NEW STAFF QUARTERS (G + III) 40. DIRECTOR'S RESIDENCE (G + I) 41. OLD STAFF QUARTERS (G + III) 42. GIRL'S HOSTEL - 3 (G + II)

E. UTILITY & SERVICES BLOCK

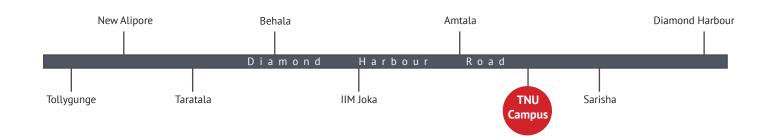
43. ELECTRICAL ROOM44. PUMP ROOM

F. RECREATIONAL BLOCK

- 45. FOOTBALL GROUND
- 46. CRICKET GROUND
- 47. SWIMMING POOL
- 48. MULTI PURPOSE HALL
- 49. BASKETBALL COURT (3 NOS.)

G. HEALTH BLOCK

50. MEDICAL UNIT





ज्ञानम् आत्म प्रदीपाय UGC Enlisted & Recognised

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