

Birla Institute of Technology & Science (BITS), Pilani
Practice School Division
Practice School-I course (May 28th – July 23rd, 2024)
PS Chronicles (Electronics)
(A compilation of student experience during PS-I)



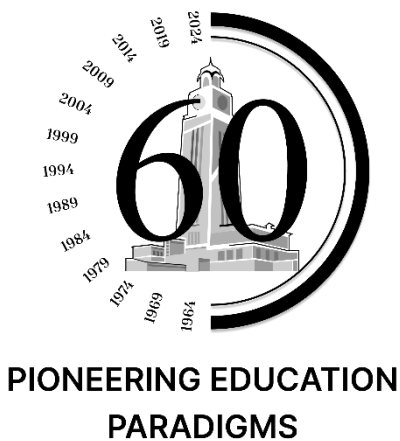
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From the Desk of the Editor

It is my great pleasure to bring forth the 6th edition of the PS-I Chronicles. This edition features over 1059 articles from PS-I students sharing their experiences during summer 2024.

The basic premise behind the release of PS-I Chronicles is to document the PS-I learning experience of students keeping the below objectives in view.

- To provide more information on the learning experiences by immediate senior students and PS-I faculty about stations, and thereby enlightening the learning opportunity among the student community.
- To provide the faculty with the enhanced information about the type and nature of work carried out at the organization.
- To transform the knowledge gained at the organization into class room teaching and also to identify the scope of deepening the collaborations with organization.

The articles have been classified into six categories based on the industry domain.

- Chronicle 1: Information Technology
- Chronicle 2: Electronics
- Chronicle 3: Chemical, Mechanical, Cement, Textile, Steel, Infrastructure & others
- Chronicle 4; Health Care
- Chronicle 5: Finance and Management
- Chronicle 6: Government Research Labs

I would like to thank students for sharing their experiences during their stint at the organization. I would also like to thank Prof. Arun Maity, Prof. M. K. Hamirwasia and Dr. G Muthukumar for reviewing the articles and providing us the feedback. I would also like to extend my thanks to Mr. Om Prakash Singh Shekhawat, Mr. Shyam Sunder Saini and Mr. Varun Singh of the Practice School Division, of BITS, Pilani – Pilani Campus for their help in bringing out this edition of PS-I Chronicles.

I would be happy to receive any feedback regarding the Chronicles. Please feel free to email me at psd@pilani.bits-pilani.ac.in or at murugesan@pilani.bits-pilani.ac.in.

S. Murugesan

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PS-I station: Airports Authority of India (AAI), Delhi

Student

Name: DEEPANSHU JAIN (2022B2A81582P)

Student Write-up:

PS-I Project Title: Communication Navigation Surveillance

Short summary of work done: Coming to AAI, felt like a satisfactory achievement; soon turned out to be a lengthy but grateful experience. Getting to know about all the work that takes to make an airplane fly, and having a god-like supervision over all the flights feels exciting. We had the opportunity to interact with the ATC officials about their work and life, and about their future aspirations. We got to observe and study some most expensive equipments and servers in the country. The staff was helpful and knowledgeable about their fields. The only issue we faced was the course structure, they had less idea of what exactly to teach. If we asked questions, they were eager to teach, but it wouldn't have been a two-way communication if we hadn't asked, or participated in the PS. It is a good PS for Delhi residents, but might be avoidable for those living outside Delhi, or Noida side (transport issue).

Objectives of the project: To get thorough with the various units in the CNS department of the AAI.

Tool used: Specific Monitors and Equipments at the AAI

Details of papers/patents: None

Brief description of the working environment: The working environment is quite semi-formal like a modern government office. The staff is quite relaxed and with absolutely no worries (until and unless a technical fault). Certain expectations which weren't met, were of the visits to the ATC tower and the airport, it was felt that we could have been exposed to the ATC and airport equipments and officials and get more idea of the life and job there. Expectations like certain minimal privileges and communications with officials were hugely met.

Academic courses relevant to the project: Electrical Science, Electromagnetic Theory I/II, Nanochemistry, Mechanical Oscillations and Waves

Learning outcome: Robust equipments used to communicate, navigate and supervise aircrafts.

Level of redundancy and detail in every operation.

Recording each and every step in all operations.

Name: AMAN RAI (2022B5A30789P)

Student Write-up:

PS-I Project Title: Understanding the workings of the CNS (Communication, Navigation, Surveillance) Department

Short summary of work done: We visited the various units (VHF, Radars, AMSS, SMGCS, COPS) in groups according to the schedule. Though the officers in each of the units were mostly busy, they took out some time to give us a basic understanding of how the work is done in that unit - the various technologies, old and new used to that end. There were some lecture sessions to aid what we learn in the units.

Objectives of the project: To gain a first-hand understanding of the various units that constitute and help the CNS department serve essentially as the backbone of the civil aviation.

Tool used: Since there was no dummy hardware (all of it was in use, any tampering with which would be troublesome) for us to try our hands on, we were to only see, listen and understand as to how the various equipments work.

Details of papers/patents: N/A

Brief description of the working environment: The CNS department at Airport Authority of India is usually quite busy given the volumes of traffic they have to take care of at the Indira Gandhi International Airport. It was usually difficult for any instructors to take out time to give exhaust the depth of information, but we were mostly given a good basic understanding of what goes on. Since not all of us were from ECE and that we had only finished second-year courses limited our knowledge base that we could have used in seeing the practical use of those concepts. As this was the institution's first time, the two months' schedule and teaching material could've been better devised. There were many days where we had already exhausted what the units had to teach us and we'd sit idle.

Academic courses relevant to the project: Communication Systems, Electrical Machines.

Learning outcome: Practical application of various communication systems, radars, information technology, and power systems to maintain a robust infrastructure that manages air traffic from tower, approach to area regions of the airspace.

PS-I station: Allegro Microsystems, Hyderabad

Student

Name: KARTHIK PERIASAMY (2022B4AA0621P)

Student Write-up:

PS-I Project Title: Device characterisations in BCD process technology using industry standard simulation tool

Short summary of work done: We first learned how to use the software (cadence virtuoso). We learnt the basics of analog design and what it entails. There were also trainings on the company's products that was helpful.

Objectives of the project: Characterise NMOS, PMOS and DMOS devices and obtain data useful to analog design engineers.

Tool used: Spectre simulation on Cadence Virtuoso, excel

Details of papers/patents: Cannot disclose

Brief description of the working environment: Very good working environment. Very friendly team with a lot of bits alumni's. Flexible working timings and supportive environment.

Academic courses relevant to the project: Microelectronic circuits, electrical sciences

Learning outcome: Analog simulations, analog design, industry standard device specifications.

PS-I station: Areca Embedded Systems, Hyderabad

Student

Name: AMAN GUPTA (2022A3PS0344G)

Student Write-up:

PS-I Project Title: Development of Web application using Python

Short summary of work done: We made a group project using different routes in flask and implemented the back end using socket library

Objectives of the project: To develop a web app and integrate it with a smart coach

Tool used: VS Code

Details of papers/patents: None

Brief description of the working environment: Online station therefore pretty relaxed

Academic courses relevant to the project: Computer programming

Learning outcome: Knowledge of flask and socket libraries.

Name: [HANUSH NAGABHIRAM MUDUMBA \(2022A3PS0549H\)](#)

Student Write-up:

PS-I Project Title: Water level sensing module

Short summary of work done: Created a dynamic web application using Flask, Flask-SocketIO, and SQLite, featuring real-time updates and user data management. Utilized Flask-SocketIO to enable WebSocket support for live notifications. This included broadcasting updates to all connected clients upon form submissions and deletions. Designed and managed an SQLite database to store user information. Implemented database initialization scripts to create and maintain tables using SQLite. Developed routes for handling form submissions with Flask. Processed form data, inserted records into the database, and ensured data integrity with timestamp management. Implemented real-time notifications for data changes using WebSockets, ensuring instant updates across all client connections.

Objectives of the project: Design a flask API linked to a SQLite database and a UDP server.

Tool used: Languages: Python, HTML, CSS Frameworks: Flask, Flask-SocketIO Database: SQLite.

Details of papers/patents: NA

Brief description of the working environment: Working environment was online. We had a meet once a week and we had to do most of the research about the work ourselves.

Academic courses relevant to the project: None

Learning outcome: Learnt python, Learn about communication protocols, learnt API development using flask and python, learnt web design using html and css, learnt about databases.

Name: SREYASH SOMESH MISHRA (2022A8PS0676H)

Student Write-up:

PS-I Project Title: Smart Coach - Indian Railways

Short summary of work done: Designing an emergency call system for the Smart Coach (PICCU) in Indian Railways with a Flask application where users can both enter and view data with navigation buttons. It includes setup and configuration of the Flask app, database connection setup, routes and models. Built suitable template that displays all the entry data in a webpage in a sequence, recorded at different timestamps along with other functionalities.

Objectives of the project: Designing an Emergency Call System for the Smart Coach (PICCU) in Indian Railways.

Tool used: Visual Studio Code

Details of papers/patents: N/A

Brief description of the working environment: This was an online PS station. I had the opportunity to work in a highly supportive and collaborative working environment. We were provided with sufficient resources enabling efficient workflow. We used to have regular meetings and discussions.

Academic courses relevant to the project: No specific courses as such which are needed, but a basic knowledge of Python, HTML, CSS and JavaScript would help.

Learning outcome: Research on Smart coach IR, which includes OBCMS, Papis, Water level sensing module and ECS.

Name: NAMAN DIMRI (2022AAPS1547H)

Student Write-up:

PS-I Project Title: Developing LTE-R for Indian Railways

Short summary of work done: Created API app that lets any user to add a record in a database online.

Objectives of the project: Create Water Level Module and Emergency Call System for Smart coach.

Tool used: Microsoft Visual Studio Code

Details of papers/patents: N/A

Brief description of the working environment: The PS was online. The working hours were flexible. Deadlines were given and we had to complete the tasks allotted before the deadlines.

Academic courses relevant to the project: DBMS

Learning outcome: API development using Flask in Python

PS-I station: Centre for Development of Telematics (C-DOT), Bengaluru

Student

Name: ARUNAAV PADMAPATI (2022AAPS0240P)

Student Write-up:

PS-I Project Title: Implementation of PSS and SSS signals of 5G on an FPGA Board

Short summary of work done: The project initially involved the understanding and familiarisation of signals and deployment architectures of 5G telecommunications. We then proceeded to simulate a couple components of 5G Communications like Sequence Generation (PSS and SSS sequences), Modulation techniques (BPSK and QPSK Modulation Schemes), Cyclic Redundancy Check Algorithm and OFDM Symbol Generation on MATLAB. Finally, we attempted to create a block which would generate the PSS and SSS sequences according to the 5G Specification on a Zynq ZCU 111 FPGA board. This was done using Vivado and Vitis HLS.

Objectives of the project: To understand 5G deployment Architectures, different processes and signals involved in 5G Telecommunications

Tool used: Hardware - AMD ZCU Zynq 111 FPGA Board, Software - Vivado, Vitis HLS, VHDL Programming, MATLAB

Details of papers/patents: None

Brief description of the working environment: The working environment was great. Our mentor guided us throughout the entire process and the whole learning experience was very enriching. It wouldn't have been possible to complete as much as we did without the continuous support and guidance of the organisation, especially our mentor throughout our PS-1.

Academic courses relevant to the project: Signals And Systems, Digital Design

Learning outcome: MATLAB Simulation, VHDL Programming, Vivado, Vitis HLS, FPGAs.

Name: VEDANT DUTTA (2022AAPS0367H)

Student Write-up:

PS-I Project Title: Study of 5G telecommunications and implementation of PSS-SSS block on Xilinx Zynq zcu 111 FPGA board

Short summary of work done: The experience was incredible and we had got the best mentors possible. Srikanth sir and Narinder sir explained the core functionality of the various parts of the 5G architecture and spent about an hour doing the same almost everyday. Once we were familiar with 5G architecture, we moved on to implementing the PSS, SSS and PRACH signals on matlab and then self and cross correlating the results with inbuilt matlab functions for the same. We learn about the flow of downlink data, subcarriers, how band spacing worked and what the need for different modulation schemes and OFDM was. Then we implemented the PSS and SSS generation blocks on VHDL and simulated the block diagrams on Vivado. The next part of our project was writing the algorithm for the zero padding of PSS and SSS data that was BPSK/QPSK modulated to be fed into the IFFT block to get time domain samples of the frequency domain data. This last part of the project was written in C++ and then implemented into verilog code by the means of the VITIS HLS tool. Then we verified and tested the functionality that we had developed on an FPGA board. All in all, I think it is one of the best PS 1 options, you will learn a lot of cool stuff and also the peer group at cdot with my fellow interns and employees was great.

Objectives of the project: Understanding and implementing parts of the 5G network architecture.

Tool used: Vivado, Vitis HLS, matlab

Details of papers/patents: N/A

Brief description of the working environment: Had the best time at CDOT and Learnt a lot about how cutting edge new technologies like 5G are developed and implemented. The working environment is great, the timings are a bit strict, Saturday and Sunday are holidays and the employees are very passionate and helpful with regards to the work. You are given food in the food court.

Academic courses relevant to the project: Signals and systems, DSA, CP, FPGA.

Learning outcome: Usage of software such as MATLAB, Xilinx Vivado, Vitis HLS etc, Implementation of algorithms like CRC, modulation schemes like BPSK, QPSK and then eventually OFDM and IFFT.

PS-I station: Center for Materials for Electronics Technology (C-MET), Pune

Student

Name: PRANAV NAIR (2022A8PS0882G)

Student Write-up:

PS-I Project Title: Fabrication of a fet using mos2 bn te nanowires and measurement of its electrical properties using a cryostat dipstick setup

Short summary of work done: We designed photomasks for the fabrication process. We setup a cryostat from the ground up and made cryogenic measurements.

Objectives of the project: To explore uses of other materials in cryogenic applications

Tool used: FreeCAD, Python QCoDeS, 2D transfer setups

Details of papers/patents: NA

Brief description of the working environment: The scientist I was working under was extremely helpful and conducted meetings daily to teach us and to review our work.

Academic courses relevant to the project: Electronic Devices, Computer Programming

Learning outcome: Learned lab work and CAD

Name: APOORV VUPPULURY (2022AAPS0504H)

Student Write-up:

PS-I Project Title: Design and Analysis of FET Devices at cryogenic emperature, using MoS2, BN, and Tellurium wires

Short summary of work done: The relentless pursuit of miniaturization and enhanced performance in electronic devices has necessitated the exploration of novel materials and device architectures. This project focused on the design, fabrication, and characterization of MOSFET devices utilizing MoS2, BN, and Tellurium nanowires. A particular emphasis was placed on understanding the device behavior at low temperatures and exploring the potential applications of the Aharonov-Bohm (AB) effect.

Objectives of the project: The primary focus of this project is on the following objectives - 1) Exploring the potential of novel materials like MoS2, BN, and tellurium nanowires for low-temperature MOSFET development. 2) Develop functional MOSFET devices using three novel materi

Tool used: Python, FreeCAD< AUTOCAD

Details of papers/patents: NA

Brief description of the working environment: I'm grateful to my mentor/supervisors Dr. RANJIT KASHID and Dr. Ambadas Phatangare, and all the Quantum Measurements Lab Scholars for their warm reception, and guidance throughout. They entrusted me with being a part of their own research project, patiently guiding me through the initial challenges and helping me navigate complexities along the way. Their patience, flexibility, and trust in allowing us freedom to explore our research interests were instrumental to our successful transition from "Academia to Application".

Academic courses relevant to the project: ED, MEC, EG

Learning outcome: NA

PS-I station: Centre for Development of Advanced Computing, Centre in North East (C-DAC CINE), Cachar

Student

Name: KUMAR KRISHNA (2022A3PS0392P)

Student Write-up:

PS-I Project Title: Machine Learning Models to classify cancer data

Short summary of work done: During the first month of our internship, our team was tasked with studying research papers on the classification of oral and lung cancer based on Volatile Organic Compounds (VOCs). We delved into the methods used to identify VOCs specific to these cancers, including various separation techniques, the concentration of VOCs, experiment outcomes, sample space, performance parameters, and the advantages and disadvantages of these techniques. We also identified common VOCs across different cancers. In the second month, we shifted our focus to developing machine learning models for image classification of three cancer classes using a provided dataset. Additionally, we created decision tree classifiers using the tabular data from the dataset. We built these models on Google Colab, utilizing Python libraries such as NumPy, Pandas, TensorFlow, Pytorch etc. After training the models, we thoroughly analyzed their performance, including metrics like accuracy, precision, and recall, to further enhance and build a robust model.

Objectives of the project: To develop machine learning models to classify cancer data

Tool used: Google Colab, Python, Tensorflow

Details of papers/patents: The dataset used to test our ML models: <https://data.mendeley.com/datasets/bbmmm4wgr8/4>

The research paper describing the dataset: <https://doi.org/10.1016/j.dib.2023.109128>

Brief description of the working environment: The working environment was decent overall, with a flexible working schedule. We had meetings with our mentors twice a week, mostly on Mondays, where they asked us about the project status, and on Fridays, where they gave us tasks. The company expected us to show initiative. They valued clear communication and the ability to troubleshoot problems effectively. During PS-I, I learned to manage my time efficiently, collaborate with team members and got to know the industry standards.

Academic courses relevant to the project: Computer Programming, Machine Learning, Data Mining.

Learning outcome: I got an opportunity to enhance my skills in building machine learning models using Python libraries and analyzing the efficiency and results of the model.

Name: AASHAY AGARWAL (2022A3PS0427P)

Student Write-up:

PS-I Project Title: Designing a User Credential Management System

Short summary of work done: In this project, we created a system to manage user credentials. We built secure login and registration features, implemented password management tools, and set up access controls to ensure users have the right permissions. We also encrypted sensitive data, kept logs for security checks, designed an easy-to-use interface, made sure the system meets legal standards, and ensured it can handle more users and work with other systems.

Objectives of the project: The goals of creating a user credential management system are to make sure users can log in and register securely, manage their passwords easily, and have proper access controls. It also aims to protect sensitive data, keep activity logs for security check.

Tool used: Programming languages like Python, Java for development. Database such as MySQL for storing user data. Web server like Apache for hosting the application. Security tools for encryption and authentication, like SSL and OAuth. Version control systems like Gi.

Details of papers/patents: NA

Brief description of the working environment: Working Environment: The project was done remotely using online tools. We used Google Meet to communicate, GitHub to manage our code, and Jira to keep track of our tasks and progress.

Expectations from the Company: The company expected us to regularly update them on our progress, join virtual meetings, and meet project deadlines. We were also expected to keep a high standard of work quality.

Learning During the Project: During this project, we learned how to manage and coordinate a project while working remotely. We got better at using online tools for communication and collaboration. We also learned how to develop a secure and efficient user credential management system. This experience helped us improve our time management and self-discipline, as we had to stay organized and motivated without being in a physical office.

Academic courses relevant to the project: Introduction to Programming (CS F111)

Learning outcome: The major learning outcomes of the project include understanding secure authentication and access control practices, gaining skills in data encryption and user interface design, and learning how to ensure compliance with security standards while integration.

Name: A VINIL (2022A3PS1648H)

Student Write-up:

PS-I Project Title: Quantum Machine Learning Solution for Escape Routing Problems

Short summary of work done: During the PS-1 we learnt Quantum Computing, Machine Learning and Escape routing. We reviewed a paper on QML solutions to escape routing problems. First, we proceeded with implementing the model described in the paper. Afterwards, we decided to try a different approach, namely, Graph Machine Learning. The rationale behind it was that graphs are very complex structures for classical machine learning algorithms to process. So, Graph Neural Networks(GNN) provide a better alternative. We also used Qiskit and PennyLane to embed classical data into quantum states using CNOT and Rotational Z gates. At the last stage of the project we had gained a comprehensive understanding of the problem we were trying to solve and the solution to it. In future, we could possibly continue work on this as we learn more about GNNs. Additionally, we can work towards developing a quantum help hand to the GNN, namely, Quantum GNN which will advanced the ML and Quantum field.

Objectives of the project: To study hybrid quantum-classical machine learning models for finding optimal path in a dynamically changing graph of a disaster-affected city.

Tool used: Python, Tensorflow, Qiskit(Quantum Computing programming language by IBM), PennyLane (QML framework by Xanadu).

Details of papers/patents: Project Repository: <https://github.com/a-vinil/qml-escape-routing>

Brief description of the working environment: Work Environment: Since it was an online PS, I decided to create a work environment in my room, which I was very successful in doing.

Expectations from company: CDAC mentors guided us all way long. Though our meetings were less frequent after some time, the outcome of every meet was fruitful. CDAC could made this internship more structured and goal-oriented rather than giving us a freehand in deciding it. The project roadmap could have been developed at the start of the project rather than in the middle.

Academic courses relevant to the project: Computer Programming(CS F111), Mathematics II - Linear Algebra(F112).

Learning outcome: Hands-on experience in creating Machine Learning models, programming quantum circuits using Qiskit and PennyLane.

Name: MATU SUNDAR (2022A7PS0165P)

Student Write-up:

PS-I Project Title: Autonomous Vehicle Driving System

Short summary of work done: Used Computer vision to capture data and object identification, and used self-trained model to navigate the paths.

Objectives of the project: To make a fully functioning self driving vehicle program which when connect to a simulator, can drive and navigate paths on it's own.

Tool used: Python, Tensorflow

Details of papers/patents: None

Brief description of the working environment: Online, everything was decent, no issues.

Academic courses relevant to the project: Machine Learning, Computer Vision, Deep Learning.

Learning outcome: I learnt Computer Vision, Machine Learning.

Name: ASLESH SANDESH JAMBHALE (2022A8PS0589P)

Student Write-up:

PS-I Project Title: Dynamic Core Allocation in Network on Chip

Short summary of work done: Simulated and tested NoC Verilog codes on Vivado and developed a code which enables dynamic switching of cores

Objectives of the project: To design a reconfigurable switching system to connect router/core pairs to implement dynamic allocation of cores in a Network on Chip.

Tool used: Vivado

Details of papers/patents: None

Brief description of the working environment: As it was an online PS, I got to interact with only two personnel from the company. The mentors were quite patient with us and gave us enough time to complete the tasks from time to time. However I feel, they did not

guide enough which lead to difficulties in understanding the project. Overall it was a good experience and it was indeed great to work on the project.

Academic courses relevant to the project: Digital Design, Microprocessors and Interfacing.

Learning outcome: Learned simulating and testing hardware on Xilinx Vivado. Learnt Verilog coding and got to understand the architecture of network for communication in multi-core chips.

Name: [PARAMESWARAN IYER \(2022AAB40415H\)](#)

Student Write-up:

PS-I Project Title: Quantum Machine Learning Applications on Escape Routing Problems

Short summary of work done: Thorough literature review on work done in the field till date followed by part by part development and implementation of code for escape routing in graphs of real world cities. Graph data was obtained from OpenStreetMaps, processed and features were added like travel distance and time across edges. Further both quantum and classical neural networks were developed to determine the shortest path between two nodes, aiming to mimic the accuracy of Dijkstra's/A* algorithms but at lesser time. Further the graphs were made dynamic by implementing update functions to update edges in real time. Graph Neural Networks were studied along with dynamic GNNs to implement the solution. Quantum GNNs were also explored as a part of the same. A major part of the PS was utilized to learn various Quantum Computing principles along with literature revcie.

Objectives of the project: This project aims to study a hybrid quantum machine learning system that can be used as an efficient and real-time implementable solution to assist in evacuation during natural disasters, particularly earthquakes.

Tool used: Python, Pennylane

Details of papers/patents: NA

Brief description of the working environment: Online PS.

Academic courses relevant to the project: Computer Programming

Learning outcome: Development of GNNs and Dynamic GNNs for graphs. Development of Quantum circuits.

Name: HARIANSH JALAN (2022AAPS0323P)

Student Write-up:

PS-I Project Title: LLMs FOR LAW ENFORCEMENT AGENCIES

Short summary of work done: Started with the basic of LLMs and PEFT with special focus on LoRa and QLoRa. Went on to implement these on python.

Objectives of the project: Develop and implement AI models for FIR, evidence analysis, charge sheet drafting, evidence collection, analysis, and documentation to streamline the legal proceedings.

Tool used: Python, huggingface

Details of papers/patents: NA

Brief description of the working environment: Since the station was online, our mentor had regular meet with us where he took updates on the task he had assigned. He also created a whatsapp group so that we could send our queries in between these meets.

Academic courses relevant to the project: Computer Programming.

Learning outcome: Learnt about LLMs, Parameter Efficient Fine tuning.

PS-I station: Danlaw Technologies India Ltd., Goa

Student

Name: ANIMESH PAWAR (2022A3PS0211G)

Student Write-up:

PS-I Project Title: Surface Mount Technology manufacturing defects analysis

Short summary of work done: Built a Web based manufacturing defect analysis tool that takes in an auto-generated csv file from the manufacturing unit and outputs pareto analysis of the data on the page.

Objectives of the project: Analyse defects in Smt process

Tool used: Matlab, html, css, js, DataTables library

Details of papers/patents: NA

Brief description of the working environment: We were in special projects, so not much interaction with people other than mentor and unit head, company expects you to come up with a project you are comfortable working with.

Academic courses relevant to the project: Electrical sciences, probability and statistics, computer programming.

Learning outcome: Trends in SMT defects, insight in smt manufacturing.

PS-I station: Delhi Electricity Regulatory Commission, Delhi

Student

Name: SHIVAM BHATIA (2022B2A31405G)

Student Write-up:

PS-I Project Title: Delhi's Energy Sector: Regulatory Insights and Vehicle-to-Grid (V2G) Technology

Short summary of work done: Research and analyze the regulations involved in distribution of electricity and exploring V2G technologies' feasibility in Delhi. Gaining insights on regulatory side of electricity distribution and exploring new technology.

Objectives of the project: Research and analyze the regulations involved in distribution of electricity and exploring V2G technologies' feasibility in Delhi.

Tool used: None as such

Details of papers/patents: None

Brief description of the working environment: Working environment is that of a typical government office. The employees at the station are helpful but are always busy having meeting and other stuff so meeting with them is a tedious task.

Academic courses relevant to the project: None surprisingly, it was all legal paperwork stuff at the Organization. My mentor was kind enough to actually find something relevant to my degree.(each student had a different mentor)

Learning outcome: Gaining insights on regulatory side of electricity distribution and exploring new technology.

Name: PRAKHAR TEJASWA PRATAP (2022B4AA0719H)

Student Write-up:

PS-I Project Title: Regulatory Insights and Vehicle-to-Grid (V2G) Technology

Short summary of work done: This report presents a comparative analysis of open-access consumer policies with a focus on Delhi and other Indian states, particularly Gujarat. The study examines the regulatory frameworks, financial implications, and effectiveness of these policies in fostering a competitive electricity market. Key areas of investigation include the imposition of additional and cross-subsidy surcharges by the Delhi Electricity Regulatory Commission (DERC) and their impact on open-access consumers. The analysis highlights the rising trend of these surcharges in Delhi, which poses challenges to the adoption of open access, and contrasts it with the balanced approach of the Gujarat Electricity Regulatory Commission (GERC), which incorporates demand charges to mitigate financial pressures on distribution companies (DISCOMs). The report also explores potential policy improvements to enhance the viability and attractiveness of open access in Delhi, providing insights into regulatory compliance, consumer awareness, and grid modernisation. The findings aim to inform policymakers and stakeholders about best practices and propose recommendations for a more sustainable and equitable power sector.

Objectives of the project: Comparative Analysis of Open-Access Consumer Policies: Insights from Delhi and Other States.

Tool used: Google Docs, Google Sheets, Google Slides, ChatGPT, Google Gemini

Details of papers/patents: NIL

Brief description of the working environment: The working environment was nice and WiFi was given. The expectations from the company were quite high as they required us to report to them everyday and we were also supposed to maintain an attendance sheet and give it to our mentor.

Academic courses relevant to the project: Absolutely no academic course is relevant to the project, the project is of consultancy and policy-making.

Learning outcome: A comparative analysis of open-access consumer policies with a focus on Delhi and other Indian states. The study examines the regulatory frameworks, financial implications of these policies in fostering a competitive electricity market.

Name: HARMAN SINGH AHUJA (2022B5A31543G)

Student Write-up:

PS-I Project Title: Green Tariff

Short summary of work done: I first got to know what Green Tariff was and then I went through the tariff orders of 18 different states to find out the method they were using for calculating green tariff. I then summarised them into 8 categories and then using these methods and data from FY 2021-2022 for Delhi, I calculated the green tariff for Delhi and gave my recommendation among the 8 methods for the calculation.

Objectives of the project: To analyse different methods used by the different states for the calculation of green Tariff and then using these methods to find the Green Tariff for Delhi.

Tool used: Google Docs, Google Sheets

Details of papers/patents: None

Brief description of the working environment: The project and the work of the organisation was not related to engineering at all instead the major work of DERC was tariff calculation and regulations for the electricity market. The work given to me didn't teach me anything new related to my domain and was related to tariff. I learned about the regulations in the power sector in Delhi and how electricity tariffs and bills are calculated. The working environment was good, my mentor was very helpful and always cleared any doubts I had.

Academic courses relevant to the project: None

Learning outcome: Calculated the Green Tariff values for Delhi using the data of FY 2021-2022 that can be implemented in the future.

PS-I station: DRDO - Solid State Physics Laboratory (SSPL), New Delhi

Student

Name: SUHANI KHURANA (2022A1PS1328P)

Student Write-up:

PS-I Project Title: Optimisation and fabrication of thermo electric coolers

Short summary of work done: Different types of work , we used various equipments, learnt how to get closer to our desired results by hit and trial, overall working experience was very lite and good

Objectives of the project: To gain hands on learning on semiconductor materials / compounds and use them to fabricate nano devices like the thermoelectric cooler

Tool used: Only lab equipments and machines

Details of papers/patents: NA

Brief description of the working environment: Easy work , no homework or prior study / expertise required, minimal expectations.

Academic courses relevant to the project: Material science, solid state, semiconductor technology.

Learning outcome: Lab work, discipline, teamwork, how researchers and scientists carry out their work/experiments, patience.

Name: RAJAT PORWAL (2022A3PS0725H)

Student Write-up:

PS-I Project Title: Device Design Using ATLAS

Short summary of work done: During my Practice School, I did my learning towards the initial topics like III-V Semiconductor materials where the major focus was towards Gallium Nitride and Aluminium Gallium Nitride and their advantages over other Such materials. I further learnt about the basic structure of a HEMT and how it operates. I also learnt about the 2-Dimensional Electron Gas Phenomenon and the input and the output characteristics of such devices. I went through the basics of the ATLAS Silvaco like Meshing, Defining A Structure and understood the syntax based on making the structure and testing it using different functions specified in the software. Ultimately, I successfully

designed a structure and conducted thorough testing, further enhancing my understanding of semiconductor device simulation.

Objectives of the project: To understand the basic concepts of ATLAS to test certain devices.

Tool used: ATLAS

Details of papers/patents: NA

Brief description of the working environment: Working Environment in DRDO -SSPL is very amazing. The Mentors in the station are pretty supportive and they helped us in any situation . My mentor helped me understand the basics of the project in an easy manner and provided clear instructions for smooth flow of the project.

During the PS project done in the last 8 weeks , I was able to understand the changes brought in the industry regarding the field of the Field Effect Transistors and how can we work towards making better FETs as time progresses . I was also able to learn how the new softwares can help us build better Performance FETs.

Academic courses relevant to the project: Electronic Devices

Learning outcome: The project provided me with valuable experience using the ATLAS SILVACO software for designing various structures. I gained insights into the process of creating and testing structures under different conditions.

Name: AYUSH SINGLA (2022A3PS1234P)

Student Write-up:

PS-I Project Title: Silicon Carbide substrate formation

Short summary of work done: Learned the primary steps of fabrication of Silicon Carbide substrate in the laboratory. understood the cleaning process. Foresaw the PVT CMP method.

Objectives of the project: To understand and analyse the substrate fabrication of Silicon Carbide and alternative for Silicon.

Tool used: Laboratory equipment like PVT reactor, Multi- diamond saw.

Details of papers/patents: None

Brief description of the working environment: It was a good place to work. Had a lot of experienced as well as helpful working staff.

Academic courses relevant to the project: Electrical Science, Electronic Devices, Semiconductor Fabrication Techniques.

Learning outcome: Laboratory experience, working with direct professionals and scientists.

Name: SIDDHANT GOYAL (2022AAPS0260P)

Student Write-up:

PS-I Project Title: Photonic Integrated Circuits

Short summary of work done: During my PS-I at DRDO-SSPL, I focused on designing and simulating a Mach-Zehnder Interferometer (MZI) within a Photonic Integrated Circuit (PIC). My project aimed to create a compact and efficient MZI for optical communication and sensing applications. I began with a literature review to understand the principles and technologies related to MZIs and PICs. Using Ansys-Lumerical, I conducted simulations to model light behavior within the PIC, optimizing waveguide dimensions and materials to achieve desired performance. I also performed mathematical modeling to predict the device's behavior under different conditions, validating the models against simulation results. Throughout the project, I collaborated with my mentor and team members, gaining insights into practical photonic design and engineering processes. This experience enhanced my skills in simulation, design, and mathematical modeling, providing valuable hands-on experience in photonics.

Objectives of the project: To create a compact and efficient MZI for optical communication and sensing applications.

Tool used: Ansys-Lumerical, Matlab, Python

Details of papers/patents: NA

Brief description of the working environment: The working environment at DRDO-SSPL was collaborative and research-focused. The institute expected me to contribute to ongoing projects, document findings, and present results in regular progress meetings. I learned to balance theoretical knowledge with practical constraints, navigate real-world engineering challenges, and work effectively in a team. The mentorship and guidance from experienced professionals were invaluable in honing my technical skills. Overall, the PS-I internship at DRDO-SSPL has been a transformative experience, providing a solid foundation for my future career in photonics and integrated circuits.

Academic courses relevant to the project: Nanophotonics, EMT, DD, MuE

Learning outcome: Developed proficiency in Ansys-Lumerical for simulating and designing photonic integrated circuits, particularly Mach-Zehnder Interferometers. Enhanced mathematical modeling skills for predicting device behaviour. Strengthened collaboration, documentation.

Name: DIVYANSH VASHISHTHA (2022B4A30989P)

Student Write-up:

PS-I Project Title: Using EIT based Rydberg atoms for sensing and voltage standardization.

Short summary of work done: Quantum wireless sensing is a technology that utilizes principles from quantum mechanics for sensing applications, without the need for physical connections such as wires. It typically involves quantum phenomena such as superposition and entanglement to achieve highly sensitive and precise measurements of various physical quantities like magnetic fields, temperature, or pressure. This technology has the potential to revolutionize fields such as healthcare, environmental monitoring, and telecommunications by offering unprecedented accuracy and efficiency in data collection and analysis.

Objectives of the project: Research in areas of photonics (IC) and radio wave sensing.

Tool used: Python (ML)

Details of papers/patents: Nil

Brief description of the working environment: For Project 1, the duration is 8 weeks, so gate passes will not be provided. Electronic devices and pendrives are not permitted. Researchers will receive project reports from scientists and are required to visit the station three to four times a week.

Academic courses relevant to the project: Electronic devices, microelectronic circuits, communication.

Learning outcome: Areas of electronics and communication.

PS-I station: Eastern Regional Load Dispatch Center, Grid Control India, Kolkata

Student

Name: HIMANSHU KUMAR (2022A8PS0557P)

Student Write-up:

PS-I Project Title: Utilization of Battery Storage as Ancillary Services

Short summary of work done: Worked on a study project

Objectives of the project: Determine the scope of BESS in India and International practice

Tool used: Google Docs, Slides

Details of papers/patents: N/A

Brief description of the working environment: The PS station was part of their Internship Trainee Program which is intended for 3rd years, as a 2nd I was able to manage my expectations and the company also had similar expectations. They paired us with 3rd year students from other colleges to work on the project. The project was interesting and learnt quite a bit. Not very hectic and a good organization to work under if you want to work in the power/energy industry.

Academic courses relevant to the project: Power Systems, Electrical Machines

Learning outcome: Working of the Indian Power Grid and related organizations. Detailed functioning like scheduling, metering, analysis, etc.

PS-I station: Electronics Center of Excellence (e-COE), Bhubaneswar

Student

Name: YASH AMOL PATIL (2022A3PS0437P)

Student Write-up:

PS-I Project Title: Design of Analog circuit design in cadence environment

Short summary of work done: I delved deeply into Analog IC Circuit design using Cadence Virtuoso. Initially, I familiarized myself with the software and simulated basic digital circuits such as transmission gates and CMOS inverters. I plotted characteristic curves for NMOS and PMOS transistors and explored pass transistor logic, calculating and simulating delays and switching characteristics, including propagation delay and noise margin calculations for CMOS inverters. Advancing to analog circuits, I simulated common source amplifiers with and without degeneration, performing AC, DC, and transient analysis. I investigated the impact of varying parameters like temperature, width, and length of MOS devices. Throughout, my mentor provided daily tasks, guidance, and feedback, ensuring my understanding and progress. In the first week, I also worked on common gate amplifiers, source followers, and current mirrors with active loads, studying their AC and DC properties and applications. My final task was to simulate and optimize a latch-based comparator. I began by understanding the conventional sense amplifier and its shortcomings, then applied my knowledge of latches to develop and simulate the comparator. I optimized the device by adjusting transistor sizing and created its physical layout, ensuring its efficiency and functionality. This comprehensive experience has significantly enhanced my skills in analog circuit design and simulation.

Objectives of the project: This project involves learning and applying analog IC circuit design using Cadence Virtuoso. Key tasks include simulating basic digital and analog circuits and analyzing their characteristics.

Tool used: S/w, Cadence, Virtuoso

Details of papers/patents: None

Brief description of the working environment: I was assigned a mentor who provided guidance and support whenever I faced difficulties in understanding concepts or working with the software. Each day, I received a specific task related to simulating basic digital and analog circuits, which I had to complete and present by the evening. This routine not only sharpened my technical skills but also improved my ability to articulate my approach and methods.

The company culture encourages continuous learning and practical application, evident from the daily tasks and feedback sessions. The work environment is collaborative, with access to advanced tools and resources that facilitate thorough exploration of circuit behaviors under various conditions.

Academic courses relevant to the project: Electronic Devices, Electrical Sciences, Digital Design, EMT, MicroElectronic Circuits

Learning outcome: Analog IC Circuit Design: Gained proficiency in simulating and analyzing analog circuits using Cadence Virtuoso, including common source amplifiers and latch-based comparators.

CMOS Technology: Developed a solid understanding of CMOS technology.

Name: DIG DARSHAK DASH (2022A3PS0590H)

Student Write-up:

PS-I Project Title: Tasks under vivado, ofdm and channel coding

Short summary of work done: It was a great learning experience

Objectives of the project: Building a software to control the electric circuit

Tool used: S/w

Details of papers/patents: None

Brief description of the working environment: It was mostly online and weekly seminars were very great.

Academic courses relevant to the project: Signal and systems

Learning outcome: Vivado, Vitis and MATLAB

PS-I station: Electrono Solutions, Bangalore

Student

Name: AGASTYA SANYAL (2022A8PS0061G)

Student Write-up:

PS-I Project Title: Smart Quenchant Coolant Performance

Short summary of work done: A machine the company had built for a client in Gujarat was returned for servicing, and two of us had to go through datasheets, work with servo motors (and drivers) and sensors along with the companion software to fix bugs and make it work reliably. The actual work isn't very difficult but testing is time based and can take hours.

Objectives of the project: Repaired, serviced and tested a machine that automates the quenching process of heat treatment of metals.

Tool used: S/w, Virtuoso

Details of papers/patents: Nil

Brief description of the working environment: The company took 15 interns but only had work for ~8, so the rest of us went several weeks without a project. HR is somewhat strict about work timings and having to show up 6 days a week physically throughout the internship period.

The learning is more about practical use of sensors and motors than new technical knowledge.

Academic courses relevant to the project: ES, MuP

Learning outcome: Reading datasheets, using electrical tools like multimeters on live control panels.

PS-I station: Genus Power Infrastructure Ltd., Jaipur

Student

Name: DEVANG MAHESHWARI (2022A3PS1473H)

Student Write-up:

PS-I Project Title: Optimization of payload for wireless communication

Short summary of work done: I was asked to optimize BSDIFF4 algorithm that will help the company in reducing their software updates size for smart meters.

Objectives of the project: To optimize BSDIFF4 Algorithm

Tool used: Python, Github

Details of papers/patents: None

Brief description of the working environment: The internship operates primarily in an offline, project-based setting, requiring physical presence for only 5-6 days throughout the 2-month tenure. The working environment promotes independent project development, offering flexibility while balancing autonomy with necessary collaboration. This setup allows for a focused and efficient work approach.

Academic courses relevant to the project: Signal and system

Learning outcome: Python programming, DSA

Name: RAJAT SINGHAL (2022A8PS0567P)

Student Write-up:

PS-I Project Title: Optimization of Payload for Wireless Communication

Short summary of work done: During my internship at Genus Power Infrastructure Limited, I focused on the project "Optimization of Payload for Wireless Communication." My work involved: **Research and Analysis:** Conducted a thorough analysis of existing wireless communication protocols to identify inefficiencies in payload transmission. **Data Optimization Techniques:** Explored various data compression methods and payload structures, assessing their impact on transmission speed and reliability. **Simulation Modeling:** Utilized simulation tools to model different scenarios, testing the effectiveness of various payload optimization strategies under varying network conditions. **Implementation of Solutions:** Developed and proposed a framework for dynamically adjusting payload sizes based on real-time network performance metrics. **Documentation and Presentation:** Compiled findings into a detailed report and presented the results to the team, highlighting the potential benefits of the proposed optimizations.

Objectives of the project: The objective of this project is to enhance the efficiency and effectiveness of wireless communication systems by optimizing payload transmission. This includes analyzing current payload structures, identifying bottlenecks and inefficiencies in data trans.

Tool used: **Simulation Software:** Tools like MATLAB, Simulink, or NS2/NS3 for modeling and simulating wireless communication scenarios and analyzing payload optimization. **Data Analysis Tools:** Python or R for data manipulation, analysis, and visualization of network.

Details of papers/patents: NA

Brief description of the working environment: During my internship at Genus Power Infrastructure Limited, I experienced a dynamic working environment that emphasized innovation and collaboration. The team was supportive and encouraged open communication, which fostered a sense of belonging and engagement. The company expected interns to demonstrate initiative, take ownership of tasks, and contribute actively to projects. There was a strong focus on deadlines and quality, which pushed me to manage my time effectively and prioritize my responsibilities. Throughout my internship, I gained valuable insights into the energy sector, learned about cutting-edge technologies in power infrastructure, and developed practical skills in project management and teamwork. This experience has significantly enhanced my understanding of industry practices and prepared me for future professional challenges.

Academic courses relevant to the project: Machine learning, C Programming and OOPS.

Learning outcome: Understanding Wireless Communication Protocols: Gained insights into various wireless communication standards and protocols, including their strengths and limitations regarding payload management.

Data Compression Techniques: Learned about different data.

Name: SHREYA BHARGAVA (2022B3AA0635G)

Student Write-up:

PS-I Project Title: Advanced Metering Infrastructure Requirement Analysis for next generation wide-scale deployment

Short summary of work done: Database creation for automated verification of meter data. Economic analysis of the company's market share and performance levels in the smart meters category.

Objectives of the project: 1. Automation of verification and validation of metering data.

Tool used: Excel, python (little bit)

Details of papers/patents: Nil

Brief description of the working environment: My mentor was helpful and provided good guidance. However few managers in the company displayed negative corporate culture and did not set the most warm atmosphere hence affecting morale of the interns.

Academic courses relevant to the project: Machine learning, C Programming and OOPS.

Learning outcome: Product management and reporting, economic analysis.

PS-I station: Goa Shipyard Ltd., Goa

Student

Name: HARI SURESH (2022B2A41421G)

Student Write-up:

PS-I Project Title: Intro to Ship building

Short summary of work done: Report on ship making

Objectives of the project: Learn basic things related to shipbuilding

Tool used: CAD

Details of papers/patents: Used many research paper. Credit given in report

Brief description of the working environment: Expectations was learning about ship and know more about it.

Academic courses relevant to the project: Mechanical

Learning outcome: Got to know more about parts and its assembly

PS-I station: Himachal Pradesh Electricity Regulatory Commission, Shimla

Student

Name: JATIN DHINGRA (2022A4PS0254P)

Student Write-up:

PS-I Project Title: Strategic Proposal for PIR Sensor-Based Street Lighting and Roadmap for Achieving Net Zero Carbon Emissions in India by 2070

Short summary of work done: Done market research for Strategic Proposal of PIR Sensor-Based Street Lighting and Roadmap for Achieving Net Zero Carbon Emissions in India by 2070.

Objectives of the project: Our primary focus is the integration of Passive Infrared (PIR) sensors in streetlights to optimize energy consumption. Recognizing the urgent need for sustainable energy solutions, our internship focuses on innovating in the realm of energy-efficient public.

Tool used: Excel, google doc

Details of papers/patents: Sakuru, S. K. V., & Ramana, M. (2023). Wind power potential over India using the ERA5 reanalysis. Sustainable Energy Technologies and Assessments, 56, 103038.

<https://doi.org/10.1016/j.seta.2023.103038>
Nuclear power saves lives. (2013). Nature, 497(7451)

Brief description of the working environment: Working environment is really nice, everyone is supportive in the PS station and helped us in every stage of our obstacles. Expectation were a little or more different but overall liked the industry experience and work culture for the first time in student life. Some learning would be How to install PIR sensor, do market analysis of different countries in Energy sector, Do cost analysis and make presentation.

Academic courses relevant to the project: Electrical Sciences

Learning outcome: How to install PIR sensor, do market analysis of different countries in Energy sector, Do cost analysis and make presentation.

Name: SRI RAM BHARDWAJ (2022A4PS1244G)

Student Write-up:

PS-I Project Title: Strategic Proposal for PIR Sensor-Based Street Lighting and Roadmap for Achieving Net Zero Carbon Emissions in India by 2070

Short summary of work done: We extrapolated data to find energy demand of india in 2070 and then fill that energy demand with various renewable sources and we also worked out the finances of installing sensor based streetlights.

Objectives of the project: To develop logistics to promote energy savage and minimize csrbon footprint.

Tool used: Excel, google doc

Details of papers/patents: No

Brief description of the working environment: The working environment was harmonious and conductive ,with staff members being extremely supportive and helpful.

Academic courses relevant to the project: Electrical Sciences

Learning outcome: Understanding of government hierarchy, current scenario of renewable energy, working of corporate world.

Name: SHAURYA DEEP (2022B2A11570P)

Student Write-up:

PS-I Project Title: Strategic Proposal for PIR Sensor-Based Street Lighting and Roadmap for Achieving Net Zero Carbon Emissions in India by 2070

Short summary of work done: During my Practice School I (PS-I) program, I was involved in a project focused on implementing Passive Infrared (PIR) sensor-based street lighting systems to enhance energy efficiency and contribute to India's net zero carbon emissions goal by 2070. My primary responsibilities included conducting research on the current energy consumption patterns of traditional street lighting and analyzing the potential energy savings through the adoption of PIR sensor technology. I collaborated with a team to design and prototype a PIR sensor-based lighting system that activates streetlights only when motion is detected, significantly reducing unnecessary energy usage. We conducted field tests to evaluate the system's performance, ensuring it met safety and reliability standards. Additionally, I contributed to developing a comprehensive strategic proposal that outlines the benefits, costs, and implementation roadmap for scaling up this technology across urban and rural areas in India. This proposal also included a detailed analysis of how such an initiative aligns with the broader objectives of India's roadmap to achieve net zero carbon emissions by 2070. Throughout the project, I gained valuable insights into sustainable energy solutions, the intricacies of sensor technology, and the importance of integrating innovative technologies into existing infrastructure. This experience enhanced my technical skills and provided a deeper understanding of the role of policy and public awareness in driving environmental sustainability initiatives.

Objectives of the project: The strategic proposal aims to reduce energy consumption by implementing PIR sensor-based street lighting and outlines a roadmap for India to achieve net zero carbon emissions by 2070, focusing on sustainable energy solutions, and infrastructure development.

Tool used: Research Databases (e.g., IEEE Xplore, Google Scholar) Data Analysis Tools (e.g., Microsoft Excel) Documentation Tools (e.g., Microsoft Word, LaTeX)

Details of papers/patents: No

Brief description of the working environment: The working environment during my PS-I program was collaborative and research-focused, fostering a culture of continuous learning and innovation. The team comprised experienced professionals and fellow interns, providing a supportive atmosphere conducive to both personal and professional growth. Regular meetings and brainstorming sessions encouraged open communication and the exchange of ideas.

Expectations from the company included a comprehensive understanding of PIR sensor-based street lighting technology and its potential impact on energy efficiency and carbon emissions reduction. The company anticipated thorough research, detailed analysis, and

well-documented findings to support the strategic proposal. Additionally, the company expected adherence to deadlines, active participation in team discussions, and a proactive approach to problem-solving.

During the PS-I program, I gained valuable insights into the implementation of sustainable energy solutions. I developed a deep understanding of PIR sensor technology, including its operational principles and benefits in reducing energy consumption. The project honed my research skills, enabling me to critically analyze data and synthesize information from various sources.

Furthermore, I improved my documentation skills, learning to present complex technical information clearly and concisely. The experience also enhanced my project management abilities, as I balanced multiple tasks and collaborated effectively with team members. Overall, the PS-I program provided a solid foundation in sustainable energy technologies and project execution, preparing me for future challenges in the field of chemical engineering and environmental sustainability.

Academic courses relevant to the project: Electrical and Electronic Circuits: Gaining knowledge about circuit design and analysis, relevant for integrating PIR sensors with street lighting.

Learning outcome: Understand the implementation of PIR sensor-based street lighting. Grasp strategies for reducing energy consumption and carbon emissions. Analyze India's roadmap for achieving net zero carbon emissions by 2070. Evaluate sustainable energy solutions.

PS-I station: IDS Infotech Ltd., Chandigarh

Student

Name: SURYABHA MUKHOPADHYAY (2022A7PS0166H)

Student Write-up:

PS-I Project Title: Facial Emotion Recognition using Deep Learning

Short summary of work done: We followed a curriculum designed by our industry mentor, which outlined a clear pathway for learning about machine learning algorithms and techniques. We had regular meetings where our mentor checked in on our progress. Along the way, we built small projects based on what we had learned and demonstrated them to our mentor. For the final project, we developed a Facial Emotion Detector using deep learning techniques.

Objectives of the project: To detect facial emotions in real time using Deep Learning

Tool used: Numpy, Pandas, Scikit Learn, Matplotlib, Tensorflow, Keras

Details of papers/patents: None

Brief description of the working environment: The working environment was quite relaxed, with minimal pressure and the opportunity to learn at our own pace. Deadlines were flexible, making it feel more like a training camp than active contribution to the company's operations. Since it was an online setup, the experience was more focused on learning rather than gaining substantial work experience or making significant contributions to the company's projects.

If you're looking to gain real exposure to how things are done, I would recommend opting for an in-person internship.

Academic courses relevant to the project: Basic Programming Knowledge in Python which is not a course so you have to learn on the go.

Learning outcome: Gained knowledge and experience in the field of Machine Learning and Deep Learning through hands-on projects.

PS-I station: ILJIN Electronics India Pvt. Ltd., Noida

Student

Name: VISHWAM AGGARWAL (2022A3PS1224P)

Student Write-up:

PS-I Project Title: Learning model of room air conditioning

Short Summary of work done: We learnt about Python, Embedded C, and HVAC.

Objectives of the project: To set room temperature and other limit of system based on various electrical parameters and temperature.

Tool used: Embedded c, Python

Details of papers/patents: NA

Brief description of the working environment: It was online, I expected an offline workstation but at last minute it was changed to online.

Academic courses relevant to the project: CS F111, BITS F111.

Learning outcome: Learned HVAC, embedded C, Python.

Name: HEMANT KUMAR ANDHAVARAPU (2022A8PS1115G)

Student Write-up:

PS-I Project Title: Voice Enabled platform for air conditioning system.

Short summary of work done: During the internship period we learnt various softwares to write a code for a voice implementation module. We learnt about the basics of an air conditioner, different modes, different settings. Then we moved on to the coding part, we coded in C. We also used Renesas microcontrollers for the voice implementation so we had to understand the working of it.

Objectives of the project: Developing a voice Enabled platform for an air conditioner.

Tool used: IJin data monitor software, Renesas microcontrollers hardware, C programming, Renesas e2 Suite software.

Details of papers/patents: No

Brief description of the working environment: The working environment was very professional, we got a conference room in the office where all the interns sat together and worked. There were employees helping us wherever needed at each stage of the project.

Academic courses relevant to the project: Digital Design, Computer Programming.

Learning outcome: Learning different softwares, team building skills, presentation and communication.

Name: SWARIT KACHROO (2022B1A31150P)

Student Write-up:

PS-I Project Title: Learning model for room Air Conditioner

Short summary of work done: I got to understand about the working of the Air conditioner and how the refrigeration cycle takes place, then I designed the mechanism of taking in previous compressor frequencies and formulating a graph in the Data Monitor, based on this graph the Air Conditioner would automatically control the maximum

frequency, to maintain a balance between energy efficiency and room cooling, I also programmed a code which maintained a constant power limit in the room, which allowed the AC to use excess power or expel power if it was using too much, this was to keep all machines inside a room in sync. Coding was done in python. I also learnt about IDU and ODU controllers.

Objectives of the project: To learn about the functioning of the AC and to control the frequency of the compressor and to maintain a constant power limit, (this was my part).

Tool used: Python programming application, Renesas software, ILJIN data monitor and ILJIN PDF documents.

Details of papers/patents: None

Brief description of the working environment: It was done in online mode, despite being in online mode it felt like the people that were far away were working right with me, the mentors were very friendly and they explained everything very well, I got a technical insight into electric parts of ACs and knowledge of python, this experience was wonderful and I got work experience. I have mentioned all I have learned above also.

Academic courses relevant to the project: Electrical and Electronics Engineering, Microprocessors, and Skills of Coding.

Learning outcome: Team cooperation skills, Python coding, knowledge of AC and refrigerator components and leadership skills, knowledge of refrigeration cycle.

Name: [KUNJ GOEL \(2022B4AA0817P\)](#)

Student Write-up:

PS-I Project Title: Learning model for room air conditioner

Short summary of work done: This is a software development project based on company's existing aircon platform. In this project we explored the implementation of self clean/manual clean/service required detection based on cooling power and filter clean based on air flow/power consumption in the air conditioner system.

Objectives of the project: To develop a learning model for room air conditioner.

Tool used: Python software, iljin software, iljin documents.

Details of papers/patents: No

Brief description of the working environment: It was online. Everyone was very cooperative. They taught us first about our conditioners and then started implementing the project. We were given sufficient time to do it.

Academic courses relevant to the project: Python

Learning outcome: Python language, communication skills, team work.

PS-I station: Imagine Marketing Ltd., - Customer Experience & Supply Chain Management, Mumbai

Student

Name: [SHEREEN MALANI \(2022A8PS0661G\)](#)

Student Write-up:

PS-I Project Title: SKU classification and inventory management

Short summary of work done: My work involved classifying SKUs or products on the basis of its revenue contribution and demand pattern of the products. Mainly used ABC and XYZ theories to go through with the project. The second half of the project involved assessing the forecast accuracies of the company for 6 month periods and determine which type of products- ones discontinued from the market or ones performing normally etc were more accurate etc. This provided the company with a base to build a strategy to improve the forecast accuracies and optimize overall inventory.

Objectives of the project: - classifying the SKUs or products from most to least important using SKU classification methods 2) Assessing forecast accuracy to derive insights.

Tool used: Excel was used intensively throughout the internship.

Details of papers/patents: Nil

Brief description of the working environment: The timings were officially 10-6 but one could leave early if they were done with their work for the day. The entire team was very friendly and helpful in case of clearing doubts encountered during the project. Although they have a strict no work from home policy, they were understanding in case of very genuine reasons to allow work from home.

Academic courses relevant to the project: Nil

Learning outcome: Learnt about SKUs and its classification methods and overall inventory management.

Name: VIDHAN AGRAWAL (2022A8PS1561G)

Student Write-up:

PS-I Project Title: Production planning tool development

Short summary of work done: The development of an advanced production planning tool designed for factory operators to optimize and enhance production efficiency in real-time. Leveraging the capabilities of Excel, Python, and VBA, the tool integrates sophisticated data analysis and automation techniques to streamline production processes. The tool's core features include dynamic scheduling, real-time data updates, enabling operators to make informed decisions promptly. It addresses common bottlenecks in production planning, reduces downtime, and ensures optimal resource utilization. Through comprehensive testing and iterative enhancements, the tool demonstrates significant improvements in production efficiency and operational effectiveness. The tool's development process, key functionalities, and the resultant benefits observed in a real-world factory setting.

Objectives of the project: To optimise the production planning process by keeping into mind the different constraints involved like raw material availability, manpower and demand forecast.

Tool used: Advanced Excel and Python.

Details of papers/patents: NA

Brief description of the working environment: Helpful and knowledgeable.

Academic courses relevant to the project: POM, Computer programming.

Learning outcome: Social skills, Python, advanced Excel and VBA.

PS-I station: Indian Semiconductor Mission (ISM), Delhi

Student

Name: SHIKHAR AGARWAL (2022A3PS0528P)

Student Write-up:

PS-I Project Title: Customs regime for India's burgeoning Semiconductor Industry

Short summary of work done: This report examines India's customs policy for the semiconductor industry, analyzing the customs authority structure, duties, AEO scheme, export promotion schemes, and global best practices. It compares customs duties from major semiconductor-producing countries and offers recommendations to streamline procedures, revise duty structures, enhance the AEO program, and adopt international best practices to boost India's competitiveness in the global semiconductor market.

Objectives of the project: To find bottlenecks, and compare global best practices to give suggestion, on how Indian semiconductor industry can be wholly benefitted.

Tool used: Not any tool as such, but I was required to search for documents and policies from the internet, plus I was given some internal documents to study.

Details of Papers/patents: NA

Brief description of the working environment: The work environment was very nice, we were given our own cubicles to work from. But I want to say that we DID NOT GET TO DO WHAT WAS GIVEN IN THE DESCRIPTION. In the ps description it was given that we might be working with some hardware or at least get to see it, but actually all we got to do was study articles and policies from the internet and no other exposure. At least psd should properly contact and know about the station before writing description and making us allot that. Because that was very unprofessional, and I might have chosen some other station since I wanted somewhat hardware exposure. Even the managers at Ps station was saying to us, that she stressed to you about that there wasn't any technical work that we might do, so think clearly before sending interns.

Academic courses relevant to the project: None as such, but a bit idea about semiconductor might be good.

Learning outcome: I got to learn about various customs policies, about the supply chain, and what issues industry is facing, plus what govt should do to incentivise semiconductor industry.

PS-I station: Institute of Seismological Research (ISR), Gandhinagar

Student

Name: SUBHRO SAMIRKUMAR ROY (2022A2PS1123P)

Student Write-up:

PS-I Project Title: Liquefaction Hazard assessment using SPT N-Value and Index properties of soil

Short summary of work done: I had to calculate the risk of liquefaction in an area using standard penetration test values and index properties of soils. I had to conduct lab experiments to determine the index properties of soils and calculate the risk of liquefaction in an area using the concept of liquefaction potential.

Objectives of the project: Understanding the risk of liquefaction in a particular area using concepts in geotechnical engineering.

Tool used: Hydrometer, Casagrande Apparatus

Details of papers/patents: No Papers as such

Brief description of the working environment: The working environment is perfect for someone to explore his/her curiosity regarding geotechnical engineering. The company expected us to report regularly and punctuality was maintained. Although strict the staff was extremely friendly to interns. They help the students to adjust into the work culture of the company.

Academic courses relevant to the project: Soil Mechanics

Learning outcome: Firstly, I understood a lot about geology and how earthquakes happen. Then, I studied how crucial the index properties of soil can be to determining the engineering properties of soil in that area. Then, I learned to perform experiments on soil index properties.

PS-I station: Intelenergi Global Pvt. Ltd., Gurgaon

Student

Name: MUMUKSHU AGRAWAL (2022AAPS0271G)

Student Write-up:

PS-I Project Title: Market Sizing and determination of SAM and SOM in various geographies.

Short summary of work done: Market Sizing of certain products and sectors in Indian market. Determination of TAM SAM and SOM of certain foreign countries. A lot of my work was heavily focused on the use of MS Excel.

Objectives of the project: Facilitate the organisation in go-to-market strategy in foreign countries.

Tool used: Excel and SEO

Details of papers/patents: N/A

Brief description of the working environment: The PS was an online station. The mentor was quite understanding and approachable.

Academic courses relevant to the project: N/A

Learning outcome: Current market scenario of ESS in India and abroad.

PS-I station: Jhaveri Power Labs, Mumbai

Student

Name: ISHAN LAKHERA (2022A3PS0616G)

Student Write-up:

PS-I Project Title: Secure IoT Temperature Monitoring System Using ESP-32 with AES 256 Encryption, HTTPS, and MQTT Integration

Short summary of work done: During my PS-I, I successfully designed and implemented a secure IoT temperature monitoring system using an ESP-32 microcontroller. I interfaced the ESP-32 with a temperature sensor to capture real-time data and applied AES 256-bit encryption to ensure data security during transmission. I secured the web server with HTTPS and integrated the MQTT protocol for efficient data communication. Additionally, I developed user-friendly web interfaces and an MQTT dashboard for real-time data visualization, ensuring robust system performance through thorough testing and validation. Comprehensive documentation was maintained throughout the project.

Objectives of the project: To design a secure IoT system using ESP-32 for real-time temperature monitoring with AES 256 encryption, HTTPS, and MQTT, ensuring reliable data acquisition, transmission, and user-friendly visualization.

Tool used: Arduino IDE, C

Details of papers/patents: NA

Brief description of the working environment: The working environment was really great, we were given a free jand and were provided with a lot of resources as well as support. The company's expectation was to make us familiar with the project domain and make this a learning opportunity. Throughout PS-I, I developed technical proficiency in interfacing ESP-32 microcontrollers with sensors, implementing AES 256-bit encryption, and securing web servers with HTTPS. I also gained hands-on experience with the MQTT protocol for data transmission.

Academic courses relevant to the project: CP, DD, MuP

Learning outcome: IoT Integration: Interface ESP-32 with temperature sensors.
Data Security: Implement AES 256-bit encryption.
Secure Communication: Use HTTPS for secure web servers.
MQTT Implementation: Apply MQTT for efficient data transmission.

Name: HARSH RAI (2022AAPS0431G)

Student Write-up:

PS-I Project Title: Raspberry Pi Linux Server with two-way communication and OTA updates

Short summary of work done: Building a Linux Server using a Raspberry Pi SBC that can enable 2-way communication via JSON data and can read/write to a database that is backed up on a micro-SD card and then Enabling OTA updates on the server. Used Python for OTA updates, Flask for back-end of the server and HTML for front-end.

Objectives of the project: 1. Building a Linux Server using a Raspberry Pi SBC that can enable 2-way communication via JSON data and can read/write to a database that is backed up on a micro-SD card. 2. Enabling OTA updates on the server.

Tool used: Raspberry Pi, SSH, Flask, HTML, Python

Details of papers/patents: NA

Brief description of the working environment: Not much work pressure from the company. They allot projects considering the interest of the students and give reasonable deadlines to finish the work.

Academic courses relevant to the project: CP, MuP

Learning outcome: Setting up a Raspberry Pi, SSH, Flask

PS-I station: Joint Electricity Regulatory Commission (JERC), Gurgaon

Student

Name: GUREKAS SINGH SAHNEY (2022A8PS1270P)

Student Write-up:

PS-I Project Title: ANALYSIS OF THE REGULATORY FRAMEWORK OF TERRITORIES UNDER THE JURISDICTION OF JOINT ELECTRICITY REGULATORY COMMISSION

Short summary of work done: Performed an In-Depth Analysis of the framework of electricity regulation sector (generation, transmission and consumption) in the territories of Goa, Chandigarh, Puducherry, Lakshadweep, Dadra and Nagar Haveli, Daman and Diu and Andaman and Nicobar Islands.

Objectives of the project: To analyze the regulatory framework of the territories under the jurisdiction of the Joint Electricity Regulatory Commission.

Tool used: HTML, CSS, JS, Python - (Pandas, Openpyxl)

Details of papers/patents: N/A

Brief description of the working environment: The station was located on the 3rd floor of an office in Udyog Vihar, Gurugram. We primarily conducted research by ourselves, the employees assisted us with inputs wherever required. The project consisted of forming a report on the functioning of the Joint Electricity Regulatory Commission. In addition, I created a website to display energy consumption and tariff data for the previous 3 years, which was available in the Annual Reports of the Commission. Learning during the internship, primarily comprised of the art of creating reports and interacting with the government employees at the Joint Electricity Regulatory Commission.

Academic courses relevant to the project: Technical Report Writing, Electrical Machines.

Learning outcome: Understanding of the regulatory framework of the electricity generation, transmission and consumption sector in India.

PS-I station: MeitY Startup Hub (MSH), New Delhi

Student

Name: PRATHAM WALIA (2022A7PS0166P)

Student Write-up:

PS-I Project Title: Govt Schemes Analyst

Short summary of work done: Documents and presentations on the title

Objectives of the project: Analysis

Tool used: Microsoft word, excel, powerpoint

Details of papers/patents: None

Brief description of the working environment: Great environment and brilliant mentors

Academic courses relevant to the project: Basics of computer programming

Learning outcome: Report making and analysis

Name: SATVIK BELI (2022B4AA0885P)

Student Write-up:

PS-I Project Title: Analysis of growth of SAMRIDH portfolio

Short summary of work done: Majorly created reports and filled excels, but the learnings were beyond that because we had a lot of interaction with the office staff and it was pretty enriching.

Objectives of the project: To gather data and create a report on growth of startups since investment.

Tool used: Microsoft word, excel, powerpoint

Details of Papers/patents: NA

Brief description of the working environment: Very healthy work environment

Academic courses relevant to the project: Computer programming

Learning outcome: Creating reports, following time lines, office culture, work ethic

PS-I station: MELSS Systems and Services, Chennai

Student

Name: ANEESH KAARTHIK SIVAKUMAR (2022AAPS0019P)

Student Write-up:

PS-I Project Title: Embedded Systems for Power Electronics

Short summary of work done: I am under NDA. Cannot disclose this

Objectives of the project: To help with the development of embedded system

Tool used: kicad, Ltspice

Details of Papers/patents: None

Brief description of the working environment: I am under NDA. I cannot disclose this

Academic courses relevant to the project: Microelectronics

Learning outcome: Circuit Design

PS-I station: Military College of Electronics and Mechanical Engineering - Electronics, Secunderabad

Student

Name: KSHITIJ ARORA (2022A8PS0022G)

Student Write-up:

PS-I Project Title: Simulation of 4G LTE Wireless Standard

Short summary of work done: The project was research oriented as we focussed on building a LTE Network structure which could help the defence organization. We did a lot of literature review and after that we worked on Matlab and Simulink for building a network simulation. We learnt about various technologies such as MMSE etc.

Objectives of the project: Research on LTE networks and 5-G and building Network architecture and it's simulation.

Tool used: Matlab, Simulink

Details of papers/patents: Our group got testimonials from our project instructor at MCEME.

Brief description of the working environment: The working environment was really good and balanced. Since it was a military establishment there was a strict need for discipline.

Academic courses relevant to the project: Communication systems and some other Dels.

Learning outcome: I learnt a lot about Wireless Communication and It's working and the specifics of 5-G and 4-GLTE. I also learnt Matlab and Simulink which are two very important softwares in my domain of engineering.

Name: AYUSHMAN NEERAJ (2022A8PS1357G)

Student Write-up:

PS-I Project Title: Design of Micro Strip Patch Antenna for 5G Applications

Short summary of work done: Designed a microstrip patch antenna for operating frequency between 24 - 60 GHz.

Objectives of the project: To design a microstrip patch antenna for 5G application and compare various parameters with already existing antennas.

Tool used: Software used: Ansys HFSS

Details of Papers/patents: None

Brief description of the working environment: The working environment was totally relaxed yet productive. No-one was monitoring you on an hourly basis but you had to report your day to day progress. Overall the work given was easily completed within the time of PS 1. In MCEME we were able to interact with people from the army and some of them even guided us on how to approach the project given and gave us directions on how to complete the scope given. Overall I and my teammates enjoyed and learnt more in this PS station than we learnt in 2 years at BITS.

Academic courses relevant to the project: We had to study about antenna and microstrip antennas from different books and research papers from scratch.

Learning outcome: Got to learn about antennas, learnt about 5G, learnt how to design microstrip patch antennas.

Name: SHUBAN KAMATH (2022AAPS0339P)

Student Write-up:

PS-I Project Title: Computer Vision Based Drone Detection

Short summary of work done: During my Practical Summer Internship (PS-I) at the Military College of Electronics and Mechanical Engineering, I contributed to a project focused on computer vision-based drone detection. The project involved developing algorithms using Python, machine learning, and deep learning techniques. Under the guidance of Dr. Mahesh, who was both supportive and considerate, we progressed through various stages of the project, starting from conceptualization to implementation. Our work included data collection, preprocessing, model training, and testing to enhance drone detection accuracy. Collaboration with peers from different groups enriched our approach and problem-solving capabilities. Throughout the internship, Dr. Akshay Gundla from BITS Pilani Hyderabad Campus provided valuable insights and guidance, ensuring our project remained on track and aligned with educational objectives. The internship experience was characterized by hands-on learning in computer vision technologies and practical application of theoretical knowledge gained from academic coursework. It underscored the importance of interdisciplinary skills and teamwork in tackling real-world challenges. Overall, the PS-I stint not only expanded my technical proficiency in Python,

machine learning, and deep learning but also deepened my appreciation for collaborative research in defense technology.

Objectives of the project: 1) To upgrade to (/make) an efficient drone detection system
2) Make the model work without the need of internet. 3) Increase the training dataset

Tool used: Software - Python, machine learning, deep learning, Flask and yolo. communication, teamwork, problem solving and critical thinking were a few other skills used.

Details of papers/patents: NA

Brief description of the working environment: During my Practical Summer Internship (PS-I) at the Military College of Electronics and Mechanical Engineering with the Indian Army, I engaged in a pioneering project focused on computer vision-based drone detection. This experience spanned from May 28th to July 23rd and was characterized by incremental progress in project development.

The working environment was exceptionally conducive to learning and growth. Colleagues across various groups were not only welcoming but also immensely supportive, fostering a collaborative atmosphere that enhanced productivity. This camaraderie extended beyond my immediate batch mates, encompassing peers from other groups as well.

The organization's expectations were clearly defined yet flexible enough to accommodate our innovative strides, allowing us to exceed predefined objectives. This dynamic challenged me to push boundaries and deliver outcomes that went beyond initial project goals. The emphasis on achievement was balanced with a nurturing approach, where mentorship and guidance played crucial roles in our development.

Key takeaways from this internship included honing technical skills in computer vision and project management, as well as gaining insight into the operational complexities of defense technologies. Moreover, the experience underscored the importance of teamwork and effective communication in achieving collective success.

Overall, my PS-I at the Military College of Electronics and Mechanical Engineering was not just about technical learning but also about personal growth in a supportive and motivating environment.

Academic courses relevant to the project: Computer programming, Maths 2, Maths 3 and signals and systems.

Learning outcome: Now we'll versed with python, machine learning, gpu compatibility, deep learning and YOLO model.

Name: TEJ PRATAP MARELLA (2022B1A31368G)

Student Write-up:

PS-I Project Title: Design of Microstrip Patch Antenna for 5G Applications

Short summary of work done: We have learned basic antenna theory, microstrip patch antennas (MPA), and metamaterial. We have also learned how to design microstrip patch antennas in Ansys HFSS. Microstrip patch antennas, being smaller and easier to manufacture compared to other antennas, are used in mobile antennas. With increasing frequency, the bandwidth increases, hence increasing the capacity of users. We have designed a microstrip patch antenna at millimeter wave frequency 24-60 GHz and enhanced its parameters like bandwidth, gain, efficiency, etc, by implementing metamaterial into the antenna. We later compared it with other high-frequency antennas. We have also culminated our work into a research paper. We are refining the paper and looking for conferences to submit it to.

Objectives of the project: Learn about microstrip patch antennas and 5G. Learn Ansys HFSS software to design microstrip patch antenna for 5G at 24-60GHz. Compare the designed antenna with existing high frequency antennas.

Tool used: Ansys HFSS

Details of papers/patents: We have written a draft research paper proposing a 5G millimeter wave frequency antenna. The paper has yet to be published; we are refining it and looking for conferences to submit it to.

Brief description of the working environment: The required books and resources were in the library for our progress in the project, so we worked in the library most of the time; sometimes, we worked in the LE lab. There are no problems with the working conditions. The working time was from 8 am to 1:30 am, and Saturdays were online. We have interacted with many other MCEME staff for project assistance. All the necessary resources were provided to continue with our project. During the two months of internship at MCEME, we have gained knowledge outside the syllabus taught in the last two academic years. Apart from our project, we also learned presentation, report-writing, and formatting skills. The internship experience at MCEME has been excellent; it helped me learn presentation skills, document formatting, new concepts and applications like Ansys HFSS.

Academic courses relevant to the project: Electromagnetic theory

Learning outcome: Designed microstrip patch antenna using metamaterial for 5G at 24-60GHz using the software Ansys HFSS. Have learnt how to write a research paper.

**PS-I station: Ministry of Electronics and Information Technology (MeitY),
New Delhi**

Student

Name: ANADI NARAYAN (2022A7PS0008P)

Student Write-up:

PS-I Project Title: Performance Exploration of Seismic Mapping Application

Short summary of work done: Compiled a seismic mapping application using different compilers and optimization flags, and executed the same using different quantities and pinning of CPU cores based on machine architecture and analyzed how these factors impact performance.

Objectives of the project: To learn basic concepts in HPC, as well as to understand factors such as vectorization and memory architecture and their impact on parallel programs.

Tool used: SLURM scripts, gcc, Linux command line, ssh

Details of papers/patents: None

Brief description of the working environment: The nature of work a PS-I intern can expect at MEITY depends on the area of internship (decided a few days after the joining date). In this case the project was in the area of HPC, and done remotely from the MEITY office in Delhi with the guidance of mentors from C-DAC Pune. Officials from the High Performance Computing cell at MEITY provided general guidance and coordinated with the mentor.

Academic courses relevant to the project: Computer Programming, Parallel Computing (I have never taken this course, but the material was somewhat related to my project), Microprocessors and Interfacing (to a very limited, minimal extent).

Learning outcome: Learned methods of basic operation of an HPC cluster, gained a basic overview of parallel computing, learned about NUMA, CPU pinning and vectorisation and gained an understanding of how these impact the performance of a parallel program.

Name: DARSH RATHI (2022A7PS0187P)

Student Write-up:

PS-I Project Title: Security in ML/AI

Short summary of work done: Worked under Mr. Sushil Kumar Nehra,, Scientist F from the cybersecurity division of the Ministry. Had multiple interactions with him for directions of what to do next. Worked on Attacking of machine learning models under his guidance. First Studied and reported about common face recognition models currently in use and their drawbacks and attacking potential. Then started work on GANs and VAEs and their working and types of attacks. Made our own simple model and tried and tested the effects of attacks on those models.

Objectives of the project: An analysis of security risks in ML and AI models currently in use. Studying common algorithms and experimenting with attacks to break those algorithms.

Tool used: Python, PyCharm, Google Colab, Kaggle

Details of papers/patents: None

Brief description of the working environment: Quite nice and laidback working environment as expected from the ministry. The Mentors were nice and helpful every step of the way.

Academic courses relevant to the project: Machine Learning, Computer Programming

Learning outcome: Learnt about models currently in use and hacking and cracking techniques for ML models.

Name: ANANAY MAYOR (2022AAPS0264P)

Student Write-up:

PS-I Project Title: Quantum Communication

Short summary of work done: Worked on building QC protocols

Objectives of the project: Building QC protocols

Tool used: OPTISYSTEM

Details of papers/patents: NA

Brief description of the working environment: It was very good, mentors were very helpful throughout the process.

Academic courses relevant to the project: Communication Systems.

Learning outcome: Learnt QC protocols

Name: ADITYA GUPTA (2022B3A70509P)

Student Write-up:

PS-I Project Title: Security in AI/ML

Short summary of work done: This report explores key aspects of machine learning, emphasizing diverse types, security implications, and face recognition technologies. It begins by defining various machine learning categories to contextualize subsequent discussions on security. The distinctions between face detection and identification are highlighted, with practical examples like Haar-Cascade for detection and LBPH for recognition elucidating real-world applications. The architecture and applications of deep neural networks are explored, distinguishing between discriminative models (e.g., CNNs, RNNs) and generative models (e.g., GANs, VAEs), showcasing their versatility across tasks. Addressing security concerns, the report categorizes adversarial attacks as evasion and poisoning, underscoring their threat to machine learning systems. It proposes defense strategies to mitigate these risks, stressing the need to secure ML systems effectively. Overall, the report aims to provide a comprehensive understanding of machine learning advancements, practical implementations, and security challenges in fields like face recognition and deep neural networks.

Objectives of the project: Security in artificial intelligence (AI) and machine learning (ML) is critical for ensuring reliability, privacy, and ethical use. Key areas include defending against adversarial attacks, preserving privacy during model training, protecting intellectual property rights.

Tool used: pycharm,google colab,jupyter notebook and anaconda

Details of papers/patents: No

Brief description of the working environment: The working environment was exceptionally pleasant, characterized by a friendly atmosphere where everyone was approachable and willing to engage in meaningful conversations. Colleagues were supportive and open, creating a conducive atmosphere for collaboration and sharing ideas. People demonstrated a genuine interest in explaining concepts and processes, fostering a culture of knowledge exchange and continuous learning.

Academic courses relevant to the project: NG andrew coursera, few youtube videos.

Learning outcome: The evolution of face recognition technology shows the convergence of computer vision with deep learning methodologies, enabling applications in security,

surveillance, and personalized user experiences. The deployment of deep neural networks, including C.

PS-I station: National Atmospheric Research Laboratory (NARL), Tirupati

Student

Name: DHRUVJIT PATRA (2022A2PS1700P)

Student Write-up:

PS-I Project Title: Study of urban extent in Indian metropolis

Short summary of work done: Urban area in Delhi using Night time light data

Objectives of the project: To find the urban extent in Indian cities

Tool used: Python, numpy, matplotlib, QGIS

Details of papers/patents: None

Brief description of the working environment: The work environment at the PS station was satisfactory. The admin of the PS station was very co operative. They tried to fulfil all our need and granted some special permissions too.

Academic courses relevant to the project: CP

Learning outcome: Python, numpy, matplotlib, QGIS

PS-I station: National Centre for Polar and Ocean Research (NCPOR) - Data Communication, Vasco da Gama

Student

Name: AGAMDEEP SINGH (2022A8PS0620P)

Student Write-up:

PS-I Project Title: Data Communication

Short summary of work done: For the first half of my project, I built an FTP Server and automated the process by writing a Python script which automatically connects to our server in Norway, and collect fresh data readings without human intervention. For the next half of my project, I did data analysis of the data using Python. I plotted all sorts of graphs with the help of various python libraries, and finally, I created a Web server using PHP and basic HTML to display my data in a neat manner, just like NCPOR's website.

Objectives of the project: To create a FTP Server to facilitate file transfer from remote servers, and then analysing the data.

Tool used: Python, FileZilla, PHP

Details of papers/patents: Nil

Brief description of the working environment: It is a really good working environment. Everyone around here is super chill and you are not nagged to finish your work by your superiors. You are just expected to do it within a given timeline. Also if you miss the breakfast here in the canteen then you are missing out on half the fun of your PS. The weather also stays really nice and cool, but with it raining almost 24*7, it might get difficult to reach the station every morning but it's not that big a deal and you can make it work.

Academic courses relevant to the project: Basic Programming, Signals and Systems.

Learning outcome: I learned about FTPs which are really amazing pieces of software. I also become proficient in Python and used it for data analysis and Web Dev Languages like PHP and HTML to create beautiful websites just like NCPOR does.

Name: SANIA SIDDIQUI (2022B5A70395P)

Student Write-up:

PS-I Project Title: Variability of sea level and ocean current in the Arabian Sea

Short summary of work done: I worked on the observational data provided by NCPOR, and ran it through the given ocean models in NetCDF libraries to find the outcome and then plot the output. This helped depict and predict the monthly trends in the Arabian Sea.

Objectives of the project: To outline the importance of climate models and depict trends in the Arabian Sea with respect to sea level and ocean current.

Tool used: NetCDF4, Python, MATLAB, matplotlib, numpy

Details of papers/patents: N/A

Brief description of the working environment: The working environment was very flexible as I had an online PS. We had weekly meets with our mentor where he would review our work and give us recommendations for how to proceed next. He was always ready to guide us if we approached any roadblock. My expectation from the company was that I would learn about what goes into creating such models and the physics behind them. I learnt beyond my expectations as well as it helped me become even more proficient in python and matlab and its various libraries. It also introduced me to a new data format which is NetCDF, and how to use the data in that format to my liking.

Academic courses relevant to the project: Computer Programming

Learning outcome: I learnt a lot of physics behind ocean dynamics and how the models to predict trends in the ocean were made, and also learnt implementation of the NetCDF file format in Python and MATLAB.

Name: RIYA AGARWAL (2022B5A40972P)

Student Write-up:

PS-I Project Title: Causes of Antarctic Sea Ice Variability

Short summary of work done: The project involved collecting and processing data from various sources to investigate the variation in Antarctic sea ice cover. The study focused on correlating sea ice extent data with key climate datasets including ENSO, PDO, IOD, and SAM, as well as local variables such as Solar Radiation and Thermal Radiation, 2m Air Temperature, Latent Heat Flux, Sensible Heat Flux, and Neutral Wind Speed. The data were analyzed on a monthly basis across five regions: Weddell Sea, Indian Ocean, Pacific Ocean, Ross Sea, and Bellingshausen-Amundsen Seas. The study utilized various statistical methods such as Pearson Correlation, Butterworth Filter, and Multiple Linear Regression to analyze the data. The findings revealed significant regional and temporal variations in correlations, providing insights into the complex interactions between sea ice extent and climate indices. The datasets were filtered and fit into multivariate statistical models to better analyze the contributions of each parameter on the Sea Ice Extent.

Objectives of the project: To study the Antarctic Sea Ice Extent in five sectors (Weddell Sea, Indian Ocean, Pacific Ocean, Ross Sea, and Bellingshausen-Amundsen Seas) by considering variations of different climatological parameters.

Tool used: Python, CDO

Details of papers/patents: Nil

Brief description of the working environment: We were required to be present from 9 AM to 5 PM, five days a week, with a bus facility provided for convenience. Our mentor was knowledgeable, skilled, and humble, assigning us the project on our first meeting. Initially, we conducted basic data analysis on Antarctic sea ice extent, analyzing separate variables to understand their impact. Later, we performed multivariate analysis. The company expected us to learn data handling and become proficient in Python. We were provided with data and working systems. Through collaboration and guidance from our mentor, we successfully delivered accurate results. Overall, it was a great learning experience.

Academic courses relevant to the project: CP

Learning outcome: The project involves analyzing the variation in Antarctic sea ice cover, correlating data with key climate datasets such as ENSO, PDO, IOD, SAM, Solar Radiation, Thermal Radiation, Air Temperature, Latent Heat Flux, Sensible Heat Flux, and Neutral Wind Sp.

PS-I station: Regional Remote Sensing Centre (RRSC), Jodhpur

Student

Name: KESHAV JALAN (2022A3PS0447P)

Student Write-up:

PS-I Project Title: Development of Web GIS portal for Healthcare Establishments using Flask, Clickhouse & LeafletJS

Short summary of work done: The project involved the creation of a web-based GIS portal using Flask as the web framework, Clickhouse as the database for managing healthcare data, and LeafletJS for interactive map visualization. The portal integrated over 1.5 lakh subcenter data points, allowing users to visualize and analyze healthcare facilities' spatial distribution. Advanced spatial techniques like H3 indexing were used to enhance data analysis and visualization capabilities, enabling better decision-making in healthcare resource management.

Objectives of the project: To develop a Geographic Information System (GIS) web portal aimed at enhancing the management and accessibility of healthcare center data, using Flask, Clickhouse, and LeafletJS. The portal facilitates intuitive exploration and analysis of healthcare data

Tool used: Flask, Clickhouse, LeafletJS, H3 Indexing & CanvasFlowmap Layer

Details of papers/patents: NA

Brief description of the working environment: The organisation provides an excellent working environment, with a vibrant community of interns and a team of supportive scientists and employees who are always willing to offer assistance.

Academic courses relevant to the project: None

Learning outcome: Understanding GIS Technologies: Gained proficiency in using GIS technologies such as LeafletJS for creating dynamic maps.

Database Management: Learned to integrate and manage large-scale data using Clickhouse for efficient data retrieval and analysis.

Name: [ROHAN PANDEY \(2022AAPS0488H\)](#)

Student Write-up:

PS-I Project Title: Deep Learning Based Semantic Segmentation for automatic extraction of Horticulture Plantation Type in Arid Regions of Rajasthan

Short summary of work done: I completed my PS focused on developing a pipeline for horticulture plantation type detection using satellite imagery. My primary responsibilities included preprocessing geospatial raster data with GDAL and Rasterio libraries. I also designed and trained a convolutional neural network (CNN) using TensorFlow/Keras to classify and detect different horticulture plantation types from satellite images. Throughout the PS, I executed an end-to-end project that encompassed data acquisition, preprocessing, model training, and evaluation. This experience allowed me to demonstrate strong skills in handling geospatial data and applying machine learning techniques. Additionally, the PS provided valuable opportunities for interaction, connection, and social learning, contributing significantly to my professional growth.

Objectives of the project: • Developed a pipeline for horticulture plantation type detection using satellite imagery, focusing on preprocessing geospatial raster data with GDAL and Rasterio libraries. • Designed and Trained a convolutional neural network (CNN) using TensorFlow/Kera.

Tool used: Deep Learning, Machine Learning

Details of papers/patents: NA

Brief description of the working environment: During my PS-I, I worked in a dynamic and collaborative environment that fostered both individual and team growth. The company provided state-of-the-art tools and resources, allowing me to efficiently process and analyze geospatial data. I was part of a supportive team where regular interactions

and feedback sessions were encouraged, promoting a culture of continuous learning and improvement.

The expectations from the company were clear and structured. I was tasked with developing a pipeline for horticulture plantation type detection using satellite imagery, with specific milestones for data acquisition, preprocessing, model training, and evaluation. The company valued innovation, accuracy, and timely delivery of project components, which helped me stay focused and motivated.

Throughout the PS-I, I gained hands-on experience with GDAL and Rasterio libraries for geospatial data processing, and honed my skills in designing and training convolutional neural networks (CNNs) using TensorFlow/Keras. Additionally, the experience provided ample opportunities for professional development through interaction and networking with colleagues and mentors. This exposure not only enhanced my technical abilities but also improved my communication, collaboration, and problem-solving skills.

Academic courses relevant to the project: Several academic courses were highly relevant to my PS-I project on horticulture plantation type detection using satellite imagery: Machine learning, Image Processing, Geospatial Data Analysis, Computer Vision, Data Structures and Algorithms, Statistics and Probability.

Learning outcome: Machine Learning, Deep Learning

Name: AKSHAT KRIPLANI (2022B2A31139P)

Student Write-up:

PS-I Project Title: Development of geo spatial website

Short summary of work done: Made a website for NHRR dataset and render markers on health care establishments, sorted these markers and also using h3 indexing made choropleth map as per number of establishments.

Objectives of the project: To develop a web page in geo spatial map format and render health care establishments of our nation and provide necessary functionalities.

Tool used: Flask, Clickhouse, Leaflet.Js

Details of papers/patents: Nil

Brief description of the working environment: Overall the environment is peaceful and makes your learning experience very nice.

Academic courses relevant to the project: DSA, Prob&statistics

Learning outcome: Columnar Databases, Flask, Sql, Leaflet.Js, Js

Name: DIVYANSH BISSA (2022B2A31836H)

Student Write-up:

PS-I Project Title: Implementation of mesh networks using LoRa modules to detect atmospheric conditions

Short summary of work done: Coded arduino in order to detect temperature using DHT 22 Sensor and transmit it to several other nodes using LoRa modules.

Objectives of the project: To monitor climatic factors in non-accessible area (Connectivity perspective).

Tool used: LoRa module, DHT 22 Sensor, Python, Arduino IDE, Arduino Uno R3, C++

Details of papers/patents: None

Brief description of the working environment: The scientists were extremely helpful and approachable. They were very open to idea of working together. They let you work on the real projects they are working on.

The scientists were always available whenever you needed them. No phones were allowed inside the campus.

Academic courses relevant to the project: IoT

Learning outcome: Learnt how to work with arduinos, Circuit management for LoRa modules, Arduino IDE.

Name: MOHD YAAWAR ASKARI (2022B4AA0787P)

Student Write-up:

PS-I Project Title: Deep Learning based semantic segmentation of vegetation cover

Short summary of work done: The work was very much related to a typical Deep Learning project. We were provided satellite along with corresponding masks. They expected us to make a fully functioning model within the span of 2 months with pixel level accuracy.

Objectives of the project: To extract vegetation data through Indian satellites with a CLI interface.

Tool used: Powerful GPUs, Tensorflow, python and ML libraries, rasterio, Quantum GIS

Details of papers/patents: Nil

Brief description of the working environment: The scientists were very chill, they just expected us to complete the allotted work. They also provided us accommodation for 2 months which had everything including ACs and fridges in the room. This station is great for people who are looking to explore ML. ISRO tag is another plus point.

Academic courses relevant to the project: Machine Learning, Deep Learning

Learning outcome: ML, DL, Data Analysis, Raster Layers

Name: ABHAY KUMAR MADDHESHIYA (2022B5A81066P)

Student Write-up:

PS-I Project Title: Implementation of Mesh Networks of Long-Range (LoRa) Modules for Real-time Monitoring of Atmospheric Conditions using Internet-of-Things (IoT) Devices

Short summary of work done: During my PS-I at RRSC Jodhpur, I worked on a project focused on the implementation of mesh networks using Long-Range (LoRa) modules. The aim of the project was to develop a real-time monitoring system for atmospheric conditions through Internet-of-Things (IoT) devices. LoRa technology was chosen due to its ability to cover long distances with low power consumption, making it ideal for remote environmental monitoring. I was involved in setting up a mesh network where multiple LoRa modules communicated with each other, enabling seamless data transmission across large areas. This network gathered climatic data from various sensors connected to microcontrollers and sent it to a central hub for analysis. The project provided hands-on experience with hardware setup, communication protocols, and real-time data handling, allowing for efficient monitoring of weather conditions in real-time.

Objectives of the project: To Learn about the IoT devices and mesh networks

Tool used: Arduinio, LoRa Modules, C++, Python

Details of papers/patents: None

Brief description of the working environment: During my PS-I at RRSC Jodhpur, I experienced a collaborative and research-focused working environment. The team was highly supportive, encouraging independent problem-solving while also providing

guidance when needed. I worked alongside experienced professionals who offered valuable insights into practical applications of IoT and wireless communication technologies. The open work culture allowed for knowledge sharing and frequent discussions on project progress.

My expectations from the company included gaining hands-on experience with emerging technologies like LoRa and IoT, as well as understanding how these technologies are applied in real-world scenarios. The opportunity to work on a project with real-time environmental monitoring also aligned with my interest in contributing to innovative solutions for climate-related challenges.

Throughout the internship, I developed a deeper understanding of mesh networking, wireless communication protocols, and sensor integration. I gained practical experience in setting up and managing hardware devices, troubleshooting network issues, and handling data transmission. Additionally, I learned the importance of precise data collection, efficient communication between devices, and the role of IoT in improving decision-making for environmental monitoring. This experience enhanced both my technical skills and my ability to work within a team on complex projects.

Academic courses relevant to the project: Computer Programming, Internet of things

Learning outcome: Arduino, C++, IoT etc

PS-I station: Rural Electricity Corporation (REC-Bengaluru), Bengaluru

Student

Name: BALAGANGADHAR M BHAT (2022A8PS0058G)

Student Write-up:

PS-I Project Title: Financial Strategies and Emission Control in the Modernization of Power Plants

Short summary of work done: During my internship, I focused on analyzing emission control and modernization strategies for various power plants, with a significant emphasis on financial aspects. At the Bellary Thermal Power Plant, I evaluated methods for controlling SO_x and NO_x emissions, including the use of low-sulfur coal, Flue Gas Desulfurization (FGD) units, and Selective Catalytic Reduction (SCR) systems. My work also involved assessing the renovation and modernization (R&M) efforts at the Shivanasamudram and Yelahanka power plants, focusing on upgrading turbines, generators, and implementing advanced control systems. A critical part of my internship was understanding the financial strategies involved in these projects. I explored the loan structures and debt-to-equity ratios, particularly the role of REC Ltd. as a key lender. I calculated the Internal Rate of Return (IRR) for different projects to assess their financial

viability and learned about project cost estimation, including CAPEX and OPEX considerations. Furthermore, I studied various financial terms and procedures crucial for financing power projects, such as repo rate, MCLR, and hypothecation. I gained practical experience in risk minimization and evaluating loan requests, ensuring a comprehensive understanding of both technical and financial aspects of power plant projects. This internship has provided me with valuable insights and practical knowledge, equipping me to contribute effectively to the power sector.

Objectives of the project: The objectives of this internship encompass several key areas. Firstly, the analysis of emission control measures focuses on evaluating strategies for controlling SO_x and NO_x emissions at thermal power plants. Secondly, assessing modernization initiatives

Tool used: microsoft word and Excel

Details of papers/patents: Nil

Brief description of the working environment: During my PS-I internship at REC Ltd., I was immersed in a professional and collaborative working environment. The team was highly supportive, fostering a culture of continuous learning and knowledge sharing. Regular meetings and discussions with experienced professionals provided valuable insights and practical understanding of the power sector.

REC Ltd. expected me to engage actively with ongoing projects, analyze technical and financial aspects, and contribute to the evaluation of emission control and modernization strategies. They anticipated a high level of diligence, analytical thinking, and effective communication skills to work on detailed project reports and financial assessments.

Academic courses relevant to the project: Fundamentals of Financing and accounting small part of electrical machines.

Learning outcome: During this internship, I gained a comprehensive understanding of emission control measures and modernization initiatives for thermal, hydroelectric, and gas power plants. I learned about financial strategies, including loan structures, project cost estimation.

PS-I station: Rural Electricity Corporation (REC-Mumbai), Mumbai

Student

Name: VISHAL SINGH (2022A4PS0806P)

Student Write-up:

PS-I Project Title: Comparative study of Gujarat and Maharashtra power sector

Short summary of work done: We analysed the power sector of Gujarat and Maharashtra and gave a detailed report on various areas in which both the states have underperformed and gave some reasonable solution to the problem.

Objectives of the project: To no understand and analyse the working of power utility sectors and how to improve the economical condition.

Tool used: Ms word, excel, power point

Details of papers/patents: No

Brief description of the working environment: Working environment was great and there was lot to learn from the people working there and get a feel of work culture.

Academic courses relevant to the project: Finance, Management, Electrical sciences

Learning outcome: Analysis of the working of power utility sectors and how to improve the economical condition.

Name: PRABHLEEN KAUR (2022A8PS0596G)

Student Write-up:

PS-I Project Title: Comparative Case Study between the power sector of Maharashtra and Gujarat

Short summary of work done: Our study involved a comparative analysis of the power sectors in Maharashtra and Gujarat, focusing on their operational efficiencies, financial health, and policy frameworks. We examined the complexities of power distribution, identified key challenges such as distribution losses and the provision of power to agricultural consumers, and explored the impact of subsidies. The study also delved into power sector finances, energy trading, and power purchase agreements (PPAs) with generation companies (gencos). Based on the insights gained, we proposed actionable solutions to enhance the financial performance and sustainability of Maharashtra's power distribution company.

Objectives of the project: The objective of this comparative case study was to analyze the power sectors of Maharashtra and Gujarat, evaluating their operational efficiencies, financial health, and policy frameworks. By examining the differences and identifying best practices from the study.

Tool used: None

Details of papers/patents: None

Brief description of the working environment: The working environment during our PS-I internship was exceptionally supportive and friendly. The people were approachable, always ready to provide resources and clarify our doubts whenever we needed assistance. This created a relaxed and homely atmosphere, making it easy to integrate and focus on our tasks. The company's primary expectation was for us to gain valuable insights and learning experiences throughout the internship.

Academic courses relevant to the project: Electrical Machines, Principles of Economics

Learning outcome: The major learnings from this study included gaining insights into the complexities of power distribution and the inherent losses associated with it. I learned about the challenges in providing power to agricultural consumers and the role of subsidies in the power sector.

PS-I station: Rural Electricity Corporation (REC-Gurgaon), Gurgaon

Student

Name: VEDA GOEL (2022A4PS1562P)

Student Write-up:

PS-I Project Title: Recruitment & Selection in PSUs

Short Summary of work done: Screening of about 100-150 applications, calling applicants for the online assessment test, identifying error in the recruitment portal where it accepts application even if the candidate has not paid application fee, verification and interview process wherein my work in the team is to coordinate with the verification committee and send in the candidates for interview with the selection committee as per the list given. Also reaching out to state and union chief secretaries inviting applications of IAS Officers for the post of level 12 and above, executive director.

Objectives of the project: The objective of this report is to provide a comprehensive overview of the recruitment and selection practices within Public Sector Undertakings (PSUs).

Tool used: MS Excel

Details of papers/patents: None

Brief description of the working environment: REC Ltd. fosters a dynamic and inclusive working environment designed to support the professional growth and well-being of its employees. Expectations from the company were team collaboration, integrity and ethics, accountability, and professional excellence.

Academic courses relevant to the project: Cross cultural skills, was a course taken up by me as a Humanities Elective during 3rd semester. I strongly believe that this course was very useful in executing the project as in an office workspace, we interact with various kinds of people from different areas.

Learning outcome: A brief of the HR department, how the recruitment process takes place in a PSU, or broadly in any company. I learnt what mistakes candidates can make while the recruiting process, for instance, not attempting the online assessment with seriousness.

PS-I station: Semi-Conductor Laboratory (SCL), Mohali

Student

Name: PALASH KOHLI (2022AAPS0232P)

Student Write-up:

PS-I Project Title: Signal Integrity in High Speed Digital Design

Short summary of work done: The first three weeks were spent studying the different causes of signal integrity violations in circuits. Then I researched various communication protocols to pick an implement one on a PCB and simulate signal flow.

Objectives of the project: Simulating an SPI bus to study signal integrity effects

Tool used: OrCAD

Details of papers/patents: None

Brief description of the working environment: I expected the PS station to be much better than it was. Barely enough attention was given to interns, the mentor did not know how to handle giving people tasks. The first 4 weeks were spent trying to find resources without any guidance. The mentor explicitly told me he wouldn't be available for more than an hour daily. There was hardly any support from the mentor. My PS1 was more of a personal project, rather than quality research experience or apprenticeship.

Academic courses relevant to the project: EMT

Learning outcome: Signal integrity, PCB design

PS-I station: Shalaka Connected Devices LLP, Pune

Student

Name: ARNAV RANJEKAR (2022A3PS0421G)

Student Write-up:

PS-I Project Title: Car digital twin

Short summary of work done: I built the backend engine and API. Wrote code in javascript & used Node.js framework & express servers. Used the hivemq MQTT client for sending data between hardware & backend. Stored our data in a MongoDB database by architecting it to our needs. Tested the system using mosquitto MQTT broker & postman API.

Objectives of the project: To build and test and end to end system which would replicate a virtual simulation of a car.

Tool used: MongoDB, Node.js, express.js, JavaScript, HiveMQ, Mosquitto, Postman API, JW tokens.

Details of papers/patents: Nil

Brief description of the working environment: Wonderful people in the company! We had flexible work timings. Expectations were not very high. We were expected to keep up with the timeline & keep our mentor updated with the progress. We could ask our doubts at any time to our mentor. He was very helpful.

Academic courses relevant to the project: Embedded systems, C programming.

Learning outcome: Being in the backend team, I learnt a lot about building a backend engine, API built & testing, database management. For frontend, their work was mainly in UI/UX domain, hardware work included working with microcontrollers, understanding Car data bus.

Name: VARUN LALITKUMAR SABOO (2022AAPS0215P)

Student Write-up:

PS-I Project Title: Digital Twin of a Car

Short summary of work done: The project was divided into 3 sub teams. Hardware, backend and frontend. Each student was given a choice to join whichever team he likes. I was part of hardware team. My work was to code ESP 32 to collect the data sent from simulator designed, through wifi. Also receive the time of data collection from RTC chip and then send all of it through CAN bus protocol to another ESP 32. It was then sent over the MQTT platform from where the backend team would collect that data and its timestamp. That data was then displayed by frontend team on company's website.

Objectives of the project: 1.Setting up the hardware with the simulator to connect to MQTT 2.Setting up the MQTT Broker with its details 3. Connecting the MQTT with the Backend and its Database 4.Working on the frontend of the webpage to show the car data.

Tool used: H/w tools: ESP 32 WROOM 3D, TJA 1050 CAN transceiver, DS 1307 RTC chip. S/w: Arduino IDE, hiveMQ, python.

Details of papers/patents: None

Brief description of the working environment: Working environment was very comfortable and supportive. They were always ready to help and clear any doubts or issues we had. Expectation from the company is working on ideas in IoT. You can learn a lot of new things like CAN bus, MQTT platform, json packet, embedded C, usage of RTC chip.

Academic courses relevant to the project: CP

Learning outcome: CAN bus protocol, functioning of OBD-2 board of a car, working of ESP 32, Usage of MQTT platform.

PS-I station: Siemens, Aurangabad

Student

Name: TESHU PATERIA (2022A3PS0126G)

Student Write-up:

PS-I Project Title: Digitalisation for Industry 4.0 using IoT

Short summary of work done: Collected data from factory machines and processed it in the central broker, to make a dashboard to visualise important factory parameters.

Objectives of the project: Internet of Things, Digitalisation of Factory Place, Industry 4.0

Tool used: Node-RED, MQTT, Apache Kafka, Prometheus

Details of papers/patents: Nil

Brief description of the working environment: The working environment is typically characterized by high-tech facilities and a collaborative atmosphere. The environment encourages innovation, precision, and adherence to strict quality standards and strict safety rules. Overall, it is really very good.

Academic courses relevant to the project: Electrical Machines and Electronic Devices

Learning outcome: How data works, flows, can be stored and visualised.

Name: [YASH ASHISH KOTHARI \(2022A3PS0405P\)](#)

Student Write-up:

PS-I Project Title: Enhancement of Time Constant of RCCB Circuit

Short summary of work done: Worked on increasing the time constant of a Residual Current Circuit Breaker (RCCB) which can enhance electrical safety by solely increasing the current while keeping all other parameters constant. By carefully manipulating the current, I observed an improvement in the RCCB's response time to fault conditions, thereby reducing the risk of electrical hazards. This approach offers a practical and efficient method to enhance electrical safety in various applications.

Objectives of the project: To increase the time constant of RCCB Circuit.

Tool used: Oscilloscope, RCCB Tester, Multimeter

Details of papers/patents: None

Brief description of the working environment: At Siemens Aurangabad, the working environment is typically characterized by high-tech facilities and a collaborative atmosphere. The environment encourages innovation, precision, and adherence to strict quality standards and strict safety rules. The working hours are long and every Saturday is working. As a team member working on the enhancement of the time constant of RCCB circuits, you would likely have access to state-of-the-art labs equipped with advanced

testing and measurement tools, such as oscilloscopes, function generators, and RCCB testers.

Expectations from the Company: 1.Technical Proficiency 2.Innovation and Problem-Solving 3.Collaboration and Communication 4.Quality and Safety Compliance 5.Project Management 6.Continuous Learning.

Academic courses relevant to the project: Electrical Machines and Electronic Devices

Learning outcome: Importance of RCCB in electrical industry and how can it serve as a major safety device.

Name: BHOPE SHARDUL (2022A4PS1484H)

Student Write-up:

PS-I Project Title: Lean Optimization

Short summary of work done: This project explores the development and implementation of integrated manufacturing solutions focusing on two key areas: Assembly Line Optimization and Busduct Engineering Automation. The primary objective is to enhance operational efficiency and productivity using Microsoft Power Automate. The first segment of the project delves into Assembly Line Optimization, aiming to streamline the assembly processes through the application of data analytics and automation. By leveraging real-time data, predictive maintenance, and process automation, the assembly line is optimized to reduce downtime, minimize defects, and increase throughput.

Objectives of the project: To analyze Assembly Line process

Tool used: AviX Software

Details of papers/patents: NA

Brief description of the working environment: Environment was good. The peers were hardworking and sincere. The Seniors and Mentors were Supportive. The Company expected discipline.

Academic courses relevant to the project: Not Specific

Learning outcome: Improvements that can be implemented in Industries

Name: HARSH RAJ (2022A8PS0570P)

Student Write-up:

PS-I Project Title: Improvement and Enhancement of CMMS

Short summary of work done: During my PS-I at Siemens, I focused on optimizing data collected by the maintenance department and enhancing the Computerized Maintenance Management System (CMMS) in the Low Voltage product factory. This project aimed to improve the management and procurement of spare parts for Miniature Circuit Breakers (MCBs), Residual Current Circuit Breakers (RCCBs), and Fuses. I began by consolidating spare parts data from multiple sources into the CMMS, ensuring the information was accurate, standardized, and up-to-date. This centralization was crucial for reliable inventory management and helped in reducing machine downtime by ensuring timely availability of parts. Additionally, I identified and resolved several bugs within the CMMS portal, enhancing its functionality and user experience. These improvements included real-time data updates and a more user-friendly interface, which contributed to the system's overall reliability. Furthermore, I used the XMind app to map and analyze the spare parts procurement process. This analysis revealed inefficiencies and highlighted areas for potential automation, leading to a more streamlined and efficient process. To gain a deeper understanding of the production processes, I conducted a comprehensive tour of the shop floor, observing the manufacturing and testing procedures for MCBs, RCCBs, and Fuses, as well as the maintenance requirements of the machinery involved.

Objectives of the project: To remove the major bugs from the newly made CMMS portal and to improve it for better user experience.

Tool used: CMMS software (a software to handle the product procurement and management).

Details of papers/patents: NA

Brief description of the working environment: The working environment at Siemens was both dynamic and collaborative. The factory setting was structured and highly organized, with a strong emphasis on safety and efficiency. I worked closely with experienced professionals who were always ready to share their knowledge and provide guidance. The culture promoted continuous learning and innovation, encouraging interns to take initiative and contribute meaningfully to ongoing projects.

From the company, I expected a comprehensive introduction to real-world industrial practices and an opportunity to apply my theoretical knowledge to practical problems. Siemens met these expectations by involving me in significant projects that required critical thinking and problem-solving skills. The hands-on experience, coupled with the supportive mentorship from colleagues, was invaluable.

Academic courses relevant to the project: Several courses such as Electrical Devices, Control System etc.

Learning outcome: Learned how the procurement of any product in a company happens and how it is maintained so as to not obstruct the ongoing production.

Name: NIRANJAN M S (2022ABPS0978P)

Student Write-up:

PS-I Project Title: MCB Job Analysis

Short summary of work done: 1) Had to observe MCB testing processes and list reasons for potential cracking. 2) Find reasons for jobs falling off production lines. 3) Analyse scrap generation in factory floor

Objectives of the project: Analyze Job cracks, scrap generation analysis

Tool used: Excel

Details of papers/patents: Nil

Brief description of the working environment: Laidback environment, mentor didn't bother much. Could do tasks on my own.

Academic courses relevant to the project: Electrical Devices, Control System.

Learning outcome: Communication, analysis

Name: ESHAN KAWTIKWAR (2022B1AA1818H)

Student Write-up:

PS-I Project Title: Busduct Engineering Automation Tool

Short summary of work done: In this project, I focused on automating the busduct design process using Excel Automate and OfficeScript. Initially, the design involved manual entry of parameters such as Product Type, PD Measurement, Bays with Busduct, Bay Number, Length of Each Bend, and Total number of bends, which was time-consuming and prone to errors. By implementing precise algorithms and leveraging automation tools, I streamlined the calculation of critical output parameters, including total busduct length, number of bends, bend angles, short-circuit level, PD cover modules, arc detector placement, compensator details, GT and GP Bushings, filter requirements, total PD sensors, and pipe lengths and frequencies. The automation process also

encompassed calculating the number and types of pipes based on maximum length, total SF6 gas quantity, filter and PD sensor placement, and max lengths based on product type. This significantly reduced design time from 3-4 hours to just a few minutes, improving overall project productivity and accuracy. Additionally, the project ensured compliance with safety and performance standards, enhancing the reliability and efficiency of power substation operations. By reducing manual effort and minimizing human error, the automated system provided more reliable data and allowed engineers to focus on more complex and strategic tasks, ultimately contributing to better project outcomes.

Objectives of the project: The primary objectives of the busduct design automation project are to enhance design accuracy and increase efficiency. By implementing precise algorithms, the project aims to reduce human error and ensure reliable data for critical parameters.

Tool used: Excel Automate, JavaScript

Details of papers/patents: Nil

Brief description of the working environment: I completed my project at Siemens Aurangabad, specifically in the GIS factory. The working environment at Siemens was dynamic and collaborative, fostering innovation and precision in engineering. The GIS factory was equipped with advanced technologies and tools, providing an ideal setting for implementing automation solutions. I had access to a team of experienced professionals who offered guidance and support throughout the project, enhancing my learning experience.

The expectations from the company were clear: to develop an efficient and reliable automated system for busduct design that could significantly reduce manual labor and increase accuracy. Siemens aimed to improve the overall productivity of the GIS factory by leveraging automation tools like Excel Automate and OfficeScript. They expected the project to streamline the calculation of critical parameters, ensure compliance with safety and performance standards, and ultimately contribute to the high-quality operation of power substations. The company valued innovative approaches and precise algorithm implementation, emphasizing the importance of delivering a solution that minimized human error and optimized the design process.

Overall, the project at Siemens Aurangabad provided a conducive environment for applying and enhancing my skills in automation and engineering, meeting the company's high standards and expectations.

Academic courses relevant to the project: Electrical Devices, Control System

Learning outcome: The major learning outcomes of the busduct design automation project include a deep understanding of how automation tools like Excel Automate and OfficeScript can drastically improve engineering processes. The project highlighted the importance of precise algorithms.

Name: SWARNIM JAIN (2022B1AB0993P)

Student Write-up:

PS-I Project Title: Digitalization and automation

Short summary of work done: I worked on automating quality management system with the help of automating tools power automate and UiPath and performed robotic process automation.

Objectives of the project: Automating the quality management system

Tool used: UiPath, power automate, Microsoft excel, taxonomy manager

Details of papers/patents: No

Brief description of the working environment: The working environment was very cooperative and helpful. It was a great learning experience.

Academic courses relevant to the project: Operations management, quality reasurance

Learning outcome: Power automate Microsoft 365, VBA script and office script.

Name: ANIKET SONAWANE (2022B3A70031G)

Student Write-up:

PS-I Project Title: Data Visualization using PowerBI

Short summary of work done: I made 3 PowerBI dashboard for AIS factory of Siemens, Aurangabad. These were : Manufacturing Process Improvement Ideas, where i need to project insights of a list of ideas, their execution status, cost avoided by them and cost investment requierd. Also in which factory this projects are affecting. Secondly, I developed a Employee performance Matrix where key performance metrics like Attendance, Productivity, learning, Ideas provided, monthly trends. Thirdly, I made a dashboard showing number of employees distribution in different factories and departments, How many are union employees, how many employees have mobile access etc.

Objectives of the project: Make multiple dashboard to project employee performance, manufacturing process improvement projects analysis, employees distribution in factories dashboard.

Tool used: PowerBI, Excel

Details of papers/patents: Nil

Brief description of the working environment: I worked in a conference room in one of AIS factories where many meetings were held in my presence. I got to learn about project management and how to contribute your values to the meetings. Since two of my supervisor also used to do their work in same office, I learnt how they manage their junior Executives and take everyday decisions on manufacturing problems and management issues. Further I got opportunity to train some of the employees about powerbi dashboard development and also learn about their experience in Siemens and perks they get.

Academic courses relevant to the project: Data Analytics, Data Visualization with PowerBI, Excel

Learning outcome: 1) Power BI 2) data modelling and cleaning 3) Corporate tools 4) Safety measures and protocols in manufacturing industry 5) Communication between team members.

PS-I station: Siemens (Goa), South Goa

Student

Name: SIDDHANTH B N (2022B1AA1757H)

Student Write-up:

PS-I Project Title: Integration of Artificial Intelligence into inspection of manufactured PCB's

Short summary of work done: The Printed Circuit Boards (PCB's) manufactured in the Goa factory production lines are monitored via an Automated Optical Inspection (AOI) technology fitted at the end of each line. This technology scans each mounted PCB on the line in real-time and compares it with a reference image of a perfectly mounted PCB and tags the PCB as either "Good"-‘G’ or "Not Good"-‘NG’. These PCB's are then mechanically segregated by a robotic arm for further processes. The problem with the present model is that it falsely rejects a lot of PCB's which are otherwise perfectly functional as there are limitations to image processing. With the help of Artificial Intelligence model integrated into my Python program, the AOI will start storing the images of all the 'false' rejects and use them as reference for PCB's manufactured thereafter. Once the project begins to be implemented and achieves a good level of accuracy, it would significantly reduce the manpower required to manually inspect each

'NG' PCB checking for the defect. When put into numbers, it was estimated that only one person was required in the place of four or five operators to ensure efficient production.

Objectives of the project: Using AI to segregate good PCB's from the defective ones by reducing manual involvement.

Tool used: Automated Optical Inspection machine, Python programming, YOLO v8 software.

Details of papers/patents: Nil

Brief description of the working environment: The working environment was quite friendly but the work timings need to be strictly adhered to. We were also provided with breakfast and lunch everyday. We were given separate desks to sit and work in and we were seated quite close to our sub-mentors. Hence, we got our doubts cleared then and there, leading to a smooth learning experience. The company definitely expects highly from BITSIANS and hence allotted some of us multiple projects. We also had to regularly report and present our respective progress to our mentors and make necessary changes in lines with their feedback. Overall, it was a great learning experience to work in a corporate environment, especially in an established institution like Siemens.

Academic courses relevant to the project: Computer Programming, Engineering Graphics.

Learning outcome: Thorough understanding of YOLO v8 software and using it in tandem with Python programming, building a GUI in Python using Streamlit library.

Name: [HARDIK PANDYA \(2022B2A31613P\)](#)

Student Write-up:

PS-I Project Title: Object detection system

Short summary of work done: Created a system to detect real time parts of a machine that is made in the factory, if the parts are detected Correctly the machine goes towards for further proccesssss, if the parts are not being detected the machine is haunted to go further. To see the process, a camera is installed which shows green signal on part of detection.

Objectives of the project: To detect real time machine parts

Tool used: Python, Opencv, labelling, yolov8

Details of papers/patents: None

Brief description of the working environment: The working environment was really good with mentors continuous help and guidance.

Academic courses relevant to the project: None

Learning outcome: AI, machine learning, python, deep learning, yolo

Name: CHAITANYA AGRAWAL (2022B2A31680P)

Student Write-up:

PS-I Project Title: Streamlining Production and Efficiency at Siemens Goa

Short summary of work done: During my PS-I at Siemens Goa, I contributed to three key projects: the Component Defect Tracker, Production Time Calculation Automation for PCB Assembly, and the Capacity and Manpower Calculator. My primary responsibilities included designing and implementing software solutions to streamline various manufacturing processes. For the Component Defect Tracker, I developed a tool to record and categorize defective components in real-time, improving inventory accuracy and enabling efficient defect management. In the Production Time Calculation Automation project, I created a system using VBA and Microsoft Access to automate the calculation of production times for PCB assemblies, which significantly reduced manual errors and administrative workload. Lastly, the Capacity and Manpower Calculator project involved creating a comprehensive tool to analyze production capabilities and workforce requirements, aiding in better resource planning and allocation. Throughout these projects, I collaborated closely with senior staff to understand the existing challenges and needs, gathered data, and tested the developed solutions. My work not only helped streamline operations and reduce errors but also provided valuable insights into the production processes at Siemens Goa. This experience allowed me to apply my technical skills in a real-world setting and contribute to meaningful improvements in the company's operations.

Objectives of the project: 1. Component Defect Tracker: Develop a system to efficiently record and manage defective components, enhancing inventory accuracy and reducing delays. 2. Production Time Calculation Automation: Automate the calculation of PCB assembly times to eliminate manpower calculations.

Tool used: VISUAL STUDIO,C#,VB

Details of papers/patents: NA

Brief description of the working environment: The working environment at Siemens Goa was amazing and supportive. Our mentors provided guidance at every step and ensured we had all the necessary equipment. Sub-mentors worked closely with us,

offering valuable insights and hands-on assistance. The atmosphere was friendly, making it easy to collaborate and learn. We were expected to deliver practical solutions and apply our skills effectively, which pushed us to grow professionally. Through this experience, I learned about real-world manufacturing processes, data analysis, and the importance of teamwork. It was an enriching and enjoyable opportunity to bridge academic knowledge with practical application.

Academic courses relevant to the project: Computer Programming (CP)

Learning outcome: Gained practical experience in developing software solutions for manufacturing processes, including defect tracking and production time automation. Enhanced understanding of real-world challenges in inventory management, production scheduling, and resource management.

Name: DHRUV NARAYAN (2022B3A30630P)

Student Write-up:

PS-I Project Title: Warehouse Digitalisation

Short summary of work done: As an intern at Siemens, I developed two Windows Form applications using Visual Basic to enhance the efficiency and accuracy of their logistics processes. In the first project, I created an application to automate the tracking and management of goods within the Outbound Logistics Warehouse. The warehouse is divided into four racks: BA, BB, BC, and BD. While Siemens' SAP system tracks goods until they reach rack BD, subsequent movements to other racks were manually recorded in Excel spreadsheets. This manual process was labor-intensive and prone to errors. My application automates data entry and storage, tracking the inflow and outflow of goods across racks BA, BB, and BC. By storing the data in an embedded database, the application provides a more organized, accurate, and efficient system, improving inventory management, reducing human error, and enhancing data security. The second project involved developing another Windows Form application to track and manage metal boxes used for shipping final products to Siemens plants in locations such as Mumbai and Berlin. Siemens rents these boxes from an external supplier for 120 days, and inefficiencies in manual tracking often led to unused boxes and extra rental costs. The application maintains a database of all metal boxes, recording their usage duration and categorizing them into green (<20 days used), yellow (20-40 days used), and red (>40 days used). This categorization ensures a FIFO (First-In-First-Out) method for box selection, optimizing usage and minimizing rental inefficiencies. By storing this data in an Excel file on the server, the application provides an accurate and accessible record of each box's lifecycle, improving overall logistics management. These projects have not only enhanced my understanding of supply chain management but also provided me with valuable skills in Visual Basic and application development.

Objectives of the project: Automating warehousing processes so as to reduce manual intervention.

Tool used: Visual Basic, Visual Studio Community

Details of papers/patents: None

Brief description of the working environment: My working environment at Siemens was incredibly supportive and conducive to learning. My sub mentors, Mr. Dipesh Pandre and Mr. Dattaprasad Bondre, were always available to help with any doubts or issues we encountered. Their guidance was instrumental in navigating the complexities of the projects and ensuring that we applied our technical skills effectively. Siemens placed a strong emphasis on understanding factory processes and encouraged us to use our knowledge to develop applications that would enhance efficiency and productivity within the factory.

Throughout this experience, I not only honed my technical abilities in Visual Basic and application development but also learned how to present myself professionally. The exposure to real-world supply chain management was invaluable, providing insights into how large-scale operations are managed and optimized. This internship was a significant learning opportunity that broadened my understanding of both the technical and operational aspects of manufacturing and logistics. The collaborative and well-structured environment at Siemens made it an enriching experience, fostering both personal and professional growth.

Academic courses relevant to the project: CP

Learning outcome: App development, Visual Basic, Manufacturing Processes

PS-I station: Southern Regional Load Despatch Centre (Grid Controller of India Limited), Bengaluru

Student

Name: DHEERAJ M.P (2022A7PS0006H)

Student Write-up:

PS-I Project Title: Data Cleaning

Short summary of work done: Worked on a code for data cleaning for the historical and real time data.

Objectives of the project: Data Cleaning of Historical data and for Real-time

Tool used: Python, Grafana, PostgreSQL

Details of papers/patents: Nil

Brief description of the working environment: The working environment was really good and the managers were very helpful and friendly.

Academic courses relevant to the project: DBMS

Learning outcome: About python libraries, power grid management, irregularities in data, etc.

PS-I station: Spectrum Eduventures, Dehradun

Student

Name: VIDYA BHASKAR (2022A5PS1451P)

Student Write-up:

PS-I Project Title: Management

Short summary of work done: Worked for management of institute and also arrangement of work in relation with student and faculty in the coaching

Objectives of the project: To increase the student intake in the institute

Tool used: Excel, sql

Details of papers/patents: None

Brief description of the working environment: It was a pleasure working there as the colleagues were very friendly and helpful also the founders were inclined in the work with us.

Academic courses relevant to the project: POM

Learning outcome: Management skills

PS-I station: Sswitch Technologies, Hyderabad

Student

Name: VAISHNAVI JAKKANAGARI (2022A3PS1471H)

Student Write-up:

PS-I Project Title: SoC design and verification

Short summary of work done: So first week we learned about what is an SoC, different parts and peripherals then during the course we learned about clock and were asked to design micro-architecture to achieve various frequencies required by the peripherals. We learned about verilog and used tools like vivado for coding and learned few linux commands. We revised the important concepts of digital design.

Objectives of the project: To develop the Clock architecture for SoC and coding in verilog.

Tool used: Vivado

Details of papers/patents: Nil

Brief description of the working environment: Good working environment with doable tasks and regular insights on our work.

Academic courses relevant to the project: Digital design, C

Learning outcome: Brief Introduction to an SoC, Concept of clock management, clock dividers, verilog and documentation.

PS-I station: Tata Power Central Odisha Distribution Ltd., Bhubaneswar

Student

Name: SOUVIK SATTWIK AGASTI (2022A3PS1659H)

Student Write-up:

PS-I Project Title: ppm system of transformer

Short summary of work done: Power transformer was taught in details and ppm method of measurement needed some improvement with iot technology

Objectives of the project: To upgrade current ppm system

Tool used: c++, hardware development

Details of papers/patents: Report submitted

Brief description of the working environment: Nice working culture and helping mentors.

Academic courses relevant to the project: Power system

Learning outcome: Internet of things

Name: SHEAA KANUNGO (2022A4PS0965P)

Student Write-up:

PS-I Project Title: Automatic ppm transformer measurement

Short summary of work done: Learnt basics of power sub station inventory management, equipment maintenance and functional procedure and theory. Worked on a written project on tentative design of automatic ppm measurement in transformer. Worked on model grid power connections designs on software.

Objectives of the project: Understanding power substation equipment, new innovations applied in that field.

Tool used: Relay, excel, ppm meter, multimeter

Details of papers/patents: NA

Brief description of the working environment: Friendly instructors, with methodical teaching.

Academic courses relevant to the project: Electrical machines, Control systems, Mechanisms and machines

Learning outcome: Industry experience, basics of electrical equipment, inventory management, safety protocol.

Name: AVNITH MISHRA (2022AAPS0347P)

Student Write-up:**PS-I Project Title:** Automated PPM measurement unit and its IOT integration**Short summary of work done:** Learned about the procedure and SOP related to the maintenance of Transformers, Distribution line and substation. Also designed a IOT integrable model for the maintenance of the substation equipment.**Objectives of the project:** Studying the Automated PPM measurement Unit and its applications and also designing a protocol to integrate it with IOT devices.**Tool used:** Excel, powerpoint, Matlab**Details of papers/patents:** None**Brief description of the working environment:** Very nice environment and the staff is also helpful. Or mentor was very enthusiastic about teaching us new stuff everyday. He also took us to the field to see live working and maintenance operations.**Academic courses relevant to the project:** Electrical machines, digital design**Learning outcome:** Problems with electrical distribution and how to maintain essential equipments related to it.
-----**PS-I station: Universal Energy Solutions - Web Development, Kolkata****Student****Name:** ROHIT RAJ (2022A7PS0157G)**Student Write-up:****PS-I Project Title:** Web Development**Short summary of work done:** Rebuilt universal energy solution website using react.js**Objectives of the project:** Make a prototype of current website**Tool used:** React.js, html, css, js**Details of papers/patents:** NA**Brief description of the working environment:** Only very basic stuff is taught. Very few meets

Academic courses relevant to the project: NA

Learning outcome: Web Development and basics of HVAC

PS-I station: Universal Energy Solutions, Kolkata

Student

Name: PRAKHYAT VIVEK (2022A3PS0478P)

Student Write-up:

PS-I Project Title: Heat load calculation

Short summary of work done: Great experience, got to learn how industry works for an air conditioner and what all is required to build a system.

Objectives of the project: To learn how to select the type of ac to be used for a project

Tool used: AutoCAD

Details of papers/patents: No

Brief description of the working environment: Great ambience with a lot of guidance and flexibility.

Academic courses relevant to the project: EG, Electrical Machines, CP

Learning outcome: Teamwork, Electronics, Management

Name: PRIANSHU BANERJEE (2022A3PS0741G)

Student Write-up:

PS-I Project Title: Web Development

Short summary of work done: Our goal was to Develop and enhance web pages using HTML, CSS, JavaScript , and other technologies to improve user experience and site functionality Ensured web pages adhered to industry standards and best practices for

accessibility and SEO; created responsive and interactive web pages to optimize site performance.

Objectives of the project: To make a working web site

Tool used: html, css and java script

Details of papers/patents: Nil

Brief description of the working environment: Very nice and friendly environment

Academic courses relevant to the project: None

Learning outcome: Learned about the basics of website building like html, css, java-script.

Name: HARSHIL PAREKH (2022A8PS0087G)

Student Write-up:

PS-I Project Title: HVAC

Short summary of work done: No work was done only once a week 1hr session on Air conditioners.

Objectives of the project: Learn about working of AC

Tool used: None

Details of papers/patents: None

Brief description of the working environment: It was an online, expectations were that will get some corporate work experience but it was not more than a class.

Academic courses relevant to the project: Engineering Graphics.

Learning outcome: Basic Knowledge on working on Air conditioners.

Name: YASHUB KHATOR (2022AAPS1361G)

Student Write-up:

PS-I Project Title: Electronics intern

Short summary of work done: Got to learn about industrial IoT, HVAC, and the heat load calculation necessary.

Objectives of the project: To design a building management system

Tool used: Autocad

Details of papers/patents: NA

Brief description of the working environment: Good. Ma'am was very helpful and cleared necessary doubts we had.

Academic courses relevant to the project: A bit of thermodynamics and digital design.

Learning outcome: Got to learn about industrial IoT, HVAC, and the heat load

PS-I station: UP Electricity Regulatory Commission, Lucknow

Student

Name: PARTH ROY (2022B5A81544G)

Student Write-up:

PS-I Project Title: Operation and maintenance benchmarking

Short summary of work done: We had to gather information and insights from several documents including annual reports and tariff orders and then compile it into an Excel spreadsheet. Analyse the data and see if O&M benchmarking really helped reduce the disparity in ARR and true-up cost.

Objectives of the project: To verify the effectiveness of O&M benchmarking.

Tool used: Microsoft office tools

Details of papers/patents: None

Brief description of the working environment: Working experience and environment with this organisation is top notch. Instructors are very helpful in every step of the project. Very nice and tidy place to work in. Overall a nice learning experience.

Academic courses relevant to the project: Electrical Sciences

Learning outcome: Data analysis

PRACTICE SCHOOL MILESTONES:

- Conceptualization – 1973
- Extended PS option to all disciplines – 1975
- Inception of PS-I - 1976
- COPSIMS (Computer Operated Practice School Instruction Monitoring System) – 1985
- First PS station abroad – 1991
- PS for Higher Degree – 1992
- Double semester PS for Dual Degree students – 1992
- Combined PS-I operation for Pilani and Goa campuses – 2006
- Combined PS-II operation for Pilani and Goa campuses – 2007
- WEPSIMS (Web Enabled Practice School Instruction Monitoring System) – 2008
- Combined PS-I operation for Pilani, Goa and Hyderabad campuses – 2010
- Combined PS-II operation for Pilani, Goa and Hyderabad campuses – 2011
- BITS Pilani started offering scholarship of Rs. 8,000/- per month amounting to Rs. 44,000 (for the entire duration of PS-II) to selected PS-II students with CGPA 7.00 and above at various research organizations to encourage students to opt for CSIR & other Govt. Research labs - 2012
- PSMS (Practice School Management System) – 2014
- Conceptualization of PS Chronicles - 2015
- Digital Content for Skill gap - 2016
- Enhanced scholarship amount for PS-II students (CGPA 7.00 & above) at CSIR & other Research labs - Rs, 12,000 per month amounting to Rs. 66,000 (for the entire duration of PS-II) - 2016
- Introduction of Subject Matter Expert (SME) for PS-I Projects - 2017
- Digital version of PS Diary - 2019
- Successful implementation of PS-I course in remote mode for 2940 + students during summer 2020 with detailed project identification prior to start of the course - 2020
- Establishment of Student Counselling Cell (SCC) – 2023
- Conceptualization of open house much prior to allotment process - 2023
- Initiated Level of Engagement (LoE) survey for PS-I students during the course – 2023
- Pre PS-II Preferences Survey - 2023
- Conceptualized the live support sessions for students opting for PS – 2023
- BITS Pilani is currently offering an enhanced scholarship of Rs. 20,000 per month amounting to Rs. 1,10,000/- (for the entire duration of PS-II) to selected PS-II students with CGPA 6.00 and above at various research organizations - 2023.
- Complete restructuring of PS transcript - 2023
- Conceptualization of data source page for providing the access to information in a single platform for students - 2024
- Implementation of New Practice School Management System with enhanced capabilities for planning & allotment purposes - 2024.
- Conceptualization of Pre Practice School-I survey – 2024



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