AmbujaNeotia

THE NEOTIA UNIVERSITY

ज्ञानम् आत्म प्रदीपाय

Approved Under Sec.2(f) of UGC Act 1956

8 WEEKS INTERNAL INTERNSHIP OFFERINGS FOR ODD SEMESTER-23-24

School of Sciences & Technology

The Neotia University

Link for Registration: **https://docs.google.com/forms/d/1rgrIL5w-UuMpLPRaT8U5pGhlj4EzpOhSkWJFY9cCMb4/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.

8 weeks Internal Internship **Program**

Offering Department	Offering Stream
Basic Science	Chemistry

Environmental Intelligence: Application of AI for smart and sustainable solution for waste management

Name of the Faculty:
Dr. Chandra Mukherjee,
Chemistry Unit, Basic Science, SST, TNU

Objective

Smart and sustainable solution to environmental problems (waste management)

Expected Outcome

For better understanding of new generation emerging network of sensor technologies to track the environmental changes by sophisticated physical models.

Fighting climate change with data science

Name of the Faculty:
Dr. Chandra Mukherjee,
Chemistry Unit, Basic Science, SST, TNU

Objective

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.

Expected Outcome

Students will be understanding the implications of the vast environmental datasets, a big data domain and deploying the right computational resources to build and deploy useful applications.

8 weeks Internal Internship **Program**

Green synthesis and characterization of nanomaterials.

Name of the Faculty:

Dr. Chandra Mukherjee,
Chemistry Unit, Basic Science, SST, TNU

Objective

Synthesis of metal based magnetic nanoparticles (MNP) as a promising room temperature VOC sensor, MNPs are widely used in conventional electronic, electrical and magnetic devices. For the past two decades, since the discovery of the superparamagnetic nature of MNPs, their applications in biotechnology and biomedical sciences, cosmetics to drug delivery to waste management as well as in advanced electronics and microwave devices have gained immense attention.

Expected Outcome

Students will learn to synthesize nanoparticle, nanocomposite, their characterization and applications. Able to explore nanotechnology as a solution tool to environmental challenges. Promising area of the research project and good scientific publications

8 weeks Internal Internship **Program**

Bio-inspired low-cost treatment techniques for pharmaceutical effluent.

Objective of the Internship ⫸

- Estimation of water quality parameters
- Development of biogenic low-cost adsorbent
- Techno-economic assessment of different wastewater treatment techniques
- Low-cost treatment techniques for pharmaceutical effluent using low-cost biosorbent

Who can Join?

UG / PG / Research Scholar from science background.

Name of the Faculty:

Dr. Wasim Akram Shaikh,
Department of Basic Science, School of Science and Technology, The Neotia University
Contact Number: 9955924632, Email: wasimakram.shaikh@tnu.in

Maximum Intake:

15 students

Duration of the Internship:

8 weeks

Mode of Operation:

Online/Offline

Topics to be Covered ⫸

(1) Concepts and synthesis of biogenic low-cost adsorbent

(2) Application of biogenic low-cost adsorbent in diverse fields

(3) Solution chemistry

(4) Water quality parameters

(5) Biomass to biogenic low-cost adsorbent synthesis techniques

(6) Adsorption characterizations

(7) Source and composition wise categorisation of pharmaceutical effluent

(8) Pharmaceutical effluent treatment techniques

8 weeks Internal Internship **Program**

Weekly Schedule ⫸

Week 1:
Theory: Concepts of biogenic low-cost adsorbent and its application in diverse fields
Hands on Session: Identification of functional biomatrix

Week 2:
Theory: Concept of solution chemistry
Hands on Session: preparation of standard solutions

Week 3-4:
Theory: Water quality parameters
Hands on Session: Estimation of water quality parameters.

Week 5:
Theory: Biomass to biogenic low-cost adsorbent synthesis techniques
Hands on Session: Synthesis of suitable matrix for nanocomposite.

Week 6:
Theory: Adsorption characterizations
Hands on Session: Preparation of standard curve

Week 7-8:
Theory: Pharmaceutical effluent treatment techniques
Hands on Session: Treatment of pharmaceutically active compound

Outcome of the Internship ⫸

1. Participants will learn to synthesis and significance of the biogenic low-cost adsorbent
2. Source and composition wise categorisation of pharmaceutical effluent
3. Participants will able to learn the essential water quality parameter
4. Finally, the internship programme will come up with low-cost treatment techniques for pharmaceutical effluent.

On completion of the eight weeks long internship successful candidates will be provided certificate.

8 weeks Internal Internship **Program**

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

Course Objective

The course will provide participants with comprehensive understanding of how nanotechnology can be applied to enhance the efficiency, effectiveness, and sustainability of fertilizers and pesticides in agricultural practices. They will gain a solid grasp of how nanotechnology can revolutionize the agricultural sector by offering innovative solutions to the challenges of food security, resource efficiency, and environmental protection. They should also be equipped to critically assess the benefits and risks associated with the adoption of nanoengineered fertilizers and pesticides in agricultural practices.

Prerequisite

Educational Background, A solid understanding of basic concepts in agriculture, chemistry, and biology is typically beneficial, Principles of Nanotechnology.

Name of the Faculty:

1. Dr. Manashi Chakraborty,
   Assistant Professor, Department of Chemistry, The Neotia University,
   Contact Number: +91-8013523093, Email: manashi.chakraborty@tnu.in

2. Dr. Suchandra Goswami,
   Assistant Professor, Department of Physics, The Neotia University,
   Contact Number: +91-9614674156, Email: suchandra.goswami@tnu.in

Mode of Operation:

Offline

Duration of the Internship:

8 weeks

Maximum Intake:

30 students

8 weeks Internal Internship **Program**

Topics to be Covered

1. Introduction to Nanotechnology in Agriculture
2. Nanoengineered Fertilizers and pesticide
3. Sol-Gel synthesis of Nanoparticle.
4. Synthesis of Fe2O3 and Fe3O4 nanopartile.
5. Charaterization of the formed nanoparticles via XRD and TEM.
6. Application of these nanoparticles as fertilizers in different plant based organisms.

Outcome of the Project

Participants will gain a comprehensive understanding of the principles of nanotechnology and its applications in agriculture, particularly in the development of nanoengineered fertilizers and pesticides. They will learn about nanomaterials, nanoparticles, and their unique properties, as well as how to design and engineer nanoformulations for agricultural purposes. The course will foster an interdisciplinary mindset, encouraging participants to integrate knowledge from fields such as agriculture, nanotechnology, environmental science, and ethics. Armed with the knowledge gained from the course, participants can contribute to advancing sustainable agricultural practices by promoting the responsible use of nanoengineered products.

Note: Successful candidates will be provided certificates

8 weeks Internal Internship **Program**

Latest Research Tools: Origin and LaTeX

Course Objective

The course will provide participants a solid foundation on practical skills in effectively using Origin for data Import and Manipulation, data visualization, data analysis and customization and automation of data. Familiarizing students with the basics of LaTeX, a typesetting system will equip them with creating documents with complex formatting, equations, and references. It will enable them to produce professional-quality research documents with complex mathematical content and formatting.

Prerequisite

Basic Computer Skills, A basic understanding of data analysis concepts, such as data types, descriptive statistics, and basic graphing.

Name of the Faculty:

1. Dr. Manashi Chakraborty,
   Assistant Professor, Department of Chemistry, The Neotia University,
   Contact Number: +91-8013523093, Email: manashi.chakraborty@tnu.in
2. Dr. Kalyanashis De,
   Assistant Professor, Department of Physics, The Neotia University,
   Contact Number: +91-8967208123, Email: kalyanashis.de@tnu.in
3. Dr. Suchandra Goswami,
   Assistant Professor, Department of Physics, The Neotia University,
   Contact Number: +91-9614674156, Email: suchandra.goswami@tnu.in

Mode of Operation:

Online/Offline

Duration of the Internship:

8 weeks

Maximum Intake:

20 students

8 weeks Internal Internship **Program**

Topics to be Covered

1. Introduction to Origin
2. Importing data from different file formats (Excel, CSV, etc.) and Creating 2D and 3D plots
3. Descriptive statistics and basic data analysis techniques, Curve fitting, regression analysis, and trendlines.
4. Overview of LaTeX and its advantages for academic writing.
5. Creating sections, subsections, and chapters. Generating a table of contents and lists of figures/tables in the LaTeX.
6. Including images, figures, and diagrams in LaTeX documents.

5.Using BibTeX or BibLaTeX for managing references.

6. Utilizing document classes and templates of different style.

Outcome of the Project

Completing this course would provide participants with a valuable skill set that's highly relevant to academia, research, and various professional settings. They would have the tools to efficiently conduct data analysis, visualize results, and present their findings using Origin, as well as the capability to produce well-formatted, accurate, and professional documents using LaTeX. These skills can significantly enhance their research capabilities, academic writing, and communication in scientific and technical contexts.

Note: Successful candidates will be provided certificates

8 weeks External Internship **Program**

Offering Department	Offering Stream
Basic Science	Physics

Piezoelectric materials for Artificial Intelligence (AI)

Name of the Faculty:
Dr. Kalyanashis De and Dr. Suchandra Goswami,
Physics Unit, Basic Science, SST, TNU
Contact Number: 8967208123 & 9064497078

Objective

Acquire knowledge in exploring the coactions between piezoelectric materials and artificial intelligence, fostering practical knowledge in material properties and innovative technology integration, while contributing to real-world applications.

Expected Outcomes

Possible outcomes could include:

- **Practical Expertise:** Develop knowledge on the characteristic of piezoelectric materials and their integration into artificial intelligence systems, enhancing technical proficiency.
- **Professional Growth:** Enhance your career prospects by gaining valuable experience at the intersection of materials science and AI, preparing for future roles in techdriven industries or research.
- **Personal Fulfillment:** Experience personal growth and satisfaction by actively contributing to cutting-edge research and technology development at the intersection of materials science and artificial intelligence.
- **Innovative Projects:** Create innovative projects that showcase the successful integration of piezoelectric materials and AI, demonstrating creativity and technological application.
- **Interdisciplinary Collaboration:** Foster teamwork and communication skills by collaborating with peers from diverse fields, contributing to holistic problemsolving.

Origin Implements Data Analysis

Name of the Faculty:
Dr. Kalyanashis De and Dr. Suchandra Goswami,
Physics Unit, Basic Science, SST, TNU
Contact Number: 8967208123 & 9064497078

Objective

Equip undergraduate students with practical skills in data analysis by immersing them in real-world projects centered on the 'Origin' software. This internship aims to enhance their ability to process, interpret, and visualize data, fostering expertise in using analytical tools for informed decision-making.

Expected Outcomes

Possible outcomes could include:

- **Proficiency with Origin Tool:** Gain a strong command over the "Origin toll" software, mastering its features for data import, manipulation, visualization, and analysis.
- **Data Interpretation Skills:** Develop the ability to interpret complex datasets, extract meaningful insights, and present findings through informative graphs and visualizations.
- **Analytical Expertise:** Acquire practical experience in applying statistical methods and analytical techniques using the Origin tool, enhancing problem-solving skills for real-world challenges.
- **Project Implementation:** Successfully complete data analysis projects using the Origin tool, demonstrating the capability to independently execute analytical tasks and present results effectively.
- **Enhanced Employability:** Boost your employability by adding practical data analysis experience and proficiency with a widely used software tool to your skill set, making you a valuable asset in data-driven industries or research environments.

8 weeks Internal Internship **Program**

Offering Department	Offering Stream
Basic Science	Mathematics

Detection of Multivariate Outliers: Application of Mahalanobis distance

Course Objective

Unravel the intrinsic behaviour of datasets is biggest strength for any successful data Science project. Exploratory Data Analysis(EDA) is the first and foremost step to start with. One of the essential part of EDA is outlier detection and correction.

While doing EDA on one of the project, key need was to do outlier detection on a entire data (all features) as a whole and not on a individual features.

What is Multivariate outlier and how does it differ from Univariate outlier? Multivariate outlier is a combination of extreme values(variables) which is inappropriate for data. While on the other hand, Univariate outlier are extreme values in a distribution of specific variable.

Prerequisite

Concepts of Probability and Statistics, Linear Algebra and Optimization, Calculus

Name of the Faculty:

Dr. Mostaid Ahmed
Assistant Professor, Mathematics, The Neotia University,
Contact Number: 7870591051, Email: mostaid.ahmed@tnu.in

Mode of Operation:

Online/Offline

Duration of the Internship:

8 weeks

Maximum Intake:

20 students

Topics to be Covered

1. Detection of Multivariate Outliers
2. Determination of Mahalanobis Distances

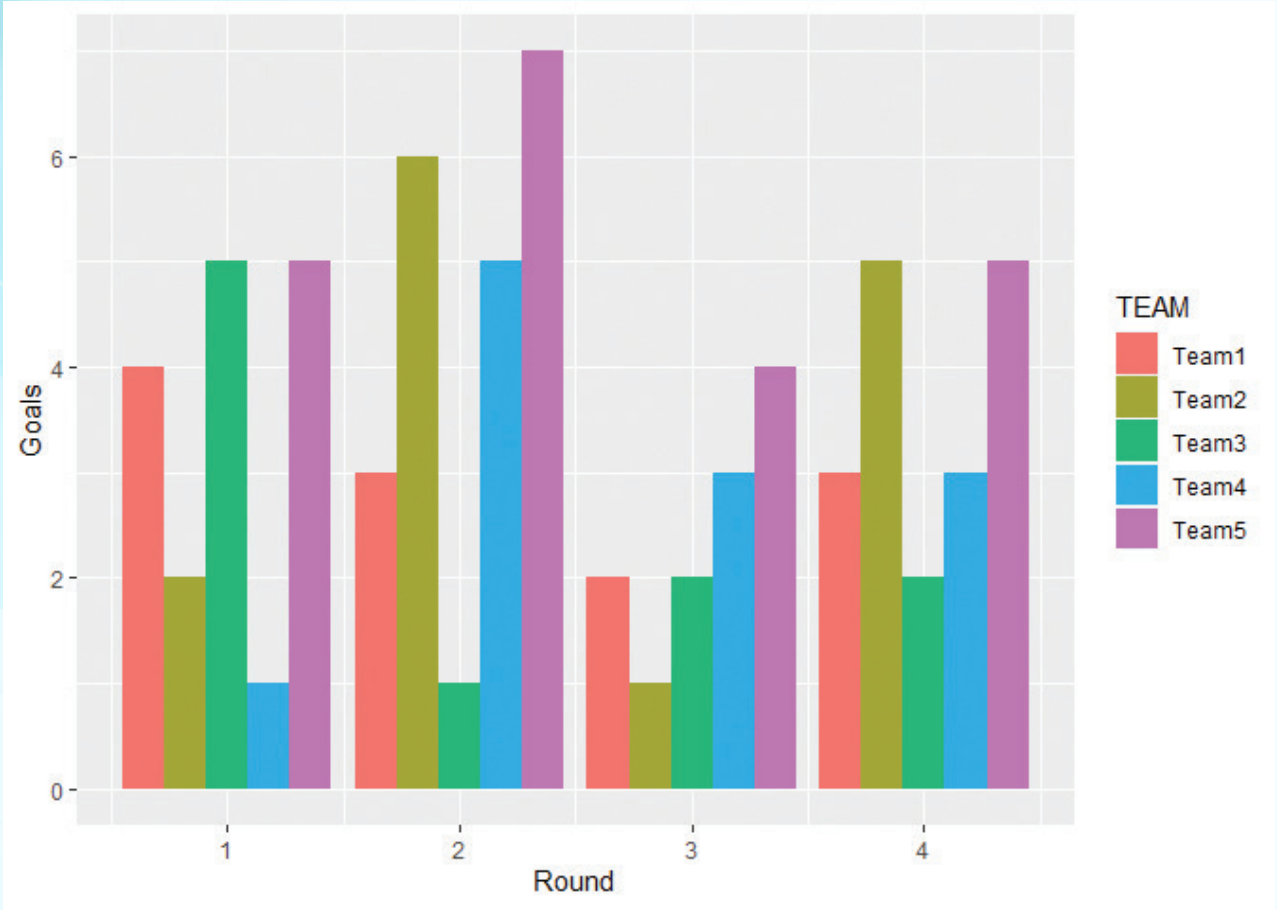
8 weeks Internal Internship **Program**

Outcome of the Project

There are many methods, scores ,techniques to detect outlier in any dataset. Each method takes into account different metrices to evaluate the outlier present in dataset. Today let's take about distance metric called Mahalanobis Distance for detecting multivariate outliers in data which is used extensively to detect multivariate outliers. Mahalanobis distance method takes into account distance between point as well as distribution of data point for detecting outlier as opposed to Euclidean Distance which just takes distance between points.

Below graph depicts how outlier are detected based on Mahalanobis distance method. It is clearly seen from the plot below the red highlighted data points are outlier based on distance as well as density.

Note: Successful candidates may be provided certificates



8 weeks Internal Internship **Program**

Offering Department	Offering Stream
BioTechnology	Entire Department

Antimicrobial effects of polymyxin B: A potential molecule that works against bacteria

Introduction

Bacillus polymyxa antibacterial substances called polymyxin B are extensively employed as therapeutic molecules in biomedicine. Polymixin B may be employed as a possible molecule to reduce antibiotic resistance, which is now a major health problem. We will examine the activity of biomolecules in diverse target organisms and put it to the test in soil isolates. Gram-negative bacteria's outer cell membranes are damaged by the antibiotic polymyxin B, which also binds and neutralizes lipopolysaccharide and prevents respiration in these bacteria. There are several ways to administer polymyxin B to treat vulnerable Gram-negative bacterial infections but natural strain is completely new for the analysis.

Name of the Faculty:

Dr. Diwakar Kumar Singh, Department of Biotechnology, The Neotia University, Contact Number: 9415810547, Email: diwakarkumar.singh@tnu.in

Maximum Intake:

4 students

Duration of the Internship:

8 weeks (2 days in a week)

Mode of Operation:

Online/Offline

Outcome of the Project

1. Students will learn the process of culture collection and purification of bacterial isolates.
2. They will come to know the basics and application of Polymixin B in biomedical field
2. Students will also learn the association of Polymixin B with other molecule for securing optimal activity in laboratory.

Note: Successful candidates may be provided certificates.

8 weeks Internal Internship **Program**

Biological Data Mining: An effective approach to understand the code of biological information

Course Objective

One of the hallmarks of modern genomic research is the generation of enormous amounts of raw sequence data. As the volume of genomic data grows, sophisticated computational methodologies are required to manage the data deluge. Thus, the very first challenge in the genomics era is to store and handle the staggering volume of information through the establishment and use of computer databases. A biological database is a large, organized body of persistent data, usually associated with computerized software designed to update, query, and retrieve components of the data stored within the system. A simple database might be a single file containing many records, each of which includes the same set of information. The chief objective of the development of a database is to organize data in a set of structured records to enable easy retrieval of information.

Databases act as a store house of information. Databases are used to store and organize data in such a way that information can be retrieved easily via a variety of search criteria. It allows knowledge discovery, which refers to the identification of connections between pieces of information that were not known when the information was first entered. This facilitates the discovery of new biological insights from raw data. Secondary databases have become the molecular biologist's reference library over the past decade or so, providing a wealth of information on just about any gene or gene product that has been investigated by the research community. It helps to solve cases where many users want to access the same entries of data. It helps to remove redundancy of data.

As the Biological data is very complex, it's difficult to arrange the data in a computer readable format. Moreover, the volume of the data is also huge, thus it is very difficult to interpret data from the database file. Thus, Understanding the format of the database file is key to extract information from the electronic storage.

Who can Join?

UG / PG / Research Scholar from any life science domain

Name of the Faculty:

Dr. Ranojit Kumar Sarker,
Department of Biotechnology, The Neotia University,
Contact Number: 9433664420, Email: ranojitkumar.sarker@tnu.in

Maximum Intake:

20 students

8 weeks Internal Internship **Program**

Duration of the Internship:

8 weeks (2 days in a week)

Mode of Operation:

Online/Offline

Topics to be Covered

1. Introduction to Bioinformatics, application of Bioinformatics in different area of research
2. Exploring Bioinformatics databases: nucleotide / protein sequence retrieval.
3. Understanding database file format. Exploring secondary databases.
4. Global And Local sequence alignment.
5. Database searching for functionally similar sequences (BLAST) and modified version of BLAST tools.
6. How to submit nucleotide sequences in GenBank to get NCBI accession.
7. Understanding the basics of primer design and interpretation of the result.
8. Prediction of protein secondary and tertiary structure

Outcome of the Project

1. Students will learn the background and significance of the Bioinformatics Databases.
2. They will come to know the various segments of the databases and will be aware the clustering of various information in the primary and secondary databases.
3. Students will also learn to query the data retrieval system which is very complex in nature as the structure of biological data is very complex
4. They will learn to understand structural & functional relationship among protein and nucleotide sequences

Note: Successful candidates may be provided certificates.

8 weeks Internal Internship **Program**

Protein structure modelling and screening of potential ligands to receptor molecules: A promising tool to address the discovery of drug through in silico approach

Course Objective

Macromolecular docking is the computational modelling of the quaternary structure of complexes formed by two or more interacting biological macromolecules. Protein–protein complexes are the most commonly attempted targets of such modelling, followed by protein–nucleic acid complexes. The ultimate goal of docking is the prediction of the three-dimensional structure of the macromolecular complex of interest as it would occur in a living organism. Docking itself only produces plausible candidate structures. These candidates must be ranked using methods such as scoring functions to identify structures that are most likely to occur in nature.

Ligands molecules are purchased from the supplier and used in the biofilm inhibition in the wet lab experiment. It indicates that we get biased towards the molecules that have been purchased. But in the PubChem database a large number of synonymous structures of the chosen molecule might be present. Thus if these structures are docked prior to selection of the in vivo experiment, then it might open the avenue of the receptor ligand binding potential and improved demonstration in the experiment can be observed. Thus, the course will provide detailed information about protein structure and its prediction as well as the underlying mechanism of protein-ligand interaction.

Who can Join?

UG/PG/Research Scholar from any life science/ computer science/Basic science domain.

Name of the Faculty:

Dr. Ranojit Kumar Sarker,
Department of Biotechnology, The Neotia University,
Contact Number: 9433664420, Email: ranojitkumar.sarker@tnu.in

Mode of Operation:

Online/Offline

Duration of the Internship:

8 weeks (2 days in a week)

Topics to be Covered

1. Introduction to protein structure database (PDB) and understanding the file format.
2. Revisiting basic principles of protein structure.
3. Protein secondary structure prediction algorithm.

8 weeks Internal Internship **Program**

4. Protein tertiary structure prediction algorithm.
5. Protein secondary structure databases.
6. Understanding the Pubchem database.
7. Introduction to molecular docking in drug design. Exploring PyRx docking system
8. Protein structure modelling / Ramachandran plot prediction and analysis.

Outcome of the Project

1. Understanding principles of protein structure to prediction of secondary & tertiary structure
2. Student will learn about protein-protein & protein-ligand interaction concepts and mechanism
3. They will be introduced about the PubChem database.
4. They will learn in details the exploration of PubChem
5. They will learn to explore docking tools
6. After completion of the internship program they will be able to interpret the molecular interaction data, binding energy, ionization potential, hydrophobicity etc.

Note: Successful candidates may be provided certificates.

8 WEEKS INTERNAL INTERNSHIP **PROGRAM**

Offering Department	Offering Stream
Computer Science	AIML

A Study on Local Image information-based Feature Analysis and Impact of Image property variations in Pattern Identification

Name of the Faculty:

Dr. Deep Suman Dev, Contact Number: 9674709542

Origin of the Research

Image Representation, Image Feature, Feature Extraction, Pattern Analysis and Matching

Introduction

Concept & Overview of Image Representation, Image property and impact of image property variation.

Mathematical Foundations:

Distance Metrices and Classifiers, sliding window mechanisms, pattern localization using pixel geometry.

Feature Modelling:

Ideas of different types of features and comparative study between them.

Feature Extraction:

Extraction of features using local descriptors and cumulative arithmetic operations.

Hands-on Design and Implementation of Local Image information-based Feature Analysis Model for Pattern Identification

Expected Outcome

On completion of the course students will be able to

- Understand image representation and how the hidden features of the image are analysed and extracted.
- Understand the pixel geometry and impact of pixel intensity while manipulating complex image data
- Understand the challenges of image property variations while analysing the presence of pattern.
- Implement pattern identification model which can be used to solve many real-time problems based on image data in Agriculture domain, HealthCare domain etc.

Pedagogy for Course Delivery

The course will be taught using theory and practical assignments while giving special emphasis towards solving real-time problems of pattern identification.

8 WEEKS INTERNAL INTERNSHIP **PROGRAM**

Object Detection and Segmentation using Deep Learning

Course Objective

It provides solid understanding of the foundational concepts of deep learning, including neural networks, MLP, activation functions, loss functions, optimization algorithms, and backpropagation. Learn about various deep learning architectures such as feedforward neural networks, convolutional neural networks (CNNs), Unet, VGG16, and Resnet. Develop practical skills in implementing and training deep learning models using popular frameworks Pytorch. Gain experience in pre-processing data, building model architectures, and tuning hyperparameters. Interns will learn to apply deep networks in various field.

Prerequisite

Python programming, Probability, Linear Algebra and optimisation, Calculus, Image processing.

Name of the Faculty:

Dr. Madhu Sudan Das, Associate Professor, CSE Department, The Neotia University,
Contact Number: 9732720445, Email: madhusudan.das@tnu.in

Mode of Operation:

Online/Offline

Duration of the Internship:

8 weeks

Maximum Intake:

20 students

Topics to be Covered

1. Deep learning Preliminaries, 2. Introduction to CNN, 3. Various deep learning model, 4. Data Preparation and Visualization, 5. Train and Test Data loader,
6. Training, Testing and Validation of the model in pytorch framework, 7. Application of deep networks in various problem.

Outcome of the Project

In this study students will be able to design a various deep learning architecture from the scratch. They will be able to design data loader. They will be able to train, test and validate their designed model for various datasets. They will learn various loss functions and their effect on model performance. Also, they will learn fine tuning for increasing the accuracy of the deep learning model. Finally, they will be able to apply deep learning techniques in various domain.

Note: Successful candidates may be provided certificates.

8 WEEKS INTERNAL INTERNSHIP **PROGRAM**

Machine Learning-based Prediction System Design.

Course Objective

Provide opportunities to young students to contribute in cutting-edge technological and interdisciplinary study, through hands-on projects on Machine Learning.

Offers a practical understanding of the techniques and tools used by practitioners. Interns learn how to understand data, make predictions, and ultimately decisions based on those predictions.

Prerequisite

Knowledge of programming languages such as Python, C++/C, Knowledge of relevant statistical, mathematical, and computational concepts.

Name of the Faculty:

Dr. Usha Rani Gogoi, Assistant Professor, CSE Department, The Neotia University, Contact Number: 9863535768, Email: usharani.gogoi@tnu.in

Mode of Operation:

Online/Offline

Duration of the Internship:

8 weeks

Maximum Intake:

20 students

Topics to be Covered

1. Machine Learning Preliminaries, 2. Introduction to Machine Learning Concepts,
3. Different Machine Learning algorithms, 4. Data Preparation and Visualization,
5. Learn to Build Prediction models, 6.Individual project Design.

Course Objective

Upon completion of the program, the participant will have an in-depth insight to apply machine learning algorithms in Prediction system design. The participants will also be able to apply their concepts to solve any real time problem, thus making the objective of the training program as desired.

Note: Successful candidates may be provided certificates.

8 WEEKS INTERNAL INTERNSHIP **PROGRAM**

Offering Department	Offering Stream
Computer Science	Cyber Security

Future Ready TNU Campus Network Design

Course Objective

This course is designed to impart knowledge about the detailed design and architecture of topologies in Computer Networks, various protocols used in Communication, Managing and configuring LAN devices, and various WAN technologies. This course aims to impart knowledge about the practical aspects of computer networks.

1. Students will be able to learn how to design an enterprise network.
2. To understand the design principles of creating virtual networks with Simulators
3. Designing campus network Prototypes with state-of-the-art technologies and the Latest trends in Cyber Security

Who can Join?

UG / PG / Research Scholar from any engineering domain

Name of the Faculty:

Prof (Dr.) Subhrendu Guha Neogi,
Department of CSE, The Neotia University,
Contact number: 7980801480, Email: subhrendu.guhaneogi@tnu.in

Maximum Intake:

30 students

Duration of the Internship:

8 weeks (2 days in a week)

Mode of Operation:

Online/Offline

Topics to be Covered

1. Design the topologies and configure the operation of data networks.
2. Understanding the IPv4 and IPv6 addressing schemes
3. Configure and verify OSPF and EIGRP
4. Implement VLANs and trunks in a switched network.
5. Explain the role of VLANs in a converged network.
6. Explain the basics of access control lists (ACLs).

7. Configure network address translation (NAT) for IPv4.
8. Describe the operations and benefits of the Spanning Tree Protocol (STP).
9. Configure and verify link aggregation control protocol (LACP).
10. Describe the purpose of the DHCP protocol.
11. Configure a router for additional administrative functionality.
12. Configure and verify a basic WAN serial connection.
13. Describe VPN technology and its role in WAN connectivity.
14. Describe the basic operation of ACLs.
15. Describe the concepts of wireless networks.
16. Describe the different methods used to secure a wireless network.
17. Describe common threats to networks and mitigation techniques.
18. Implement, verify, and troubleshoot NAT and ACLs in a medium-sized enterprise branch office network.

Outcome of the Project ⫸

Upon completion, students will be able to:

1. Describe the operation of data networks.
2. Implement any campus network.
3. Implement an IP addressing scheme and IP services to meet network requirements for a small branch office.
4. Implement routing protocols in the network.
5. Explain how to configure and verify network connections.

Note: Successful candidates will be provided certificate.

Understanding Cyber Attacks with Security Onion

Course Objective

A cyberattack is a malicious and deliberate attempt by an individual or organization to breach the information system of another individual or organization. Usually, the attacker seeks some type of benefit from disrupting the victim's network. Multiple layers of protection against cyber threats, making it more difficult for attackers to penetrate the network. By using different tools and techniques at each layer, organizations can detect and respond to threats more effectively. This approach also ensures that even if one layer is compromised, there are additional layers that can help contain the threat and prevent further damage.This is where the "Security Onion" comes in - a concept that represents a layered approach to cybersecurity defense.

The Security Onion comprises three layers: the outer layer, the middle layer, and the inner layer. Each layer serves a different purpose and uses different tools and techniques to prevent, detect, and respond to cyber threats.

The outer layer, also known as the perimeter layer, is focused on preventing cyber threats from entering the network. This layer includes tools such as firewalls, intrusion prevention systems, and security gateways that monitor and control incoming traffic. By using these tools, organizations can block known threats and suspicious traffic before it can enter the network.

The middle layer, also known as the detection layer, is focused on detecting cyber threats that have bypassed the outer layer. This layer includes tools such as security information and event management (SIEM) systems, intrusion detection systems (IDS), and network traffic analysis tools. These tools analyze network traffic and system logs to identify suspicious activity, such as unauthorized access attempts or unusual data transfers.

The inner layer, also known as the response layer, is focused on responding to cyber threats that have been detected. This layer includes tools such as endpoint detection and response (EDR) systems, security incident and event management (SIEM) systems, and incident response plans. These tools are used to contain the threat, investigate the incident, and recover from the attack.

To effectively use the Security Onion, organizations must implement a comprehensive cybersecurity strategy that incorporates all three layers. This means investing in the appropriate tools and techniques for each layer, and ensuring that they work together seamlessly.

In addition to having the right tools, organizations must also implement best practices to ensure that the Security Onion is effective. For example, organizations should regularly review and update their security policies, conduct employee training on cybersecurity awareness, and perform regular security assessments to identify vulnerabilities and improve their cybersecurity posture.

In conclusion, the Security Onion is a powerful concept that can help organizations achieve a more robust cybersecurity defense. By understanding the three layers of the Security Onion, and implementing the right tools and best practices for each layer, organizations can significantly reduce their risk of cyber threats and protect their valuable data and assets. By performing penetration tests, risk evaluations, & ethical hacks on local area networks, wide area networks, & virtual private networks, security engineers safeguard a business from security risks.

This course is designed to make students aware about cyber security and cyber attacks.

8 WEEKS INTERNAL INTERNSHIP **PROGRAM**

1. Students will be able to learn how different tools of security onion can be used.
2. To understand the concept of cyber-attacks and how to detect and prevent the attacks

Who can Join?

UG / PG / Research Scholar from any engineering domain

Name of the Faculty:

Prof (Dr.) Subhrendu Guha Neogi, Department of CSE, The Neotia University,
Contact number: 7980801480, Email: subhrendu.guhaneogi@tnu.in

Maximum Intake:

30 students

Duration of the Internship:

8 weeks (2 days in a week)

Mode of Operation:

Online/Offline

Topics to be Covered ⫸

1. Understand User management, Firewall management
2. Learning Berkeley Packet Filters, Zeek, Suricata, Elasticsearch, Logstash, Redis, LVM, Alert management
3. Grid Management, Monitoring and Tuning
4. Implement, verify, and troubleshoot Cyber Security Tools using Security Onion

Outcome of the Project ⫸

1. This course will teach you more about the concepts, consequences, distinctions, and limitations of ethical hacking. The extensive curriculum covers a wide range of topics, including the principles of ethical hacking, reconnaissance tools, footprinting techniques, network scanning, IDS/Firewall evasion techniques, vulnerability risks, social engineering, SQL injection, web server attack methodologies, and more.
2. In this course, you will learn vulnerability assessment techniques like scanning, checking configuration, architecture correlation, and mapping of attacks to evaluate the efficacy of defense-in-depth architecture. Finally, create a risk report using thread modeling to prioritize and carry out risk management actions and stimulate the resolution of process and technological gaps.
3. In this course, you will learn vulnerability assessment techniques like scanning, checking configuration, architecture correlation, and mapping of attacks to evaluate the efficacy of defense-in-depth architecture. Finally, create a risk report using thread modeling to prioritize and carry out risk management actions and stimulate the resolution of process and technological gaps.

Note: Successful candidates will be provided certificate.

8 WEEKS INTERNAL INTERNSHIP **PROGRAM**

Designing Cloud SDN with Blockchain Technologies

Course Objective

Blockchain (BC) and software-defined networking (SDN) are leading technologies which have recently found applications in several network-related scenarios and have consequently experienced a growing interest in the research community. Indeed, current networks connect a massive number of objects over the Internet and in this complex scenario, to ensure security, privacy, confidentiality, and programmability, the utilization of BC and SDN have been successfully proposed. In this course, we will discuss two recent research trends and review the related state-of-the-art literature. We first describe the main features of SDN technology and discuss their most common and used variants. Furthermore, we envision the integration of such technologies to jointly take advantage of these latter efficiently. Indeed, we consider their group-wise utilization—named BC–SDN—based on the need for stronger security and privacy. This course is designed to make students aware about use of blockchain for SDN.

1. Students will be able to learn different types of SDN Architecture.
2. To understand the concept of blockchain to ensure security for cloud SDN

Who can Join?

UG / PG / Research Scholar from any engineering domain

Name of the Faculty:

Prof (Dr.) Subhrendu Guha Neogi,
Department of CSE, The Neotia University,
Contact number: 7980801480, Email: subhrendu.guhaneogi@tnu.in

Maximum Intake:

30 students

Duration of the Internship:

8 weeks (2 days in a week)

Mode of Operation:

Online/Offline

Topics to be Covered

1. History and evolution of SDNs
2. SDN control and data plane
3. Challenges and opportunities in the architectural paradigm
4. OpenFlow/SDN control

8 WEEKS INTERNAL INTERNSHIP **PROGRAM**

5. Different SDN controllers
6. The tradeoffs of using different SDN controllers
7. Using SDN to customize control-plane behavior
8. network virtualization in software defined networking
9. Cloud virtualization in software defined networking
10. Programmable data planes involve new types of technology
11. SDN-based control and virtualization
12. OpenFlow's design flow
13. Design a control protocol with the benefit of being able to change the data plane.
14. Explore how SDN can be used to solve problems in various networking domains. branch office network.
15. Security features of SDN
16. Security Cloud SDN with Blockchain

Outcome of the Project

1. This course will teach you about SDN Technology.
2. In this course, you will learn vulnerability assessment techniques of SDN.
3. In this course, you will learn the use of blockchain for SDN Cloud.

Note: Successful candidates will be provided certificate.

8 WEEKS INTERNAL INTERNSHIP **PROGRAM**

Low Power Chip Design.

Course Objective

During the Semicon India conference held from July 28 to 30, 2023, Micron, a US-based chipmaker revealed its plan to invest USD 2.7 billion to develop a new chip design assembly and test facility in Gujarat, which will serve as the centre for the manufacturing of DRAM and NAND products. The hub will cater to both domestic and international markets and will directly create 5,000 jobs and over 15,000 community jobs in the coming years as reported by Insight Inquiries on 1st August 2023. Therefore, it is expected that substantial employment prospects will result from this decision, which will require proper skilled up manpower. In order to address the same here we are offering the internship program on "Low Power Chip Design".

The Low Power Chip Design Internship Program spans eight weeks, providing participants with comprehensive knowledge and practical skills in digital circuitry, low power design and verification methodologies. Through a blend of theoretical sessions, lab exercises, and real-world projects, interns will develop a strong foundation in chip design technologies.

Using commercial CAD tools, interns will work on cutting-edge low power chip design projects, gaining expertise in areas such as knowledge of IC design, hands on experience of designing IC chips, future of Low Power IC technology, hands on project experience of designing low power ALU chip and verification using SPICE netlist programming. This practical experience will enhance their problem-solving abilities, critical thinking, and teamwork skills.

Who can Join?

UG / PG / Research Scholar from CSE, Robotics, ECE, Electrical engineering domain

Name of the Faculty:

Biswarup Mukherjee,
Department of Computer Science & Engineering, The Neotia University,
Contact Number: 7003581174, Email: biswarup.mukherjee@tnu.in

Maximum Intake:

30 students

Duration of the Internship:

8 weeks

Mode of Operation:

Online/Offline

8 WEEKS INTERNAL INTERNSHIP **PROGRAM**

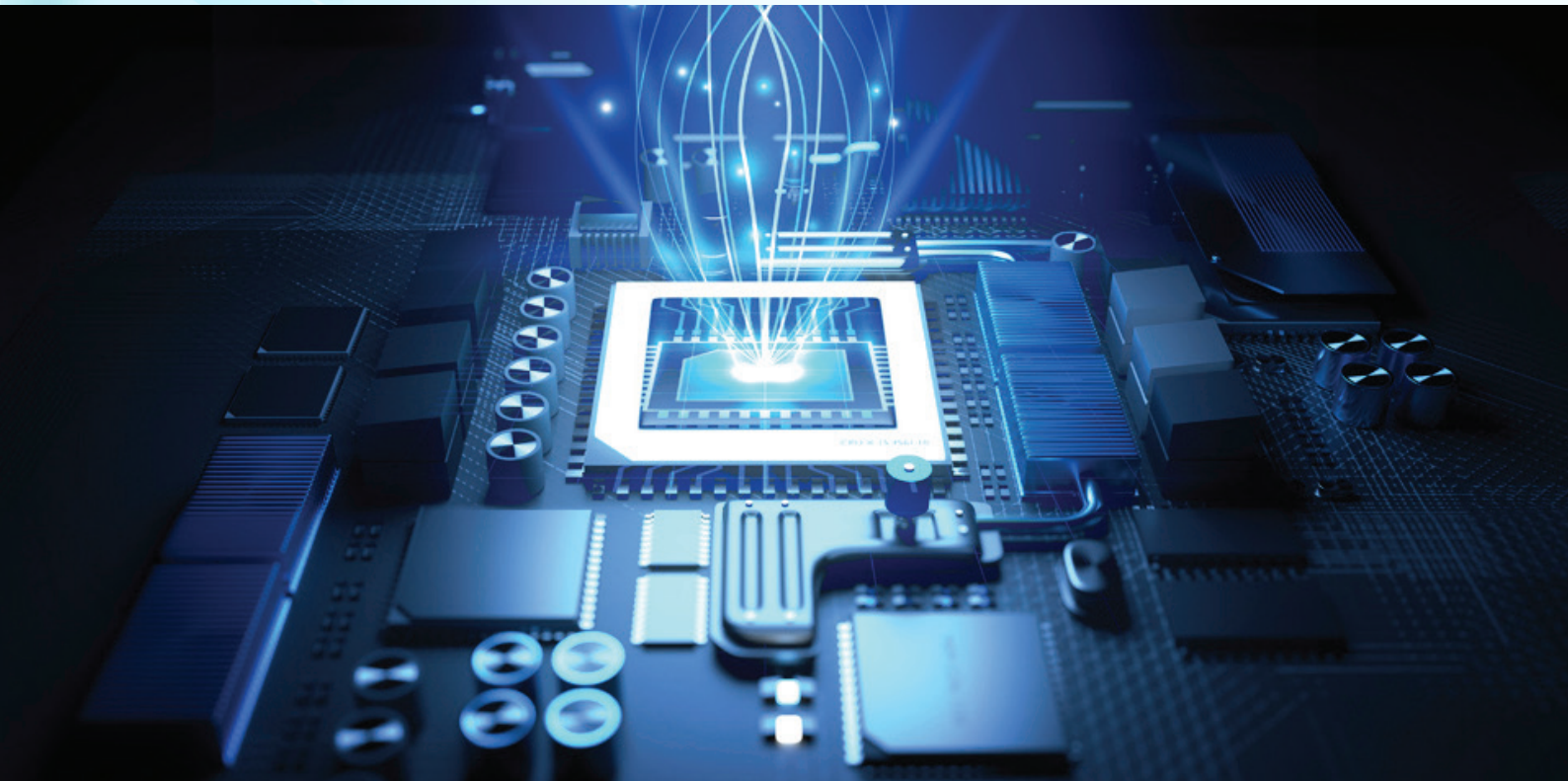
Topics to be Covered

1. Introduction to Chip design technology
2. Basics of digital gates IC design
3. Hands on experience of designing CMOS gates in schematic editor CAD tool
4. Understanding SPICE program netlist.
5. Testing of chips in functional domain. Measurement of power, latency etc.
6. Hands on experience on designing customized IC layout using layout editor CAD tool.
7. Project on designing low power ALU chip using modular approach
8. Future of low power chip design

Outcome of the Internship

1. Participants will learn the background and significance of the chip design.
2. They will come to know the various approaches of the low power chip design and will be aware the clustering of various tools used in chip design and testing.
3. Participants will also learn SPICE programming language
4. They will be skilled up for the booming market led by India Semiconductor Mission.

Note: On completion of the eight weeks long internship, successful candidates will be provided a certificate.



8 WEEKS INTERNAL INTERNSHIP **PROGRAM**

Full Stack Web Development with Security.

Course Objective

- Understand the principles of creating an effective web page, including an in-depth consideration of information architecture.
- Become familiar with graphic design principles that relate to web design and learn how to implement theories into practice.
- Develop skills in analyzing the usability of a website.
- Understand how to plan and conduct user research related to web usability.
- Learn the language of the web: HTML5, CSS, JAVASCRIPT, PHP, and BOOTSTRAP,
- Learn CSS grid layout and Flexbox.
- Learn techniques of responsive web design, including media queries.
- Develop basic programming skills using Javascript.
- Be able to embed social media content into web pages.
- Students will learn the security of the websites from multiple perspectives.

Who can Join?

UG / PG / Research Scholar from CSE, Robotics Engineering, ECE, Electrical Engineering domain.

Name of the Faculty:

Bilas Haldar, Department of Computer Science & Engineering, The Neotia University, Contact Number: 9735742282, Email: bilas.haldar@tnu.in

Maximum Intake:

30 students

Duration of the Internship:

8 weeks

Mode of Operation:

Online/Offline

8 WEEKS INTERNAL INTERNSHIP **PROGRAM**

Topics to be Covered

1. Introduction to **HTML5** tags and attributes: Main root - Document metadata- Content sectioning- Text content Frames and tag attributes - HTML Tables- HTML form.
2. Introduction to Cascading Style Sheets **(CSS)** - Anatomy of a Style Applying Styles- Linking to an External Style Sheet, Padding, Layout.
3. Introduction to **JavaScript:** Using JavaScript to Show an Alert- JavaScript Errors and Debugging- Building a JavaScript Clock - Using JavaScript to Hide and Show Content- Building a Custom Video Player.
4. Introduction to **PHP**- Syntax of PHP, Embedding PHP in HTML, Reading Data from a file, Managing Sessions and Using Session Variables Destroying a Session.
5. **MySQL**- create, alter, drop, insert, update, view, select, order by, group by, aggregate function.
6. Responsive Design and **Bootstrap**
7. Introduction to **website security:** Website Cloning, SQL injection, Brute force, File inclusion, Insecure CAPTCHA, File upload, Command Injection.
8. Project work on HTML5, CSS, JAVASCRIPT, BOOTSTRAP, MySQL, and PHP.

Outcomes of the Internship

1. Discover how websites really work, and what makes websites work.
2. Simple and impressive design techniques, from basics to advanced to focus on goal-oriented and user-centric designs.
3. How to and where to start research, planning for a website & actually building excellent websites.
4. To create web elements like buttons, banners & bars, and of course complete UI designs.
5. Forms and validations for your website.
6. Setting up page layout, color schemes, contract, and typography in the designs.
7. Use of the Content delivery network to develop Responsive web pages using Bootstrap 4.0/ 5.0
8. Be able to provide security for the websites from multiple perspectives.

Note: On completion of the eight weeks long internship, successful candidates will be provided a certificate.

8 WEEKS INTERNAL INTERNSHIP **PROGRAM**

A joy of learning Python towards implementation of machine learning applications.

Course Objective

This course is for those who are looking forward to pursuing an internal internship that involves using Python for machine learning models and app development. Here's a more detailed plan tailored to your specific interests. Keeping the current proficiency in Python of the students, machine learning, and app development can be a challenging area towards completion within 8 weeks of due date. Set clear learning objectives are required for the internship, such as gaining hands-on experience in building and deploying machine learning models within a mobile app.

Students need to collaborate with mentor or supervisor to define a goal-oriented project. For instance, they work on a project to develop a mobile app that incorporates a machine learning model. The project involves the following steps, such as:

1. **Data Collection and Preparation:** Machine learning projects involve, identify and gather relevant datasets. Preprocess and clean the data to make it suitable for training models.
2. **Data modeling:** Depending on the chosen machine learning task, design, train, and fine-tune the models using Python libraries.
3. **App Development:** Begin developing the mobile app using a suitable framework
4. **Documentation and Presentation:** Create comprehensive documentation detailing the app's architecture, code base, machine learning models, and deployment process. Prepare a presentation to showcase the project's features, technical details, and outcomes.
5. **Define Future Scope:** Reflect on what the students have learned and achieved during the internship. Consider how they can further develop their skills in Python, machine learning, and app development. Explore opportunities to contribute to ongoing projects or explore new areas of interest.

Who can Join?

UG / PG students of CSE.

Name of the Faculty:

Dr. Sutapa Chatterjee Sarkar,
Department of Computer Science & Engineering, The Neotia University,
Contact Number: 9831543575, Email: sutapa.chatterjeesarkar@tnu.in

Maximum Intake:

20 students

8 WEEKS INTERNAL INTERNSHIP **PROGRAM**

Duration of the Internship:

8 weeks (2 days in a week)

Mode of Operation:

Online/Offline

Topics to be Covered

1. Introduction to Basics of Machine learing life cycle and all about basics of Python.
2. a) Acquiring data sets from Kaggle or Github as per project
   b) Running sample projects in google colab
3. Learning of python libraries for
   a) File handling operations, b) Plots, c) Pre-cleaning, c) Modelling, d)Testing
4. Introduction to different machine learning models for executing the targeted task.
5. Introduction to App development techniques with Python.
6. App development with Python.
7. Submit Project and demonstrate.

Outcome of the Project

1. Students will learn the background and significance of Machine learning.
2. They will come to know about the various techniques for preprocessing, modeling and plotting techniques. Henceforth, calculation of efficiency of the model.
3. Students will also learn to develop an app.
4. They will learn to understand structural & functional concepts of models to app development.

Note: Successful candidates may be provided certificates.

8 WEEKS INTERNAL INTERNSHIP **PROGRAM**

IOT based Shop-floor security system to detect and protect against unhealthy gas leakage.

Course Objective

This project is aimed to develop a low-cost security system that can be used to detect gas leakage and automatically put an alarming message to the concerned person through mobile device. The system can also be enabled for alarming others locally during daytime at the time of emergency. It can be 100 % useful to protect against accident in any Industry or it can be used in domestic purpose for mainly LPG gas detection. This idea can be extended resulting a well-equipped automatic lifesaving security system. In this regard, the current project aims to investigate and work on the active parts of a system attempting to detect gas leakage of some unhygienic gases like liquefied petroleum gas (LPG), Carbon monoxide, Methane etc. Thereafter, the following product-oriented idea can also be exploited for customized products for various gas leakage.

1. To complete the hardware-software co-design of the IOT based product
2. To make the complete unit to develop a prototype

Who can Join?

UG / PG students of CSE.

Name of the Faculty:

Dr. Sutapa Chatterjee Sarker, Department of CSE, The Neotia University,
Contact Number: 9831543575, Email: sutapa.chatterjeesarker@tnu.in

Maximum Intake: 20 students

Duration of the Internship: 8 weeks (2 days in a week)

Mode of Operation: Online/Offline

Topics to be Covered

1. Design and simulate through circuit-based simulator, 2.To design the basic unit with Microcontrollers (Only on bread board level), 3.To put connectivity with WI-fi module, 4. To design a PCB & to make the cabinet (optional)

Expected outcome of the Project

1. Students will learn the background and significance of IOT in product development.
2. They will come to know about the various techniques for developing IOT based products.
3. Students will also learn to develop a marketable product.
4. A paper publication (optional)

Note: Successful candidates may be provided certificates.

8 WEEKS INTERNAL INTERNSHIP **PROGRAM**

Offering Department	Offering Stream
Computer Science	Data Science

Data analytics using Python

Name of the Faculty:

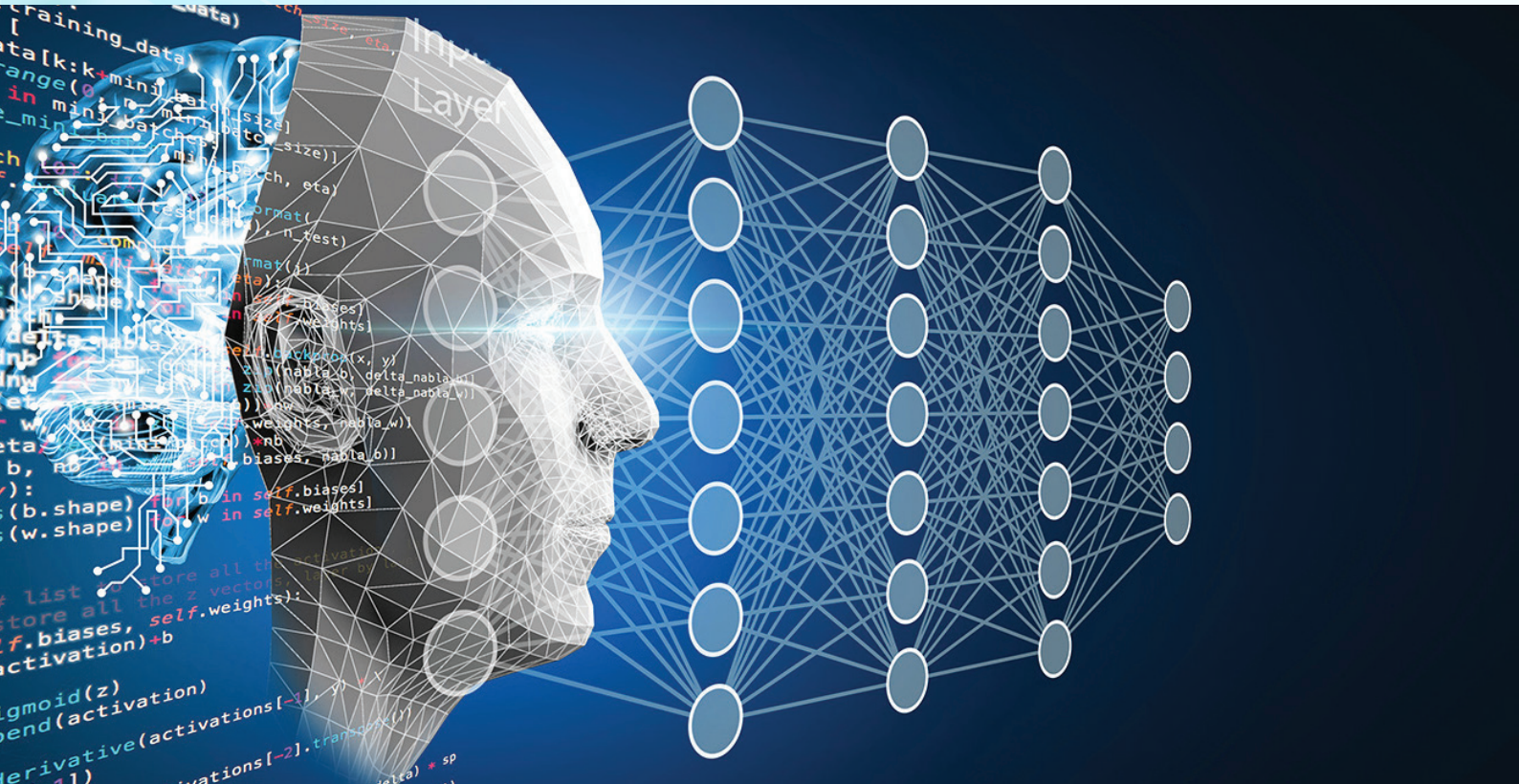
Jaydeb Mondal,
Contact Number: 7439042857

Origin of Research

Data analytics is at the core of computer science. Availabilities of various packages in python made processing and managing Big data a reality. In this internship, the focus will be to introduce students various packages available in python that are highly used in industries to make decision on different types of problems. Various case study based applications will be explored to solidify the understanding and need of data analytics

Expected Outcomes

1. Students will become expert in Python Programming.
2. Students will become familiar with the techniques of Processing and Analyzing large amounts of data.
3. They can solve real life problems with high precision in different application areas like Agriculture, Medical Imaging, Predicting weather, stock market etc.



INTERNAL INTERNSHIP **2023 WINTER**

KMS design and implementation using Php and MySQL

Name of the Faculty:

Mr. Sandipan Chakravorty, Contact Number: 7439042857

Introduction

This 8-week course provides a comprehensive introduction to web development using PHP and MySQL, with a focus on creating a practical Knowledge Management System (KMS). Participants will learn to build dynamic web applications, design databases, implement user authentication, and integrate content management features.

Target Audience

This course is suitable for B.Tech 3rd and 4th Year students and aspiring web developers from other domains interested in learning PHP and MySQL. Prior coding experience is required. Special emphasis on 3- tier architecture and design patterns would be an advantage. Participants should be motivated to develop a practical project and have 2-3 hours per week to dedicate to learning and practical activities.

Mode of Execution:

Project Based in Hybrid mode.

Duration: 8 weeks

Weekly Commitment: 2-3 hours

Max Student strength: 30

Outcome

Upon completing this course, participants will be able to:

- Understand the significance of Knowledge Management Systems (KMS).
- Develop web applications using PHP and interact with MySQL databases.
- Implement user authentication, roles, and permissions.
- Build a functional KMS with features like content search, categorization, and version control.
- Develop a user-friendly frontend interface with dynamic content editing.
- Debug, optimize, and deploy web applications while considering security aspects.

Course Structure / Plan

	Topics Covered	Practical Activities	Assignments/Quizzes
1	Introduction to KMS and its importance	Understand the purpose of a KMS	Quiz on KMS fundamentals
	Introduction to PHP and Web Development	Set up development environment	
	Basics of PHP syntax and variables	Write basic PHP scripts for KMS	
	Setting up a local server and database	Set up Apache, MySQL, and PHP	

INTERNAL INTERNSHIP **2023 WINTER**

	Topics Covered	Practical Activities	Assignments/Quizzes
2	Introduction to MySQL and Database Basics	Create a MySQL database for KMS	Assignment on designing DB schema
	Writing SQL queries for data manipulation	Insert, update, and retrieve KMS data	
	Building basic CRUD operations	Implement CRUD for KMS content	
3	KMS Content Structure and Design	Design the structure of KMS content	Quiz on KMS content design
	Defining database tables and relationships	Create necessary tables and relationships	
	Formulating data entry forms	Develop forms for entering KMS content	
4	Implementing User Authentication	Create user registration and login system	Assignment on user authentication
	Designing user roles and permissions	Set up roles and permissions for users	
	Integrating user profiles	Develop user profile functionality	
5	Search and Retrieval of KMS Content	Implement search functionality	Quiz on KMS content retrieval
	Building category and tagging systems	Develop systems for categorization	
	Advanced SQL queries and optimization	Optimize queries for content retrieval	
6	Content Editing and Version Control	Implement content editing and versioning	Assignment on content editing
	Tracking and managing content revisions	Develop revision history and tracking	
	Enabling content approval workflows	Create approval processes for content	
7	Frontend Development for KMS	Design and implement the KMS interface	Quiz on KMS frontend development
	Building navigation and layout	Develop navigation and layout structure	
	Incorporating rich text editors	Integrate editors for content creation	
8	Testing, Debugging, and Deployment	Test and debug the KMS application	Final project submission and presentation
	Security considerations and best practices	Implement security measures for KMS	
	Deploying the KMS application	Deploy the KMS project to a server	

PROPOSED INTERNSHIP **PROGRAM**

Offering Department	Offering Stream
Robotics	Entire Department

Fundamental of Robotics to Mobile robotics for Smart Farming

Name of the Faculty: Md. Kamaruzzaman & Dr. Prabin Jha

Objective

Here are the objectives of the Internship program on "Fundamentals of Robotics" presented in below:

- Provide participants with a comprehensive overview of robotics, including its history, applications, and its role in various industries.
- Familiarize participants with the fundamental principles of robotics, covering key components such as sensors, actuators etc.
- Equip participants with essential programming skills to control and automate robotic systems, including hands-on experience.
- Introduce participants to the principles of robot motion, kinematics, and the techniques involved in planning and controlling robot movements in different environments.
- Provide practical, hands-on experience through mini-projects.

Expected Outcomes

- Participants will develop a solid understanding of key robotic principles, terminologies, and components, enabling them to engage in meaningful discussions and further studies in the field.
- Participants will acquire foundational groundwork for practical implementation in various robotic applications.
- Through hands-on exercises, participants will gain familiarity with assembling, configuring, and controlling robotic systems, enhancing their practical skills in a controlled environment.
- The training will serve as a stepping stone for participants to explore more advanced areas of robotics, setting them on a path towards advanced learning, specialization, or career opportunities in the robotics and automation industry.

Prerequisite (if any)

Participants should possess basic technical aptitude, computer literacy, and a foundational understanding of mathematics and physics. Prior experience in robotics is not required, but an eagerness to learn and a personal laptop for hands-on activities are essential.

Workflow

1st Week	2nd Week	3rd Week	4th Week
comprehensive overview of ro	fundamental principles of robotics, covering key components such as sensors, actuators etc.	Equip participants with essential programming skills to control and automate robotic systems, including hands-on experience	Equip participants with essential programming skills to control and automate robotic systems, including hands-on experience
5th Week	**6th Week**	**7th Week**	**8th Week**
Introduce participants to the principles of robot motion, kinematics	hands-on experience through mini-projects	hands-on experience through mini-projects	hands-on experience through mini-projects

INTERNAL INTERNSHIP **PLAN**

PLC Based Intelligent Traffic Control System using Sensors

Origin of Research

Due to increasing population, the utilization of vehicles is increasing in large numbers. There are numerous vehicles that keeps running on the streets in the same time, as a result of this the traffic issues are being confronted. Traffic signals are the most convenient way of controlling traffic in a busy junction. In many cases, we see that these signs fail to control the traffic successfully when a specific path has got more traffic than alternate paths. This circumstance makes that specific path more crowdie than alternate paths. In the conventional traffic control system, it may be observed that the time for which the signal light is glowing for a particular road will be always constant. Handling traffic manually in such regions involves constant manpower with continuous monitoring with conventional hard-wired controlled systems, which makes the system more complicated and difficult. In this traffic light control system project, we are using traffic density control so that we will be able to monitor the traffic density and control the delay of the traffic signals automatically. The traffic density is done by counting the number of vehicles in each lane and their weight. There will be four sensors in four different lanes, when car passes through the sensor it will collect the weight details of the vehicle by sensing. It calculates the vehicle densities in a lane at a 4-way lane cross and then gives the priority to each vehicle automatically using the PLC programming algorithm. The lights [green, yellow, red] ON & OFF time is determined depending on the density of the vehicles.

Name of the Faculty:

Mr. Manshankar Mitra, Department of Robotics and Automation, The Neotia University, Contact Number: 9351042966, Email: manshankar.mitra@tnu.in

Expected Outcomes

With the help of this PLC system the Traffic System can be controlled autmatically

Prerequisite (if any)

Knowledge of PLC Controller system

Session	Week Wise	Activity
Session 1	Week	Literature review
Session 2	Week 2-3	Try to construct a design methodology.
Session 3	Week 4-5	Hardware implementation
Session 4	Week 6-7	Software implementation
Session 5	Week 8	Check out the problem and try to explore the whole system.

INTERNAL INTERNSHIP **PLAN**

PLC based Automatic Dam Shutter Control System

Origin of Research

Dam is a barrier that stops or restricts the flow of water or underground streams. Dam is also used to collect water or for storage of water which can be evenly distributed among different locations. The farmers are dependent on seasonal rain and after that bore-well water for their crops. The dams have tremendous potential for economic upliftment and growth. They can help in checking floods and famines, generate electricity and reduce water and power shortage, provide irrigation water to lower areas, provide drinking water in remote areas. Dams are typically constructed with a drain or similar mechanism to control water levels in an impoundment for normal maintenance or emergency purposes. A disaster is any event that causes great harm or damage, serious or sudden misfortune. Dam failures clearly fit this definition. This dam shutter open/close system using plc will overcome such circumstances, it will manage the water level of the water reservoir automatically. At two different level, water is sensed according to which the gate is closed or open. That is when the water level goes above the threshold mark point level, door opens and it raises buzzer and the solenoid valve opens. When the water level goes down the door shuts automatically.

Name of the Faculty:

Mr. Manshankar Mitra, Department of Robotics and Automation, The Neotia University,
Contact Number: 9351042966, Email: manshankar.mitra@tnu.in

Expected Outcomes

With the help of this PLC system the Dam shutter can be controlled autmatically

Prerequisite (if any)

Knowledge of PLC Controller system.

Session	Week Wise	Activity
Session 1	Week	Literature review
Session 2	Week 2-3	Try to construct a design methodology.
Session 3	Week 4-5	Hardware implementation
Session 4	Week 6-7	Software implementation

PROJECT **PLAN**

Internship on Smart soil moisture, electrical conductivity monitoring device using sensors and microcontroller.

Origin of Research

Water stress and salinity are two major abiotic stresses due to their wide occurrence and high magnitude of their impact. Severe drought and high salinity could promote land desertification and salinization, processes which are rapidly increasing on a global scale. More than 10% of arable land has become decertified or salinized, and average yields of major crops have been reduced drastically. Salinity and drought stresses are physiologically related because both induce osmotic stress and most of the metabolic responses of stressed plants are similar. Water stress effects on plant growth and seed yield are genotype dependent and depend on the timing, duration, and magnitude of the water deficit. Salt stress adversely affects the growth of plants during all development stages. However, crops respond and perform differently when exposed to salinity, water stress and some can be tolerant. Therefore, selection and characterization of germplasm of different crops is needed to obtain salt tolerant with draught resistant crops. Salinity needs to be regulated through irrigation.

Name of the Faculty:

Mrs. Sangeeta Barua, Department of Robotics and Automation, The Neotia University, Contact Number: 9007290632, Email: sangeeta.barua@tnu.in

Expected Outcomes

Soil salinity and water stress are greatest harmful environment problems in agriculture. Both affects plant growth and crop production directly. These system Monitor the Effect of different level of soil moisture on salinity.

Prerequisite (if any)

Knowledge of Digital Electronics and C- language

Session	Week Wise	Activity
Session 1	Week	Literature review
Session 2	Week 2-3	Try to construct a design methodology.
Session 3	Week 4-5	Hardware implementation
Session 4	Week 6-7	Software implementation
Session 5	Week 8	Check out the problem and try to explore the whole system.
Session 3	Week 4-5	Hardware implementation
Session 4	Week 6-7	Software analysis

PROJECT **PLAN**

Monitoring Soil Nutrient by NPK Sensor with Arduino and Android Cell Phone Application.

Origin of Research

All growing plants need 17 essential elements to grow to their full genetic potential. Of these 17 elements, 14 are absorbed by plants through soil, while the remaining three come from air and water. Nitrogen, Phosphorus, and Potassium or in short NPK, are the primary nutrients in commercial fertilizers. Each of these fundamental nutrients plays a key role in plant nutrition. Nitrogen, Phosphorus, and Potassium are important to soil because; Nitrogen is used by plants for lots of leaf growth and good green color, Phosphorus is used by plants to help form new roots, make seeds, fruits, and flowers, while Potassium helps plants make strong stems and keep growing fast. A certain level of Soil nutrients like Nitrogen, Phosphorus, and Potassium should be maintained in the soil which is only possible if the measuring process is known.

Name of the Faculty:

Mrs. Sangeeta Barua, Department of Robotics and Automation, The Neotia University,
Contact Number: 9007290632, Email: sangeeta.barua@tnu.in

Expected Outcomes

To understand the excess and deficiency of NPK, three elements are not good for the plants. So, before planning to add the fertilizer first must take a few samples and check the Nitrogen, Phosphorus, and Potassium level using the Soil NPK Sensor.

Prerequisite (if any)

Knowledge of Digital Electronics and C- language

Session	Week Wise	Activity
Session 1	Week	Literature review
Session 2	Week 2-3	Try to construct a design methodology.
Session 3	Week 4-5	Hardware implementation
Session 4	Week 6-7	Software implementation
Session 5	Week 8	Check out the problem and try to explore the whole system.
Session 3	Week 4-5	Hardware implementation
Session 4	Week 6-7	Software analysis

For the initial tests, a temporary connection on the breadboard needed, first started with the Oled display module and displayed the Nitrogen, Phosphorus, and Potassium values on the Oled display module.

After performing the initial tests and once satisfied with the values, then start with the HC-05 Bluetooth module and displayed the NPK values on the Android cell phone application. Then connect the Oled display module, by this way monitor of the NPK values possible. Values can be measured in both the way, by using Oled display module and on the Android cell Phone application.

PROJECT **PLAN**

Internship on Smart Embedded System in Real Time Health monitoring system.

Objective

Embedded systems are one of the significant technological advances of the twenty-first century. A computer hardware and software combination that has been specifically created to carry out one or more specialized tasks as part of a larger system is known as an embedded system. Today, embedded systems are utilized in a variety of products, including Health monitoring system, digital gadgets (such as smartphones, tablets, etc.), appliances for the home, robotic systems, aviation, and space equipment. It goes without saying that the field of embedded systems is very broad and continues to grow every day.

Additionally, this course will give students the chance to put their project-based skills into practice. If you successfully complete this program, you should be able to find a rewarding position in the embedded systems industry.

These days, the advancement of inventions by healthcare professionals makes use of these technological devices. IoT devices are widely used in the field of medicine. An IoT-based health monitoring system is the subject of the study presented in this paper. In particular, there are fewer doctors in rural areas of a country territory than there are in urban areas for COVID-19 patients, high blood pressure patients, hypertension patients, diabetic patients, etc. Except for government medical facilities, medical equipment is scarce in rural areas. In comparison to government hospitals, these clinics see a higher percentage of patients. In a similar vein, the equipment has mostly come to an end. As a result, this hardware component will transmit a report to the appropriate party in the event of an emergency.

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Expected Outcomes

This internship presents the design and implementation of a smart health monitoring system. Users can choose their health parameters with this Internet of Things-based device, which may help them regulate their health over time. The patients might eventually seek medical help if they are in need. They could quickly and simply give the doctor access to their health parameter data through a single application. We all know that one of the most coveted solutions for health monitoring right now is the Internet of Things. The most crucial aspect is that any doctor can remotely check on any patient's health because it ensures that the parameter data is secured inside the cloud.

PROJECT **PLAN**

Prerequisite (if any)

Knowledge of c programming and Basics of electronic Device

Session	Week Wise	Activity
Session 1	Week 1	Introduction to Embedded system
Session 2	Week 2	Digital Input Programming
Session 3	Week 3	Digital Output Programming
Session 4	Week 4	Sensor Interfacing
Session 5	Week 5	Motor Interfacing
Session 3	Week 6	Interfacing with LCD, Relay, ADC, DAC, Keypad
Session 7	Week 7	PWM Generation, Serial Communication, GPS, GMS, Bluetooth interfacing
Session 8	Week 8	Project Work