Birla Institute of Technology & Science (BITS), Pilani
Practice School Division
Practice School-I course (May 26th – July 19th, 2025)

PS Chronicles (Core Engineering – Cement, Steel, Chemical, Civil, Mechanical & others)

(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 7th edition of the PS-I Chronicles. This edition features over 950 articles from PS-I students sharing their experiences during summer 2025.

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 five categories based on the industry domain.

- Chronicle 1: Information Technology
- Chronicle 2: Electronics
- Chronicle 3: Chemical, Mechanical, Cement, Textile, Steel, Infrastructure
- Chronicle 4; Health Care and other
- Chronicle 5: Finance and Management

I would like to thank students for sharing their experiences during their stint at the organization. I would also like to thank the entire PSD team members for reviewing the articles and providing us the valuable feedback. I would also like to extend our sincere thanks to Mr. Om Prakash Singh Shekhawat, Ms. Ankita Duggal, Mr. Shyam Sunder Saini and Mr. Varun Singh of the Practice School Division, of BITS Pilani, Pilani Campus, Pilani 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.

The Associate Dean,
PSD Pilani.

Table of Contents

PS-I station: Chambal Fertilizers and Chemicals Limited (CFCL), Kota 13
Student 13
Name: HARDIK AGRAWAL .(2023B1A40872P) 13
PS-I station: CSIR-Indian Institute of Petroleum(CSIR- IIP), Dehradun 14
Student 14
Name: SIYA .(2023A1PS0171P) 14
PS-I station: CSIR-Indian Institute of Petroleum(CSIR- IIP), Dehradun 15
Student 15
Name: ADITI SHARMA .(2023A1PS0184P) 15
PS-I station: CSIR-Indian Institute of Petroleum(CSIR- IIP), Dehradun 17
Student 17
Name: KHUSHI BODHWANI .(2023A1PS0188P) 17
PS-I station: CSIR-Indian Institute of Petroleum(CSIR- IIP), Dehradun 19
Student 19
Name: AADIDEV GHILDIYAL .(2023A1PS0205P) 19
PS-I station: CSIR-Indian Institute of Petroleum(CSIR- IIP), Dehradun 19
Student 20
Name: HARSHVARDHAN KHANGAROT .(2023A1PS0218P) 20
PS-I station: CSIR-Indian Institute of Petroleum(CSIR- IIP), Dehradun 21
Student 21
Name: ARYAN(2023A1PS0747G) 21
PS-I station: CSIR-Indian Institute of Petroleum(CSIR- IIP), Dehradun 23
Student 23
Name: SAI ASHRITHA TIPERNENI .(2023A1PS0851H) 23
PS-I station: CSIR-Indian Institute of Petroleum(CSIR- IIP), Dehradun 24
Student 24
Name: YASH VILAS LANDGE .(2023A1PS1289P) 24
PS-I station: CSIR-Indian Institute of Petroleum(CSIR- IIP), Dehradun 26
Student 26
Name: INDRANI DUTTA .(2023A5PS1232H) 26
PS-I station: Gopal Oil Mill, Rajgarh 27
Student 27
Name: DIPIKA JAISWAL(2023A1PS0095G) 27

PS-I station: Gopal Oil Mill, Rajgarh 28
Student 29
Name: ARNABHA ACHARYA .(2023A1PS0209P) 29
PS-I station: Gopal Oil Mill, Rajgarh 29
Student 29
Name: ARNAV CHANDAK(2023A1PS0781G) 29
PS-I station: Gopal Oil Mill, Rajgarh 31
Student 31
Name: FARAH ABBASI .(2023A1PS0815H) 31
PS-I station: Grasim Industries - Online, Nagda 32
Student 32
Name: SARANSH(2022A1PS1057P) 32
PS-I station: Grasim Industries - Online, Nagda 33
Student 33
Name: PRAJYOT SINGH .(2023A1PS0174P) 33
PS-I station: Grasim Industries - Online, Nagda 34
Student 34
Name: AISHWARYA GUPTA .(2023A1PS1312P) 34
PS-I station: Grasim Industries - Online, Nagda 35
Student 35
Name: DHANAY PARIKH(2023A4PS0227G) 35
PS-I station: Grasim Industries - Online, Nagda 35
Student 35
Name: VISHAL MADHUSUDHAN REDDY BOMMAREDDY(2023A4PS1082G) 35
PS-I station: Grasim Industries - Online, Nagda 36
Student 36
Name: ABHINAV GUPTA .(2023A5PS1155P) 36
PS-I station: Grasim Industries - Online, Nagda 38
Student 38
Name: SAANVI DEVGUN .(2023A5PS1179P) 38
PS-I station: Grasim Industries - Online, Nagda 39
Student 39
Name: ADDEPALLI SAI VAMSI .(2023A5PS1201P) 39
PS-I station: Grasim Industries - Online, Nagda 40
Student 40

Name: AKSHAT KHANDELWAL .(2023B1AB0825P) 40
PS-I station: Grasim Industries - Online, Nagda 41
Student 42
Name: KHUSH PRAKASH DEVNANI DEVNANI(2023B4A10912G) 42
PS-I station: Grasim Industries - Online, Nagda 42
Student 42
Name: DIVYA SHARMA(2023D2TS1234P) 42
PS-I station: Lighthouse Energy - Chemical, Toronto 43
Student 43
Name: PRATIBHA SRIVATSAN(2023A1PS0104G) 43
PS-I station: Lighthouse Energy - Chemical, Toronto 45
Student 45
Name: BALRAM BHALA(2023A1PS0116G) 45
PS-I station: Sungold Suppliers Pvt Ltd, Kota Rajasthan, Kota 46
Student 46
Name: ARPIT NIKHIL SRIVASTAVA .(2023A1PS0199P) 46
PS-I station: Sungold Suppliers Pvt Ltd, Kota Rajasthan, Kota 47
Student 47
Name: NAMAN CHATTER .(2023A1PS0253P) 47
PS-I station: Central Public Works Department (CPWD) - Pune, Pune 49
Student 49
Name: YASHVARDHAN SHAHU MOTE(2023A4PS0255G) 49
PS-I station: Central Public Works Department (CPWD) - Pune, Pune 50
Student 50
Name: VIJAYANT JOSHI(2023A7PS0030G) 50
PS-I station: Central Public Works Department (CPWD) - Pune 53
Student 53
Name: AAYUSH KHODKE(2023B1A10658G) 53
PS-I station: Centre for Railway Information Systems, Infrastructure - New Delhi, New Delhi 53
Student 53
Name: MOHIT BUGALIA(2023D2TS1247P) 54
PS-I station: Claravest Technologies Private Limited, Navi Mumbai 55
Student 55
Name: DEEPINDER SINGH PRUTHI .(2023A2PS0290P) 56
PS-I station: CRRI- Computer Centre & Networking, New Delhi 56

Student 56
Name: PALAK GOYAL(2023A7PS0396G) 56
PS-I station: CRRI- Computer Centre & Networking, New Delhi 57
Student 57
Name: KANIK KUMAR .(2023A7PS0575P) 57
PS-I station: CRRI- Computer Centre & Networking, New Delhi 59
Student 59
Name: DEEPAYAN MUKHERJEE .(2023A8PS0682P) 59
PS-I station: Eastern Estate Construction and Developers Private Limited - Tech, Bhubaneshwar 60
Student 60
Name: ANNIKA DAVULURI(2023A4PS0006G) 60
PS-I station: Eastern Estate Construction and Developers Private Limited - Tech, Bhubaneshwar 62
Student 62
Name: SURJOT SINGH SAWHNEY(2023A4PS0763H) 62
PS-I station: Eastern Estate Construction and Developers Private Limited - Tech, Bhubaneshwar 63
Student 63
Name: DIVY AGRAWAL .(2023A7PS0658P) 63
PS-I station: Hyphen SCS Pvt Ltd, Noida 63
Student 63
Name: LAKSHYA SRIVASTAVA(2023A4PS0058G) 63
PS-I station: Hyphen SCS Pvt Ltd, Noida 64
Student 64
Name: N SAI SIDDHARTHA(2023A4PS0917G) 64
PS-I station: Hyphen SCS Pvt Ltd, Noida 65
Student 65
Name: DIBYANSH RAI(2023B3PS0852G) 65
PS-I station: Hyphen SCS Pvt Ltd, Noida 67
Student 67
Name: ADITYA MITTAL(2023B4AA0875G) 67
PS-I station: National Institute of Hydrology, Roorkee 68
Student 68
Name: CHAYANK GULATI .(2023B1A11307P) 68
PS-I station: National Institute of Hydrology, Roorkee 69
Student 69
Name: AYUSH PATEL .(2023B4A11143P) 69

PS-I station: Prestige Estates Projects Limited, Hyderabad 71
Student 71
Name: PRANAV KUMAR M .(2023A2PS0259P) 71
PS-I station: 505 Army Base Workshop-Manufacturing, New Delhi 72
Student 72
Name: ARYADITYA SINGH BASISTH .(2023ABPS0802P) 73
PS-I station: Maheshwar Rolling Mills Pvt Ltd - Accounting and finance, Gwalior 73
Student 73
Name: ADAMYA SHUKLA .(2023A2PS1369H) 73
PS-I station: 505 Army Base Workshop-Mechatronics, Delhi 75
Student 75
Name: UTKARSH PANDEY(2023A7PS0388G) 75
PS-I station: 515 Army Base Workshop, Bengaluru 76
Student 76
Name: ADITH BABULAL .(2023AAPS0207H) 76
PS-I station: 515 Army Base Workshop, Bengaluru 77
Student 77
Name: KARTHIKEYA REDDY PATANA .(2023AAPS1115H) 77
PS-I station: 515 Army Base Workshop, Bengaluru 78
Student 78
Name: AMAN RINKESH DEVNANI .(2023B4A41026P) 78
PS-I station: 609 EME BATTALION, Meerut 79
Student 79
Name: ARINJAY JAIN(2023A7PS0346G) 79
PS-I station: 609 EME BATTALION, Meerut 80
Student 80
Name: SHOURYA MISHRA(2023A7PS0475G) 80
PS-I station: Adani Power Limited., Gondia 81
Student 82
Name: HARSH RAJ(2023A4PS1098G) 82
PS-I station: Advanced Systems Laboratory, DRDO, Hyderabad 83
Student 83
Name: ARSHEYA SINGH PARMAR .(2023A3PS0304P) 83
PS-I station: Advanced Systems Laboratory, DRDO, Hyderabad 84
Student 84

Name: SAKSHAM AGARWAL(2023A3PS0521G) 84
PS-I station: Advanced Systems Laboratory, DRDO, Hyderabad 85
Student 85
Name: DHIPIN MITRA BOLLADA .(2023A8PS0453H) 85
PS-I station: Advanced Systems Laboratory, DRDO, Hyderabad 86
Student 86
Name: SAI THEJA REDDY KAMASANI .(2023AAPS0263H) 86
PS-I station: Advanced Systems Laboratory, DRDO, Hyderabad 87
Student 87
Name: SHREYAS ASHOK MEHER(2023AAPS0646G) 87
PS-I station: Advanced Systems Laboratory, DRDO, Hyderabad 88
Student 88
Name: SWARNEEL BHATTACHARJEE .(2023AAPS0695H) 88
PS-I station: ASHA OIL FOODS PVT. LTD, Dhule 89
Student 89
Name: DEVANG MISHRA .(2023A7PS1103H) 89
PS-I station: ASHA OIL FOODS PVT. LTD, Dhule 89
Student 89
Name: KRRISH GIRISH AGRAWAL(2023A8PS0830G) 90
PS-I station: ASME India Private Ltd, Gurgaon 90
Student 90
Name: VEDANT CHAWLA .(2023A4PS0430P) 91
PS-I station: ASME India Private Ltd, Gurgaon 91
Student 91
Name: VISHAL PARASHURAM DHABALI .(2023B2A40881P) 91
PS-I station: Bhabha Atomic Research Centre (BARC), Visakhapatnam 93
Student 93
Name: MUDIT WALIA .(2023A4PS0414P) 93
PS-I station: Bhabha Atomic Research Centre (BARC), Visakhapatnam 94
Student 94
Name: DANDU YASHWANTH VARMA .(2023A4PS0458P) 94
PS-I station: Bhabha Atomic Research Centre (BARC), Visakhapatnam 95
Student 95
Name: SHASHWAT JHA .(2023A4PS0801H) 95
PS-I station: Bhabha Atomic Research Centre (BARC), Visakhapatnam 96

Student 96
Name: KRISHNA ROHAN KOTAGIRI .(2023A4PS1377H) 96
PS-I station: Bhabha Atomic Research Centre (BARC), Visakhapatnam 97
Student 97
Name: ADITHYA KRISHNA KANTH MEDURI .(2023A7PS0144H) 97
PS-I station: Bhabha Atomic Research Centre (BARC), Visakhapatnam 98
Student 98
Name: NIKHILESH YALLANKI .(2023AAPS0168H) 99
PS-I station: Bhabha Atomic Research Centre (BARC), Visakhapatnam 100
Student 100
Name: LAKSHYA JAGNANI .(2023B2A40912P) 100
PS-I station: Bhabha Atomic Research Centre (BARC), Visakhapatnam 102
Student 102
Name: MANAS PAGRANI .(2023B5AA1132P) 102
PS-I station: Central Institute of Road Transport - Electrical & Electronics, Pune 103
Student 103
Name: ARYAN BHARDWAJ .(2023A3PS0316P) 103
PS-I station: Centre for Military Airworthiness & Certification (CEMILAC), DRDO, Bangalore 105
Student 105
Name: HARISHANKAR PADMAKUMAR .(2023A4PS0403P) 105
PS-I station: Delhi Metro Rail Corporation (DMRC) - Civil, New Delhi 106
Student 106
Name: VIDHI JAIN .(2023A2PS0904H) 107
PS-I station: Delhi Metro Rail Corporation (DMRC) - Civil, New Delhi 108
Student 108
Name: OM SENGUPTA .(2023A2PS0927H) 108
PS-I station: Delhi Metro Rail Corporation (DMRC) - Electronics, New Delhi 109
Student 109
Name: AKSHIT GILL .(2023A3PS0371H) 109
PS-I station: Delhi Metro Rail Corporation (DMRC) - Electronics, New Delhi 110
Student 110
Name: RAKSHAM RAJ .(2023AAPS0725P) 110
PS-I station: DHIO Research & Engineering Pvt. Ltd, Bengaluru 111
Student 111
Name: DODLOLLA RITHISH RAO .(2023A4PS0603H) 111

PS-I station: Eclipse Prism Medical Device Pvt. Ltd, Navi Mumbai 112
Student 112
Name: VEDAANT DEEPAK DESAI(2023A4PS0320G) 112
PS-I station: Gas Turbine Research Establishment-DRDO, Bengaluru 113
Student 113
Name: HEMANTH PEMMASANI (2023A4PS0679H) 113
PS-I station: Honda Motor Cycle and Scooter India Pvt. Ltd - Manesar, Gurgaon 114
Student 114
Name: ABHI PRUTHI .(2023A4PS0463P) 114
PS-I station: Honda Motor Cycle and Scooter India Pvt. Ltd - Manesar, Gurgaon 117
Student 117
Name: KRISHANU BHATIA(2023A4PS1083G) 117
PS-I station: Honda Motor Cycle and Scooter India Pvt. Ltd - Manesar, Gurgaon 119
Student 119
Name: SHANKARGOUDA HIREGOUDAR(2023A4PS1232G) 119
PS-I station: Honda Motor Cycle and Scooter India Pvt. Ltd - Manesar, Gurgaon 120
Student 120
Name: NAVYAM GOYAL .(2023B3A41001P) 120
PS-I station: Honda Motor Cycle and Scooter India Pvt. Ltd - Narasapura, Kolar 122
Student 122
Name: JASPER KANISHK BALAN(2023A4PS0264G) 122
PS-I station: Honda Motor Cycle and Scooter India Pvt. Ltd - Narasapura, Kolar 123
Student 123
Name: ARJUN SRIRAM(2023A4PS0318G) 123
PS-I station: Honda Motor Cycle and Scooter India Pvt. Ltd - Vithalapur, Ahmedabad 125
Student 125
Name: DHRUV GARG(2023B1A40678G) 125
PS-I station: Jindal Power Limited, Raigarh 125
Student 126
Name: ADITYA VIJAYWARGIYA .(2023A4PS0698H) 126
PS-I station: L&T Heavy Engineering, IC, Surat 127
Student 127
Name: PRISHA PRAVEEN BHATT .(2023A4PS0465P) 127
PS-I station: L&T Heavy Engineering, IC, Surat 128
Student 128

Name: PRIYANSHU JAIN .(2023B5A41332P) 128
PS-I station: Lily Kitchenware - Online, Moradabad 129
Student 129
Name: ISHAAN SOMANI(2023A7PS0395G) 129
PS-I station: Maruti Suzuki India Limited, Gurgaon 130
Student 130
Name: SWAGAT .(2023A4PS1050P) 130
PS-I station: Mechanical Workshop, NE Railway, Gorakhpur 131
Student 131
Name: SUYASH SAMARTH(2022ABPS1604P) 131
PS-I station: Mechanical Workshop, NE Railway, Gorakhpur 132
Student 132
Name: AMRITESH RAI .(2023A4PS0457P) 132
PS-I station: ONGC, Kakinada, Kakinada 133
Student 133
Name: MALLIKARJUNA VARAPRASAD KODIMYALA(2023B4A40637H) 133
PS-I station: Ordnance Factory, Dehradun 134
Student 134
Name: ROHITH IYER(2023B5A10984G) 134
PS-I station: Pyrotech Electronics Pvt. Ltd., Udaipur 135
Student 135
Name: BHAVYA MEHTA .(2023A4PS0154P) 135
PS-I station: Pyrotech Electronics Pvt. Ltd., Udaipur 136
Student 136
Name: DIVYANSH BOHARA .(2023A4PS0448P) 136
PS-I station: Ramco Steel Pvt. Ltd., Faridabad 137
Student 137
Name: ARPIT GUPTA(2023A3PS0506G) 137
PS-I station: Ramco Steel Pvt. Ltd., Faridabad 138
Student 138
Name: BHAVY MANGLA .(2023A4PS1300H) 138
PS-I station: Sapcon Instruments Pvt. Ltd., Indore 139
Student 139
Name: SAMEER BAJPAI(2023A4PS1211G) 139
PS-I station: Star Fab Tech, Ludhiana 140

Student 140
Name: KAVISH KUMAR(2023B1A30716G) 140
PS-I station: TATA Advanced Systems Ltd, Nagpur 142
Student 142
Name: MUKUNTH MAITHREYAN K .(2023A4PS0497H) 142
PS-I station: Thyssenkrupp Automotive Body Solutions Pvt. Ltd., Pune 142
Student 143
Name: NIDHISH HARNE .(2023A4PS0460H) 143
PS-I station: Thyssenkrupp Automotive Body Solutions Pvt. Ltd., Pune 144
Student 144
Name: PRANAV PRASHANT NANKAR .(2023A4PS0489H) 144
PS-I station: Thyssenkrupp Automotive Body Solutions Pvt. Ltd., Pune 145
Student 145
Name: CHINMAY RUTURAJ GOVILKAR(2023B2A30734G) 145
PS-I station: Trijal Enterprise, Bhubaneshwar 146
Student 146
Name: OJAS GUPTA .(2023A1PS0168P) 146
PS-I station: Trijal Enterprise, Bhubaneshwar 147
Student 147
Name: B ISHAAN PATRO .(2023A4PS0428P) 147
PS-I station: Trijal Enterprise, Bhubaneshwar 148
Student 148
Name: HITARTH HIRANMAYA .(2023A4PS0751H) 148
PS-I station: Trijal Enterprise, Bhubaneshwar 149
Student 149
Name: TAMANNA .(2023A5PS1159P) 149
PS-I station: Trijal Enterprise, Bhubaneshwar 150
Student 150
Name: RISHITA SACHAN .(2023A7PS0613P) 150
PS-I station: Hodo stays, Bengaluru 151
Student 151
Name: GAURVANSHU SHIVRAN(2023A3PS0155G) 151
PS-I station: Hodo stays, Bengaluru 152
Student 152
Name: ADITYA KUMAR PANDA .(2023A7PS0670P) 152

PS-I station: Indian Red Cross Society - Tech- Dehradun, Dehradun 154
Student 154
Name: MONA GUPTA .(2023A7PS0502P) 154
PS-I station: Indian Red Cross Society - Tech- Dehradun, Dehradun 155
Student 156
Name: NISHITA AGARWAL .(2023A7PS0600P) 156
PS-I station: National Centre for Polar and Ocean Research (NCPOR) - Geoid on Oceanography, Goa .. 156
Student 156
Name: AARSHIA RAWAT .(2023B5AA0755H) 156
PS-I station: Tamil Nadu Startup and Innovation Mission (StartupTN), Chennai 157
Student 158
Name: SARJUN(2023B1A40663G) 158
PS-I station: Tamil Nadu Startup and Innovation Mission (StartupTN), Chennai 159
Student 159
Name: HRITESH POLIREDDY(2023B4A30933G) 159

PS-I station: Chambal Fertilizers and Chemicals Limited (CFCL), Kota

Student

Name: HARDIK AGRAWAL .(2023B1A40872P)

Student Write-up:

PS-I Project Title: Study of Centrifugal Pump & Efficiency Calculation

Short Summary of work done: During my PS-I internship at Chambal Fertilisers and Chemicals Ltd. (CFCL), I conducted a detailed study on centrifugal pumps used in the Urea-II plant. My work focused on analyzing real-time operating parameters such as flow rate, head, suction and discharge pressures, and using this data to calculate the efficiency of the pump systems. I performed calculations for Water Horsepower (WHp) and Brake Horsepower (BHp) using standard engineering formulas and assessed the performance gap due to energy losses. I also explored advanced topics like cavitation, NPSH, and the effect of system design on performance. Through this project, I gained practical exposure to large-scale industrial utilities and learned how theoretical concepts such as Bernoulli's Law and Pascal's Law are applied in real-world applications. The experience helped bridge the gap between classroom learning and practical implementation, enhancing both my technical and analytical capabilities.

Objectives of the project: The objective of the project was to study the construction, working principles, and efficiency of centrifugal pumps in an industrial environment. The aim was to analyze parameters such as flow rate, head, power consumption, and efficiency to identify ways to optimize pump performance and enhance energy usage, specifically in the context of Chambal Fertilisers and Chemicals Ltd. (CFCL).

Tool used: The tools used in this project included both hardware and software components. Hardware tools consisted of pressure gauges, flow meters, and steam turbine systems used for data acquisition in the plant. For software, Microsoft Excel was primarily used for performing data analysis and efficiency calculations. The CFCL control system also provided logging tools for monitoring real-time data essential for performance evaluation.

Details of Papers/patents: No papers or patents were published or filed during the course of this project.

Brief description of the working environment: The working environment at Chambal Fertilisers and Chemicals Ltd. (CFCL) was professional, well-structured, and supportive. The Urea-II plant where the project was undertaken maintained strict safety standards and followed well-defined industrial protocols. The company provided interns access to key departments and machinery under the supervision of experienced engineers, enabling us to understand large-scale industrial processes. CFCL expected us to be proactive, punctual, and eager to learn. We were encouraged to explore systems, ask relevant questions, and analyze real-time data effectively. Throughout the PS-I period, I learned how to bridge theoretical concepts from fluid mechanics and thermodynamics with real-world machinery such as centrifugal pumps. I gained insights into system efficiency, power loss, cavitation, and the importance of proper suction design. The use of data logging tools, interpretation of flow and pressure readings, and application of efficiency formulas provided valuable practical skills. Working in an industry-oriented setting also enhanced my communication, teamwork, and technical reporting abilities. Overall, the internship fostered a professional mindset, combining theoretical knowledge with industrial exposure.

Academic courses relevant to the project: PHY F111 (meow) and BITS F111(Thermodynamics)
The academic courses that were directly relevant to this project include Thermodynamics, Fluid Mechanics, Mechanical Engineering Laboratory, and Instrumentation. Concepts from these courses were crucial for understanding pump operation, energy conversion, and data measurement techniques used throughout the project.

Learning Outcome: During the course of the project, I gained a deeper understanding of centrifugal pump mechanics and fluid dynamics. I learned how factors like impeller design, suction head, discharge head, cavitation, and NPSH influence pump efficiency and performance. Additionally, I developed practical skills in calculating pump efficiency using real-time industrial data, and strengthened my ability to apply theoretical engineering concepts to actual plant systems.

PS-I station: CSIR-Indian Institute of Petroleum(CSIR- IIP), Dehradun

Student

Name: SIYA .(2023A1PS0171P)

Student Write-up:

PS-I Project Title: Physico chemical Characterisation of Bitumen and its application

Short Summary of work done: Tested different conc of EMA polymer in bitumen using different processing conditions

Objectives of the project: Analyse the effect of EMA polymer on bitumen

Tool used: ASTM methods

Details of Papers/patents: None

Brief description of the working environment: Work environment is good, everyone is supportive.

Academic courses relevant to the project: Give great insight into petroleum processing and research.

Learning Outcome: EMA polymer hardens bitumen and can be used to convert cheaper grade bitumen to expensive

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PS-I station: CSIR-Indian Institute of Petroleum(CSIR- IIP), Dehradun

Student

Name: ADITI SHARMA .(2023A1PS0184P)

Student Write-up:

PS-I Project Title: naptha conversion; reactor design troubleshooting and process enhancement in fixed bed reactor unit

Short Summary of work done: During my Practice School-I internship at CSIR–Indian Institute of Petroleum (IIP), Dehradun, I worked on the project titled "Reaction Setup for Catalytic Reforming of Naphtha" under the Light Stock Processing (LSP) division. The project aimed to catalytically convert low-octane naphtha into high-octane aromatics (BTX) using zeolite-

supported catalysts in fixed-bed microreactors. The initial phase involved synthesizing bifunctional catalysts through the wet impregnation method using ZSM-5 zeolite and metal salts. The catalysts were then dried, calcined, and reduced under hydrogen. Attention was given to catalyst pellet size, bed packing, and guard bed design to prevent reactor choking and pressure drops. Reactions were conducted in both batch and continuous modes. Key parameters such as WHSV, temperature ramp rate, feed direction, and reactor pressure were varied. Instrumentation included mass flow controllers, back pressure regulators, thermocouples within thermowells, and condensers for product collection. Operational challenges like gas leaks, thermocouple failures, and catalyst synthesis deviations were encountered and resolved. Although direct product analysis via gas chromatography was not performed, the theoretical aspects of BTX yield evaluation and chromatogram interpretation were studied. The internship provided hands-on exposure to reactor design, catalyst development, troubleshooting, and process safety. It emphasized the industrial relevance of catalytic reforming in the context of shifting refinery focus from fuels to petrochemicals, contributing significantly to my understanding of reaction engineering and practical chemical process.

Objectives of the project: This internship focused on catalytic reforming of naphtha to convert low-octane hydrocarbons into high-octane aromatic compounds such as benzene, toluene, and xylene (BTX) using fixed-bed reactors. The project involved catalyst synthesis, reactor operation in batch and continuous modes, troubleshooting, and understanding industrial applications. The experience enhanced skills in catalyst handling, instrumentation, and process optimization, aligning with the strategic shift from fuels to petrochemicals.

Tool used: Fixed bed reactor, batch reactor, furnace.

Details of Papers/patents: NA

Brief description of the working environment: The working environment at CSIR–Indian Institute of Petroleum (IIP), Dehradun, was dynamic, research-oriented, and highly collaborative. As a PS-1 intern in the Light Stock Processing Division, I was exposed to a professional setting that mirrored real-world R&D labs. The lab maintained strict safety protocols, especially when dealing with high-pressure reactors and flammable gases like hydrogen. Scientists, project associates, and technical staff were approachable and always ready to help, which fostered a strong learning atmosphere. Despite the rigorous nature of the work, the environment encouraged curiosity, discussion, and hands-on experimentation.

CSIR-IIP expected interns to be proactive, responsible, and precise in both experimental execution and documentation. We were trusted with handling sensitive equipment like high-pressure reactors, MFCs, and thermowells—highlighting their belief in our capabilities. Interns were also expected to troubleshoot real-world issues like leaks, choking, and instrumentation errors with minimal supervision. There was an implicit expectation to maintain lab discipline, work collaboratively, and ensure safety at every step.

This internship bridged the gap between theoretical chemical engineering and industrial application. I gained practical knowledge in catalyst synthesis, fixed-bed reactor operation, and

process optimization. I also developed skills in instrumentation handling, problem-solving under pressure, and understanding the chemical industry's shift towards petrochemicals. The experience taught me the importance of precision, teamwork, and adaptability in a research-based engineering role

Academic courses relevant to the project: Heat transfer, Fluid Mechanics, Thermodynamics, Chemical Process Calculatio

Learning Outcome: Catalyst Engineering & Reactor Operation:
Hands-on experience with wet impregnation synthesis using ZSM-5, understanding how parameters like base quantity and pellet shape affect catalyst performance and reactor flow. Operated high-pressure fixed-bed reactors (batch and continuous), mastering startup/shutdown and optimizing via WHSV, temperature ramp rates, and bed configuration.
Instrumentation & Troubleshooting:
Used MFCs with correction factors and maintained pressure with BPRs; ensured accurate monitoring via thermowells. Diagnosed and resolved leaks, thermocouple failures, and reactor blockages. Reacted safely and efficiently to system faults in high-pressure lab environments.

PS-I station: CSIR-Indian Institute of Petroleum(CSIR- IIP), Dehradun

Student

Name: KHUSHI BODHWANI .(2023A1PS0188P)

Student Write-up:

PS-I Project Title: Simulation of Vertical Falling Film Evaporator using Ionic Liquids using ANSYS workbench

Short Summary of work done: • Conducted literature review to understand the feasibility and thermal behavior of ILs in heat transfer systems. • Designed a 3D model of a vertical falling film evaporator in ANSYS DesignModeler. • Carried out meshing in ANSYS Meshing ensuring refinement at liquid film interfaces. • Defined material properties of selected ionic liquids using user-defined functions (UDFs) where necessary. • Ran simulations in ANSYS Fluent, varying parameters like inlet temperature, flow rate, and film thickness. • Analyzed results through temperature contours, velocity

profiles, and heat flux graphs. • Validated trends with data from published literature.

Objectives of the project: To simulate the thermal and fluid dynamics behavior of a Vertical Falling Film Evaporator (VFFE) using Ionic Liquids (ILs) as working fluids in ANSYS Workbench, with the aim to enhance energy efficiency and heat transfer characteristics by evaluating the effect of various operational and material parameters.

Tool used: • ANSYS Workbench 2023 R1 • DesignModeler • ANSYS Meshing • Fluent (for multiphase and thermal simulations) •Microsoft Excel for data analysis • ANSYS Fluent Solver with Volume of Fluid (VOF) and Energy models • UDF (User-Defined Functions) for defining temperature-dependent properties of ionic liquids • Python/Excel for plotting heat transfer data

Details of Papers/patents: 1. "Simulation and Analysis of Falling Film Evaporators Using Ionic Liquids as Working Fluids" – Elsevier, 2021

2. "Heat Transfer Characteristics of Ionic Liquids in Film Evaporation Systems" – Chemical Engineering Research and Design, 2022

3. Relevant patents on advanced evaporators and ionic liquid integration found via Google Patents and Scopus database

Brief description of the working environment: The project was carried out in a research-oriented and collaborative environment under the guidance of experienced mentors. Regular review meetings and progress evaluations were held. Access to licensed ANSYS software and computational resources was provided. The culture encouraged innovation, self-learning, and scientific rigor.

Academic courses relevant to the project: •Transport Phenomena

- Heat Transfer Operations
- Chemical Engineering Thermodynamics
- Computational Fluid Dynamics
- Process Equipment Design
- Modelling and Simulation in Chemical Engineering

Learning Outcome: Gained hands-on experience in CFD modeling and multiphysics simulation using ANSYS Fluent and ANSYS Workbench.

- Understood evaporator design principles, specifically the thermodynamics and heat/mass transfer involved in vertical falling film evaporators.
- Explored the application of ionic liquids as advanced heat transfer fluids with unique thermal properties.
- Improved skills in pre-processing (geometry & meshing), solver setup, and post-processing (contour analysis, convergence monitoring) in ANSYS.
- Developed understanding of boundary conditions, fluid property definition, and simulation convergence techniques.

- Understood the significance of sustainable and green alternatives in process equipment design.

PS-I station: CSIR-Indian Institute of Petroleum(CSIR- IIP), Dehradun

Student

Name: AADIDEV GHILDIYAL .(2023A1PS0205P)

Student Write-up:

PS-I Project Title: Design and Synthesis of Novel Electrocatalyst for Hydrogen Evolution Reaction

Short Summary of work done: Making A catalyst for Hydrogen Evolution reaction in Water splitting using Electrolysis.

Objectives of the project: To make Electrocatalyst for Hydrogen Evolution Reaction

Tool used: Google scholar etc.

Details of Papers/patents: none.

Brief description of the working environment: Everyone was very supportive and helpful.

Academic courses relevant to the project: Material Science.

Learning Outcome: Synthesis and Characterisation of Materials.

PS-I station: CSIR-Indian Institute of Petroleum(CSIR- IIP), Dehradun

Student

Name: HARSHVARDHAN KHANGAROT .(2023A1PS0218P)

Student Write-up:

PS-I Project Title: Development and characterization of Metal Doped MOFs for Hydrogen Evolution Reaction

Short Summary of work done: During my internship at CSIR–Indian Institute of Petroleum (CSIR-IIP), Dehradun, I worked on a research project focused on the development of efficient catalysts for the Hydrogen Evolution Reaction (HER). My work involved the synthesis of Cu–Co bimetallic oxides and metal-organic frameworks (MOFs) using wet chemical methods, followed by detailed characterization using FTIR, UV-Vis, and XRD techniques. I also conducted a literature review to understand the current state of HER catalysts and benchmarked our materials accordingly. The project aimed to contribute to the advancement of green hydrogen production technologies by improving catalytic efficiency and stability.

Objectives of the project: Develop a material to generate hydrogen from water using electrolysis

Tool used: Experimental work

Details of Papers/patents: .

Brief description of the working environment: The working environment at CSIR–Indian Institute of Petroleum (CSIR-IIP), Dehradun was intellectually stimulating, research-focused, and collaborative. As a PS-I intern, I was integrated into an ongoing project in the catalysis and materials chemistry division, where I had the opportunity to interact with experienced scientists and research scholars. The atmosphere encouraged curiosity, self-learning, and hands-on experimentation, while maintaining a strong emphasis on lab safety and research ethics.

The expectations from the organization were clear: interns were expected to show initiative, maintain discipline, document their work meticulously, and develop a deep understanding of the scientific principles behind their tasks. I was given autonomy in executing experiments, analyzing results, and contributing ideas during discussions, which fostered a sense of ownership and responsibility.

Through this experience, I gained practical skills in wet chemical synthesis, instrumental characterization (FTIR, UV-Vis, XRD), and literature analysis. I also learned how to troubleshoot experimental setups, manage lab records, and present findings clearly. The exposure to real-world research problems, particularly in the area of Hydrogen Evolution Reaction (HER) catalysts, deepened my understanding of sustainable energy technologies and strengthened my

interest in materials science and chemical engineering research. Overall, the PS-I experience at CSIR-IIP was transformative, helping me bridge the gap between theoretical knowledge and practical application.

Academic courses relevant to the project: Material science and engineering

Learning Outcome: Synthesis and characterization of nano materials

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PS-I station: CSIR-Indian Institute of Petroleum(CSIR- IIP), Dehradun

Student

Name: ARYAN(2023A1PS0747G)

Student Write-up:

PS-I Project Title: Study of Biomass-derived carbonaceous composite material

Short Summary of work done: I learn about research aspects in Material synthesis and its characterization.I also learnt about physico-chemical analysis of crude oil

Objectives of the project: The primary objective of this study is to develop high-performance activated carbon from banana peel waste through a sustainable chemical activation process, with an emphasis on waste valorization and eco-friendly material engineering. The study aims to: Optimize the synthesis of activated carbon using a base-activation method to enhance microporosity and surface area. Thoroughly characterize the structural, morphological, and electrochemical properties of the synthesized material. Demonstrate its applicability in energy storage (supercapacitors), water purification (capacitive deionization), and gas adsorption (CO_2 capture), thereby showcasing a multifunctional use of agricultural waste for clean energy and environmental solutions.

Tool used: ChemDraw Professional 15.1, Origin Pro 2025b

Details of Papers/patents: This research focuses on the sustainable development of biomass-derived carbonaceous materials using waste banana peels as a raw precursor. The study utilizes

a combination of chemical activation (KOH and urea doping) and composite fabrication with polypyrrole (PPy) and manganese dioxide (MnO_2) to convert agricultural waste into high-value functional materials. The synthesized activated carbon materials were thoroughly characterized using FTIR, FESEM, XRD, BET, TGA, UV-Vis, and cyclic voltammetry (CV) techniques. Results revealed the formation of highly porous nanostructures with a specific surface area of 86.79 m^2/g and incorporation of nitrogen functionalities. Electrochemical analysis showed a specific capacitance of 12.9 F/g, highlighting the material's potential for applications in energy storage devices like supercapacitors and in water purification systems like Flow Capacitive Deionization (FCDI). The findings demonstrate the effective valorisation of biowaste into multifunctional materials with applications in CO_2 capture, fuel refining, and environmental remediation. The study promotes green material synthesis aligned with circular economy principles, offering scalable solutions for clean energy and sustainable environmental technologies. Future work will focus on advanced electrochemical testing, structural optimization, and real-world application trials to enhance performance and commercial viability.

Brief description of the working environment: My internship at CSIR–Indian Institute of Petroleum (IIP), Dehradun was an intellectually enriching experience that exposed me to real-world research practices in chemical and petroleum sciences. The working environment was structured, research-intensive, and professionally managed. The institute is equipped with advanced laboratories and sophisticated analytical instruments, fostering a space where scientific curiosity is encouraged and nurtured.

Everyone at the institute—from scientists to senior research scholars—was extremely knowledgeable and approachable. Their willingness to guide and mentor made the learning process smooth and rewarding. I was fortunate to work under experts who not only taught me technical procedures but also shared valuable insights about research methodologies and scientific thinking.

During my tenure, I gained hands-on experience with instruments such as FTIR, FESEM-EDX, and TGA, and learned about ASTM standard testing methods related to crude oil and material characterization. I also got the opportunity to work on waste valorization, particularly developing carbonaceous materials from banana peel waste for energy and environmental applications. The internship enhanced both my technical skills and analytical thinking, while also teaching me the importance of collaboration, patience, and precision in research.

This experience has greatly contributed to my academic and professional growth, and strengthened my interest in core chemical research.

Academic courses relevant to the project: Material science

Learning Outcome: About Physico-chemical analysis of Crude oil,about Material synthesis.How new materials are made.Learnt a lot of softwares like OriginPro 2025b and ChemDraw for research purposes.

PS-I station: CSIR-Indian Institute of Petroleum(CSIR- IIP), Dehradun

Student

Name: SAI ASHRITHA TIPERNENI .(2023A1PS0851H)

Student Write-up:

PS-I Project Title: STUDY FOR PRODUCTION OF HIGH-VALUE CARBON MATERIALS FROM LOW-VALUE PETROLEUM REFINERY FEED STOCKS

Short Summary of work done: This project investigates the conversion of low-value petroleum refinery feedstocks into high-value industrial carbon materials, specifically petroleum pitches. Two aromatic-rich feedstocks - 150N Extract and 500N Extract - were selected due to their limited use in transportation fuels and high aromatic content, which makes them suitable precursors for carbon materials. The study aimed to understand how thermal treatment parameters influence the formation and properties of petroleum pitch and to explore the feasibility of producing mesophase and isotropic pitches for various end-use applications. Feedstocks were first characterized for key physicochemical properties such as density, specific gravity, viscosity, pour point, refractive index, micro carbon residue (MCR), and Bureau of Mines Correlation Index (BMCI), using ASTM standard procedures. Thermal treatment was carried out at a constant temperature of 410°C under a nitrogen atmosphere, with treatment times ranging from 2 to 8 hours. Four pitch samples were prepared and characterized using softening point tests, coking value analysis, and solubility tests (toluene and quinoline insolubles). Optical microscopy was used to distinguish between isotropic and mesophase structures. SEM-EDX analysis provided detailed insights into the surface morphology and elemental composition of the pitch samples. The results revealed that longer thermal treatment times promoted greater polymerization and condensation of aromatic hydrocarbons, leading to higher yields of mesophase pitches with superior softening points, coking values, and carbon content. Pitch-1, Pitch-3, and Pitch-4 showed well-developed mesophase characteristics, while Pitch-2 remained isotropic due to shorter Thermal Treatment Time. The study successfully demonstrates that 150N and 500N Extracts can be upgraded into valuable carbon materials under controlled conditions. The ability to produce pitches of varying properties expands their application potential in industries such as carbon fibre manufacturing, graphite electrodes, and advanced composites. This project provides a foundational understanding for further optimization of pitch synthesis from petroleum-based residues.

Objectives of the project: To prepare useful carbon materials, such as mesophase and isotropic pitch, from low value petroleum refinery byproducts, so that the waste material which isnusually burnt or thrown out can be used to manufacture advanced carbon materials such as carbon fibre, electrodes, etc. that are in high demand.

Tool used: Lab Glassware, Density Bottles, RI Machine, Pour Point Chiller, Heating Mantles, Mortar and Pestle, MCR Machine, SEM,

Details of Papers/patents: none

Brief description of the working environment: The working conditions were okay, the mentors were very encouraging and helpful. However, there is a lot of overtime culture here, and our experience would be better if we were not forced to work overtime.

Academic courses relevant to the project: Separation Processes, Chemical Process Calculations, Material Science, Heat Transfer, Engineering Chemistry

Learning Outcome: I learnt how to prepare pitch from crude oil, how to characterize the pitch obtained, how to use various lab instruments and machinery.

PS-I station: CSIR-Indian Institute of Petroleum(CSIR- IIP), Dehradun

Student

Name: YASH VILAS LANDGE .(2023A1PS1289P)

Student Write-up:

PS-I Project Title: Reaction Setup For Catalytic Reforming of Naphtha

Short Summary of work done: During my Practice School-I internship at CSIR–Indian Institute of Petroleum (IIP), Dehradun, I worked on the project titled "Reaction Setup for Catalytic Reforming of Naphtha" under the Light Stock Processing (LSP) division. The project aimed to catalytically convert low-octane naphtha into high-octane aromatics (BTX) using zeolite-supported catalysts in fixed-bed microreactors. The initial phase involved synthesizing bifunctional catalysts through the wet impregnation method using ZSM-5 zeolite and metal salts. The catalysts were then dried, calcined, and reduced under hydrogen. Attention was given to catalyst pellet size, bed packing, and guard bed design to prevent reactor choking and pressure drops. Reactions were conducted in both batch and continuous modes. Key parameters such as WHSV, temperature ramp rate, feed direction, and reactor pressure were

varied. Instrumentation included mass flow controllers, back pressure regulators, thermocouples within thermowells, and condensers for product collection. Operational challenges like gas leaks, thermocouple failures, and catalyst synthesis deviations were encountered and resolved. Although direct product analysis via gas chromatography was not performed, the theoretical aspects of BTX yield evaluation and chromatogram interpretation were studied. The internship provided hands-on exposure to reactor design, catalyst development, troubleshooting, and process safety. It emphasized the industrial relevance of catalytic reforming in the context of shifting refinery focus from fuels to petrochemicals, contributing significantly to my understanding of reaction engineering and practical chemical process implementation.

Objectives of the project: To convert low octane industrial naphtha to higher octane number usable fuel

Tool used: Fixed bed high pressure micro reactor, lab instruments like furnance, ultrasonic cleaner, etc

Details of Papers/patents: none

Brief description of the working environment: The working environment at CSIR–Indian Institute of Petroleum (IIP), Dehradun, was dynamic, research-oriented, and highly collaborative. As a PS-1 intern in the Light Stock Processing Division, I was exposed to a professional setting that mirrored real-world R&D labs. The lab maintained strict safety protocols, especially when dealing with high-pressure reactors and flammable gases like hydrogen. Scientists, project associates, and technical staff were approachable and always ready to help, which fostered a strong learning atmosphere. Despite the rigorous nature of the work, the environment encouraged curiosity, discussion, and hands-on experimentation.
Expectations from the Company:
CSIR-IIP expected interns to be proactive, responsible, and precise in both experimental execution and documentation. We were trusted with handling sensitive equipment like high-pressure reactors, MFCs, and thermowells—highlighting their belief in our capabilities. Interns were also expected to troubleshoot real-world issues like leaks, choking, and instrumentation errors with minimal supervision. There was an implicit expectation to maintain lab discipline, work collaboratively, and ensure safety at every step.
Learnings:
This internship bridged the gap between theoretical chemical engineering and industrial application. I gained practical knowledge in catalyst synthesis, fixed-bed reactor operation, and process optimization. I also developed skills in instrumentation handling, problem-solving under pressure, and understanding the chemical industry's shift towards petrochemicals. The experience taught me the importance of precision, teamwork, and adaptability in a research-based engineering role—skills that will be crucial in my professional journey.

Academic courses relevant to the project: Heat transfer, Fluid Mechanics, Thermodynamics, Chemical Process Calculation

Learning Outcome: Studied and worked on continuous fixed bed high pressure micro-reactor, carried out catalyst synthesis and catalyst loading/unloading in the reactor, etc

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PS-I station: CSIR-Indian Institute of Petroleum(CSIR- IIP), Dehradun

Student

Name: INDRANI DUTTA .(2023A5PS1232H)

Student Write-up:

PS-I Project Title: Extraction Of Paraffin Wax From HWD

Short Summary of work done: The project titled "Extraction of Paraffin Wax from Heavy Wax Distillate (HWD)" focused on the systematic production and characterization of paraffin wax and oil from crude feedstocks such as HWD, PWD (Paraffin Wax Distillate), and LN slack wax. Conducted in a laboratory setting, the project involved regular experimental runs to simulate an industrial wax extraction process, offering hands-on exposure to solvent-based dewaxing and deoiling techniques. The process began with the treatment of HWD using selective solvents like MIBK (Methyl Isobutyl Ketone), which aided in the crystallization and separation of wax from the oil-rich phase. The chilled solvent feed was filtered to obtain a wax-rich cake and a filtrate rich in oil. Further deoiling was carried out to enhance wax purity using additional solvent treatments and chilling cycles. Post-extraction, vacuum distillation or evaporation techniques were applied to recover solvents and obtain pure wax and oil fractions. Characterization of the final products was a crucial component of the study. Parameters such as pour point, density, kinematic viscosity, and drop melting point (DMP) were measured for the wax, while the oil was analyzed using techniques including FTIR and oil content analysis (using solvents like MEK). The results highlighted how solvent ratios, cooling temperatures, and feed quality significantly influence product properties. This project not only deepened our understanding of wax separation chemistry but also underlined the importance of refining techniques in achieving high-purity specialty waxes and oils with potential industrial applications.

Objectives of the project: 1)To learn the need and Principle of Dewaxing and Deoiling procedures 2)How to perform these procedures and to carry out the characterization of the wax and oil obtained.

Tool used: 1)FTIR software, gas chromatography software, hydraulic press, pour point chiller,evaporation assembly, drying ovens, weighing balances, siphon structure, steam distillation apparatus

Details of Papers/patents: None

Brief description of the working environment: Working environment was good, I have been provided several opportunities to learn new methods and gain more experience on the experiments being carried out. The guide assigned to me and thr other scientists here were extremely supportive and kind, I have learnt a lot from them.Rest everything is really nice.

Academic courses relevant to the project: Process engineering, Pharmaceutical Formulations

Learning Outcome: 1) Learnt about Crude and the petroleum refining Procedures of both industry and lab level.
2)Learnt the Characterization of Wax and oil
3)Deeper understanding on Lube and Wax
4) Software and equipments used for all the experiments

PS-I station: Gopal Oil Mill, Rajgarh

Student

Name: DIPIKA JAISWAL(2023A1PS0095G)

Student Write-up:

PS-I Project Title: Sustainability in Oilseed Processing

Short Summary of work done: **Summary of Work Done (≈250 words):** The project focused on the sustainable recovery and utilization of oilseed processing by-products, with a particular

emphasis on enhancing environmental and economic efficiency in the vegetable oil industry. The study began with an extensive literature review on conventional and modern oil extraction techniques, waste generation patterns, and the composition of by-products such as oilseed cake, hulls, and gums. A detailed analysis was conducted on potential value-added applications of these by-products in sectors such as bioenergy, animal feed, organic fertilizers, bioplastics, and surfactants. Process simulation and techno-economic assessments were performed using available industrial data to evaluate the feasibility of implementing sustainable practices at scale, particularly for a 50-ton/day oilseed processing unit. Key parameters such as capital investment, operating costs, energy savings, and payback period were calculated, showing that recovery and reuse strategies could significantly reduce environmental impact and increase profitability. The project also examined case studies from Indian and international oil mills, including insights gained from an internship at Gopal Oil Mill, to understand practical challenges and opportunities in real-world settings. A sustainability framework was proposed, outlining steps for industries to transition toward circular processing models by integrating renewable energy, water recycling, and low-waste technologies. Overall, the work emphasized the need for industries to shift from linear to circular approaches in oilseed processing. The project concluded that sustainable valorization of by-products not only reduces waste but also opens up new revenue streams, contributing to environmental conservation and economic resilience in agro-industrial operations.

Objectives of the project: To develop sustainable strategies for the recovery and utilization of oilseed processing by-products for industrial and agricultural applications, aiming to minimize waste, improve resource efficiency, and enhance economic and environmental sustainability.

Tool used: NA

Details of Papers/patents: NA

Brief description of the working environment: It was an online PS Station.

Academic courses relevant to the project: Food Processing technology

Learning Outcome: Gained practical understanding of sustainable processing methods, techno-economic analysis, and value-added utilization of oilseed by-products for industrial and agricultural benefits.

PS-I station: Gopal Oil Mill, Rajgarh

Student

Name: ARNABHA ACHARYA .(2023A1PS0209P)

Student Write-up:

PS-I Project Title: Market analysis for demand prediction

Short Summary of work done: Mostly data collection, created an algorithm to predict the demand.

Objectives of the project: To create an algorithm to predict the optimal production level for the company

Tool used: Microsoft Excel, python, Canva , powerpoint

Details of Papers/patents: None

Brief description of the working environment: Overall it was a good experience.
Academic courses relevant to the project: Fundamentals of financial accounting

Learning Outcome: Data handling (through excel) , creation of presentations (Canva, powerpoint) , writing the algorithm (python)

PS-I station: Gopal Oil Mill, Rajgarh

Student

Name: ARNAV CHANDAK(2023A1PS0781G)

Student Write-up:

PS-I Project Title: Bio Oil Derivatives

Short Summary of work done: Over the course of my project at Gopal Oil Mill, I investigated how agricultural and industrial residues can be converted into bio-oil and subsequently upgraded into a spectrum of value-added products, with a primary emphasis on Sustainable Aviation Fuel (SAF). I began by studying the fast pyrolysis of oilseed by-products, rice husk, bagasse, and used cooking oil to generate bio-oil, analyzing how the resulting liquid—high in oxygen and water content—requires extensive upgrading to become suitable for high-grade end uses. My main focus was on SAF production since it represents a strategic low-carbon alternative for the aviation sector; I explored in detail the hydrocracking and hydrodeoxygenation pathways, the roles of various catalysts, the need for significant hydrogen input, and the detailed process conditions necessary to achieve ASTM-certified jet fuel. I also examined product purification, fuel property targets, and scale-up challenges, highlighting the sustainability benefits such as greenhouse gas reductions with waste-based feedstocks. Alongside SAF, I mapped routes to other derivatives like biodiesel, marine biofuels, phenolic compounds, organic acids, BTEX aromatics, bio-lubricants, resins, carbon fiber precursors, and green solvents, each requiring unique process conditions, catalysts, and purification strategies. Through this comprehensive approach, I developed a technical framework that addresses the engineering, environmental, and integration aspects needed to transform conventional oil mills into multiproduct biorefineries capable of producing both transportation fuels and industrial chemicals for a sustainable future.

Objectives of the project: Researching and data collection on different feedstocks ,pathways and processes.

Tool used: Literature Review and Academic Databases ,Documentation and Presentation Tools, Data Analysis and Visualization , Reference Management Software , Chemical Engineering and Simulation Resources , Knowledge Enrichment and Concept Clarification.

Details of Papers/patents: Key Papers and Reviews Referenced :
Hydrotreatment of Pyrolysis Bio-oil: A Review
Efficient One-Stage Bio-Oil Upgrading over Sulfided Catalysts
Bio-oils Upgrading for Second Generation Biofuels
Bio-oil Upgrading by Cracking in Two-Stage Heated Reactors
Reduced-Order Model for Catalytic Cracking of Bio-Oil
An Overview of Recent Development in Bio-oil Upgrading
Upgrading of Biomass-Derived Bio-oil via Catalytic Hydrodeoxygenation and Cracking

Brief description of the working environment: My PS-I internship at Gopal Oil Mill was conducted in an online mode. The experience was collaborative and engaging, relying on digital communication platforms for all interactions.
The company expected me to:
Apply theoretical concepts from academic studies to actual bio-oil upgrading and SAF production problems.
Analyze technical bottlenecks in process chemistry, catalyst selection, and process engineering.

Communicate my findings clearly in regular progress updates, technical reports, and presentations.
Work proactively, showing initiative in researching recent advances, best practices, and relevant literature.
During my PS-I period, I gained:
A deeper appreciation for how chemical engineering fundamentals are translated into industrial processes, especially in bio-oil upgrading and sustainable fuel production.
Practical knowledge in process design, catalyst evaluation, and the operational realities of scaling up lab concepts for industry.
Confidence in handling technical documentation, research reporting, and summarizing complex topics for multidisciplinary teams.
Experience with remote teamwork, improving my communication skills and ability to seek resources and solutions independently.
Exposure to the workflow and expectations of industrial R&D, including time management, result-oriented reporting, and balancing academic rigor with practical constraints.
Insight into the sustainability aspects and regulatory framework guiding advanced biofuel adoption in real-world contexts.

Academic courses relevant to the project: Chemical Process Calculations
Thermodynamics
Heat and Mass Transfer
Organic Chemistry
Industrial Chemistry

Learning Outcome: Researching

PS-I station: Gopal Oil Mill, Rajgarh

Student

Name: FARAH ABBASI .(2023A1PS0815H)

Student Write-up:

PS-I Project Title: Oil blend use case predictor

Short Summary of work done: Developed a working web-based tool to predict ideal use-cases for oil blends . Did comparison of multiple ML models with documented performance. Built Backend-frontend integrated application hosted online

Objectives of the project: The objective of this project is to build a machine learning-based predictive tool that can recommend the ideal use-case(s) for an oil blend, based on its chemical and physical composition. This tool will assist industry professionals and researchers by automating the selection process of oil blends for applications such as lubrication, cosmetics, food, or pharmaceuticals, depending on the constituent features.

Tool used: Google Colab, GitHub, Netlify, POST, Shadcn

Details of Papers/patents: No references were taken from anywhere.

Brief description of the working environment: I had a great learning experience in the company and understood how real projects work.

Academic courses relevant to the project: yes

Learning Outcome: Machine Learning and Full stack website development.

PS-I station: Grasim Industries - Online, Nagda

Student

Name: SARANSH(2022A1PS1057P)

Student Write-up:

PS-I Project Title: Advancements in Auxiliary and Sulphuric Acid Plant

Short Summary of work done: researched about the sulphuric acid plant, the two types of crystallizers used, as it is online, we were limited to the research work.

Objectives of the project: Research about the new technology and increasing plant efficiency

Tool used: basic tools like MS Word, MS PowerPoint, and Google Scholar,

Details of Papers/patents: .

Brief description of the working environment: WFH

Academic courses relevant to the project: .

Learning Outcome: Learnt about the industry

PS-I station: Grasim Industries - Online, Nagda

Student

Name: PRAJYOT SINGH .(2023A1PS0174P)

Student Write-up:

PS-I Project Title: Enhancing Salt Whiteness

Short Summary of work done: Studied the plants of Grasim and

Objectives of the project: Enhancing Salt Whiteness in the Auxiliary and Sulphuric Acid Plants

Tool used: NA

Details of Papers/patents: NA

Brief description of the working environment: The working environment was lenient without any pressure. The company held regular seminars to explain their workings.

Academic courses relevant to the project: Separation Processes-1, Material Science

Learning Outcome: The workings of plants, chemical processes used.

PS-I station: Grasim Industries - Online, Nagda

Student

Name: AISHWARYA GUPTA .(2023A1PS1312P)

Student Write-up:

PS-I Project Title: Parameterization of Viscose Fibre Quality : Effect of Ripening Index and Ball Fall on Fibre properties

Short Summary of work done: My project mainly consisted of research and compiling that research into a report and presenting it, so it could be helpful to the viscose department at Grasim. I worked on factors controlling the value of RI and BF and other related parameters and how they affect fibre quality. Also, how to automate the process of measuring and prediction etc.

Objectives of the project: Research survey on impact of these process control fibres on viscose production, the factors that affect them, and ways to make measurement and control over these parameters easier and faster.

Tool used: none

Details of Papers/patents: none

Brief description of the working environment: Since the PS assignment was online, communication with the company professionals was limited. However, our FIC was very resourceful and prompt in helping us through the project.

Academic courses relevant to the project: none

Learning Outcome: I got to learn about the viscose fibre production process at Grasim industries through orientation sessions but different company professionals from various departments.

PS-I station: Grasim Industries - Online, Nagda

Student

Name: DHANAY PARIKH(2023A4PS0227G)

Student Write-up:

PS-I Project Title: Automation to eliminate fiber wrapping

Short Summary of work done: Just a few projects and ppts

Objectives of the project: To eliminate fiber wrapping using conveyor speed monitoring

Tool used: Chat GPT

Details of Papers/patents: None

Brief description of the working environment: Good
Academic courses relevant to the project: None

Learning Outcome: None

PS-I station: Grasim Industries - Online, Nagda

Student

Name: VISHAL MADHUSUDHAN REDDY BOMMAREDDY(2023A4PS1082G)

Student Write-up:

PS-I Project Title: Automation to eliminate fibre wrapping - tow leaving in cutter

Short Summary of work done: The project aimed to identify the probable causes of fibre wrapping in spinning and after-treatment department. We have also found out the possible solutions to the problems found

Objectives of the project: To identify probable cause of fibre wrapping and come up with solutions to automate the process of eliminating the wrapping

Tool used: Wikipedia , Microsoft powerpoint, MS word

Details of Papers/patents: -

Brief description of the working environment: Formal structured working environment with lots of support from mentors. Expectations only of learning.

Academic courses relevant to the project: Mechanical CDCs

Learning Outcome: We got to know how the company operates and we got to know how to work in a professional environment. we got to know about VSF production process.

PS-I station: Grasim Industries - Online, Nagda

Student

Name: ABHINAV GUPTA .(2023A5PS1155P)

Student Write-up:

PS-I Project Title: Health and Safety

Short Summary of work done: During my 54-day internship at Grasim Industries, I worked on designing a Health Monitoring System for shop floor employees in the Spinning and After-Treatment Plant. The project began with a thorough assessment of workplace hazards such as chemical exposure (CS_2, H_2S), high temperatures, and ergonomic risks. I studied past incident data and safety protocols to identify critical monitoring needs. Drawing inspiration from

Grasim's existing IoT-based Zero Liquid Discharge (ZLD) systems, I proposed an integrated solution using wearable devices and environmental sensors. The wearables would track vital signs like heart rate, SpO_2, and temperature, while ambient sensors monitor PM2.5, toxic gases, and humidity. I selected specific hardware components—WHOOP 4.0, Nova SDS011, Prana Air Pocket, and SenseCAP LoRa Gateway—based on industrial reliability, cost, and compatibility. A pilot budget of around ₹5.7 lakhs was developed for 20 workers in high-risk zones. I also mapped out an implementation roadmap including sensor deployment, wearable calibration, dashboard setup using ThingsBoard, and supervisor training. The system was designed to trigger alerts and support real-time decision-making, improving both safety and regulatory compliance. This project helped demonstrate how existing digital infrastructure can be extended to occupational health, with potential scalability across other departments and sites within the Aditya Birla Group.

Objectives of the project: Development of Health Monitoring System for Shop floor Employees

Tool used: Microsoft Excel / Google Sheets – For budgeting, planning, comparison tables Google Meet & Microsoft Teams – For remote meetings, discussions, mentor feedback PowerPoint & Canva – For creating presentations and visual documentation

Details of Papers/patents: No formal paper or patent was filed as part of this internship project, but the system design is original and may be refined for future publication or implementation.

Brief description of the working environment: My PS-I internship at Grasim Industries, Nagda was conducted in online mode, which posed some challenges in directly experiencing the physical plant environment. However, I was provided access to detailed internal reports and regular mentorship, which helped me gain insights into shop floor operations, especially in the Spinning and After-Treatment Plant.

The working environment at Grasim, as understood from documentation and discussions, is industrially intensive, with processes involving CS_2 manufacturing, high-temperature operations, and chemical handling. The company places strong emphasis on safety, sustainability (e.g., ZLD systems), and operational discipline. My mentors from Grasim and BITS Pilani were supportive and encouraged independent thinking while expecting timely progress updates and technically sound deliverables.

Despite being remote, I was expected to approach the project with seriousness and deliver a solution-oriented proposal backed by data, budget, and feasibility. I learned to interpret real-world safety data, evaluate industrial hardware, and apply IoT concepts to occupational health. This experience enhanced my technical research, budgeting, and project planning skills. Regular reviews helped refine my approach, and the final output was a scalable Health Monitoring System that aligns with Grasim's values of innovation and employee welfare.

This internship gave me an early exposure to how academic knowledge can solve real industry problems, and how cross-functional systems—hardware, software, safety—come together in a modern manufacturing setup.

Academic courses relevant to the project: Pharmaceutical Microbiology
Helped understand exposure risks to airborne microbes and contamination in industrial settings.
Pharmaceutical Engineering
Provided knowledge of unit operations, equipment design, and plant layout relevant to shop floor hazards.
Physical Pharmacy
Offered insights into thermodynamics, particulate behavior, and gas–solid interactions (e.g., PM2.5, vapors).
Environmental Sciences (BITS Elective)
Helped assess air quality, toxic exposure, and sustainability strategies (e.g., ZLD systems).

Learning Outcome: Over the course of this internship, I gained a clear understanding of the hazards involved in industrial environments, especially in CS_2 manufacturing. I explored how IoT systems like those in Grasim's ZLD operations can be extended to worker safety. I also learned to evaluate hardware, budget a pilot system, and design an end-to-end health monitoring solution. Beyond the technical aspects, this project improved my ability to plan, document, and communicate complex ideas effectively with mentors and industry professionals.

PS-I station: Grasim Industries - Online, Nagda

Student

Name: SAANVI DEVGUN .(2023A5PS1179P)

Student Write-up:

PS-I Project Title: Health solutions for shop floor employees at workplace in spinning and after treatment plant

Short Summary of work done: Research

Objectives of the project: Drug discovery- To study about ongoing research in drugs relevant to the injuries and diseases that employees working in spinning and after treatment plant face

Tool used: -

Details of Papers/patents: -

Brief description of the working environment: The workload was minimal, company representatives were helpful and focused on making us understand how the industry works.

Academic courses relevant to the project: Pharmaceutical formulations 1
Physical pharmacy
Mol bio and immuno
Process engineering

Learning Outcome: Learnt about various drugs and ongoing research in the industry

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PS-I station: Grasim Industries - Online, Nagda

Student

Name: ADDEPALLI SAI VAMSI .(2023A5PS1201P)

Student Write-up:

PS-I Project Title: Health Solutions for Shop Floor Employees at Workplace in Spinning and After Treatment Plant

Short Summary of work done: This project focused on improving health and safety conditions for shop floor employees in the Spinning and After Treatment Plant. A detailed hazard identification and risk assessment (HIRA) was conducted through on-ground observations, worker interviews, and safety audits. Key hazards included prolonged exposure to cotton dust, elevated noise levels, extreme temperatures, repetitive tasks, and inadequate post-incident medical support. A customized Health Monitoring System was proposed, combining biometric wearables, real-time alert systems, and regular health check-up schedules. Additionally, strategies were developed to make workplace healthcare more accessible and cost-effective, such as mobile clinics, on-site health insurance registration, and tie-ups with local hospitals. The proposed OHS system includes training modules, standard operating procedures (SOPs), PPE distribution, and a digitized incident reporting mechanism. The project offers a scalable model

that can be adapted to similar industrial environments to enhance employee well-being and operational sustainability.

Objectives of the project: 1) Understand all hazards for shop floor employees. 2) Design a Health Monitoring System for shop floor employees. 3) Propose ways to make healthcare and incident aftercare more affordable. 4) Design and propose OHS systems for shop floor employees.

Tool used: NA

Details of Papers/patents: NA

Brief description of the working environment: Through this project, I developed a multidisciplinary understanding of occupational health by integrating industrial hazard mapping with health-tech solutions. Interacting directly with shop floor employees offered practical insights into the daily risks they face, which are often overlooked in top-down OHS frameworks. The challenge of affordability drove me to explore low-cost healthcare delivery models and preventive strategies that can be implemented without disrupting operations. Overall, this experience enhanced my ability to apply scientific and technological knowledge to real-world workplace safety challenges.

Academic courses relevant to the project: EnvDev(HuEl), HRD(HuEl)

Learning Outcome: 1) Gained in-depth understanding of occupational hazards specific to spinning and after-treatment units, including chemical exposure, heat stress, and ergonomic risks.
2) Developed a tailored Health Monitoring System integrating wearable technology and periodic health screening protocols for early detection and intervention.
3) Proposed a comprehensive OHS framework focusing on hazard control, affordable aftercare, and preventive health education for shop floor workers.

PS-I station: Grasim Industries - Online, Nagda

Student

Name: AKSHAT KHANDELWAL .(2023B1AB0825P)

Student Write-up:

PS-I Project Title: Automation to eliminate Fiber Wrapping, Improve Jet Cleaning and Consistent Dryer Temperature

Short Summary of work done: Gathered operator insights to determine that uneven drying, as hot and cold spots on the dryer bed which creates brittle or clumped fibers prone to breakage. Developed the concept of an automated, multi-zone temperature control system utilizing infrared sensors and PID controllers. This solution enables real-time, zone-wise monitoring and adjustment, targeting consistency in fiber drying. Documented the process flow, system architecture, expected benefits and operational considerations in the report.

Objectives of the project: To find better methods to maintain uniform temperature profile across dryer/fiber bed, ultimately solving the fiber wrapping issue in the viscose fiber manufacturing process

Tool used: Powerpoint, Microsoft Word, Microsoft Excel, Canva, Google Docs

Details of Papers/patents: None

Brief description of the working environment: The PS-I was conducted entirely online for our station. Due to company confidentiality policies at Grasim Industries, access to plant data and machinery details was restricted, limiting real-time exposure. However, regular virtual meetings (1–2 per week) with mentors helped us understand various departments and key challenges like fiber wrapping. We focused on literature review, conceptual learning, and studied relevant research papers and industrial technologies to propose a feasible automation-based solution tailored to Grasim's needs. This improved my problem-solving and process understanding significantly.

Academic courses relevant to the project: Thermodynamics

Learning Outcome: Learned to read research papers effectively and summarize important ideas for a literature review. I also practiced turning research findings into practical solutions that can help improve real industry systems based on their specific needs.

PS-I station: Grasim Industries - Online, Nagda

Student

Name: KHUSH PRAKASH DEVNANI DEVNANI(2023B4A10912G)

Student Write-up:

PS-I Project Title: PARAMETERIZATION OF VISCOSE & FIBRE QUALITY

Short Summary of work done: good work

Objectives of the project: ONLINE MEASUREMENT OF RI, BALL FALL, AND KW

Tool used: excel,ppt,word

Details of Papers/patents: good

Brief description of the working environment: better than expected

Academic courses relevant to the project: chemical engineering

Learning Outcome: Coporate function understanding, Machinery used in Grasim,Technical knowledge.

PS-I station: Grasim Industries - Online, Nagda

Student

Name: DIVYA SHARMA(2023D2TS1234P)

Student Write-up:

PS-I Project Title: Recycle and Reuse Of industrial effluents under ZLD

Short Summary of work done: I worked on the project "Recycle and reuse of the effluents "studying the effluents characteristics generated from different units of plants,observing multistage effluents treatment processes,etc also Preparing a comprehensive presentation and Report summarizing the processes, challenges and innovation adopted by Grasim and other industries like textile,oil and refineries,etc

Objectives of the project: to study ,analyze also understand the processes involved in the recycling and reuse of industrial effluents under ZLD and other process

Tool used: Microsoft Teams, PowerPoint, Canva

Details of Papers/patents: N/A

Brief description of the working environment: NA

Academic courses relevant to the project: Environmental engineering ,Chemical Process Calculation/process engineering, environmental Chemistry, Instrumentation and Control,etc

Learning Outcome: in depth learning understanding of ZLD systems ,insights to resource recovery methods, understanding the link between industrial sustainability and environmental responsibility,etc

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PS-I station: Lighthouse Energy - Chemical, Toronto

Student

Name: PRATIBHA SRIVATSAN(2023A1PS0104G)

Student Write-up:

PS-I Project Title: FINANCIAL DECKS, DUE DILIGENCE, AND INVESTOR RELATIONS MATERIAL PREPARATION

Short Summary of work done: As part of a strategic due diligence project for Lighthouse Energy, I conducted a comprehensive review of key corporate and technical documents to assess investor readiness. This included analyzing foundational records such as articles of

incorporation, legal agreements, and financial projections. I identified critical gaps in open-source software (OSS) license compliance, including the absence of an OSS inventory, license usage reporting, and contributor license agreements—highlighting potential IP and legal risks. I also benchmarked best practices in external communication and co-drafted a clear, accessible investor newsletter, using insights from the pitch deck and aligning the tone for Substack. The newsletter introduced Lighthouse Energy's work in clean energy and microgrids in simple, engaging language. The project bridged legal, technical, and communication domains, and emphasized the importance of transparency, compliance, and storytelling in building investor confidence.

Objectives of the project: The objective of this project was to support Lighthouse Energy's investor readiness and strategic positioning by conducting a focused due diligence review. Key goals included identifying gaps in open-source software license compliance, improving understanding of IP risks, and enhancing communication through a clear, accessible investor newsletter. The project also aimed to simplify technical narratives for broader audiences and recommend best practices for sustainable, compliant growth in clean energy infrastructure.

Tool used: Google Workspace (Docs, Sheets, Slides), Canva, Substack, Notion, Black Duck (referenced for research).

Details of Papers/patents: NA

Brief description of the working environment: The working environment was collaborative and research-driven, with a strong focus on strategic thinking and clear communication. Expectations from the company included independent problem-solving, attention to detail, and the ability to simplify complex technical and legal information for broader audiences. I was encouraged to explore cross-functional areas such as IP, compliance, and investor communications. This allowed me to develop a well-rounded understanding of how clean energy startups operate, the importance of open-source governance, and how clear storytelling can strengthen investor trust and support long-term growth.

Academic courses relevant to the project: NA

Learning Outcome: Understanding of open-source software licensing and compliance, familiarity with contributor license agreements and IP ownership issues, ability to conduct data room audits and interpret foundational corporate documents.

PS-I station: Lighthouse Energy - Chemical, Toronto

Student

Name: BALRAM BHALA(2023A1PS0116G)

Student Write-up:

PS-I Project Title: Business Development - Sales & GTM strategy

Short Summary of work done: During my Practice School-I at Lighthouse Energy, I worked on business development, focusing on sales and Go-To-Market (GTM) strategy. I began by compiling a leads database of wind, solar, and energy storage projects across Canada, segmented by province and capacity. This was followed by identifying potential clients, creating a list of relevant Points of Contact (PoCs), and preparing a presentation of key findings. Alongside lead generation, I contributed to refining the company's 10-step sales process and supported the development of the GTM strategy. I also reviewed the post-sales Technical Customer Success document for clarity and compliance with Canadian regulations. Toward the end of the internship, I participated in analyzing financial feasibility for target clients using the company's financial model. The experience offered practical exposure to market research, client targeting, and strategic planning, along with insights into startup operations in the renewable energy sector.

Objectives of the project: To curate the sales process, support customer success and compliance review, identify potential leads and PoCs, and contribute to GTM strategy through financial feasibility analysis.

Tool used: Canva (for presentation design); Google Sheets and Docs (for research compilation and documentation).

Details of Papers/patents: Not applicable.

Brief description of the working environment: Lighthouse Energy provided a collaborative and fast-paced startup environment where interns were treated as active contributors. The company encouraged initiative, independent thinking, and clear communication. Expectations included ownership of assigned tasks, strong research capabilities, and alignment with the company's broader goals.
The working environment was open and flexible, with direct interaction with mentors and leadership. Regular feedback helped guide our progress and refine our deliverables. Despite the startup setting, there was strong emphasis on structure, clarity, and quality of output.

During the internship, I gained hands-on experience in business development, working on lead generation, sales process review, and Go-To-Market (GTM) strategy. I also learned about client segmentation, regulatory compliance, and the practical use of financial models in decision-making. The experience helped me understand how strategy and execution come together in a real-world business context.

Academic courses relevant to the project: Principles of Management, Technical Report Writing, and Environmental Studies.

Learning Outcome: During the course of my PS-1, I gained valuable exposure to the intersection of business development and the renewable energy sector. I developed a strong understanding of sales processes, lead qualification, and the fundamentals of Go-To-Market (GTM) strategy. The experience also enhanced my ability to conduct market research, evaluate financial feasibility, and coordinate across cross-functional teams. Additionally, I learned the importance of aligning post-sales documentation with regulatory compliance and how strategic planning plays a critical role in early-stage business growth.

PS-I station: Sungold Suppliers Pvt Ltd, Kota Rajasthan, Kota

Student

Name: ARPIT NIKHIL SRIVASTAVA .(2023A1PS0199P)

Student Write-up:

PS-I Project Title: Understanding the Production of Metallic Stearates and Exploring the Market for Export

Short Summary of work done: Assisted in monitoring the production process of metallic stearates, conducted quality checks, studied packaging methods, and researched international market trends, regulatory standards, and export potential for various industries.

Objectives of the project: To study the production process of metallic stearates and evaluate export market opportunities and quality standards for global trade.

Tool used: Google Slides, Microsoft Excel

Details of Papers/patents: Referred to research papers, technical datasheets, and market reports to understand chemical properties, industrial applications, global demand trends, and regulatory standards related to metallic stearates and their export.

Brief description of the working environment: The working environment at Sungold Suppliers Pvt. Ltd. was highly professional, process-oriented, and safety-conscious. Employees followed strict protocols, especially in production and quality control areas, ensuring a disciplined and responsible work culture. The team was collaborative, and I had the opportunity to interact with operators, supervisors, and the R&D personnel, which enriched my practical understanding of chemical manufacturing.
The company expected us, as PS-I interns, to be observant, punctual, and proactive in learning. We were encouraged to ask relevant questions, maintain detailed notes, and understand not only the chemical processes but also the importance of safety, quality assurance, and documentation in an industrial setup.
During my time here, I learned how theoretical knowledge from academics applies in real industrial workflows. I gained valuable exposure to production monitoring, quality testing, material handling, and packaging systems. Additionally, I developed a deeper understanding of industrial discipline, regulatory compliance, and the importance of market research in business growth.

Academic courses relevant to the project: Engineering Chemistry, Material Science and Thermodynamics

Learning Outcome: Gained insights into metallic stearate production, quality control practices, and packaging protocols, while also analyzing global market trends, export regulations, and emerging opportunities for international trade expansion.

PS-I station: Sungold Suppliers Pvt Ltd, Kota Rajasthan, Kota

Student

Name: NAMAN CHATTER .(2023A1PS0253P)

Student Write-up:

PS-I Project Title: MANUFACTURING & MARKET ANALYSIS OF HIGH-PURITY METALLIC STEARATE

Short Summary of work done: During my Practice School-I at Sungold Suppliers Pvt. Ltd., Kota, I was involved in both the technical, commercial & marketing aspects of high-purity metallic stearate production. Initially, I focused on understanding the end-to-end manufacturing process of zinc, calcium, aluminium, cadmium stearates etc, including raw material procurement, reaction mechanisms, equipment used, and quality control methods. I observed plant operations closely, interacted with the staff present there, and studied key process parameters like temperature, moisture content, melting point purity levels etc. In the second phase, I carried out a detailed technical market analysis to understand the export potential of these stearates. This involved researching the global market size, growth trends, regional demand, and compliance requirements such as FDA, REACH, GMP, and Halal/Kosher certifications. I also studied trade patterns, major international players, and distribution networks. The goal was to identify growth opportunities for the company in high-margin, regulation-driven export markets. This internship gave me real-world exposure to chemical manufacturing and helped me connect classroom concepts with industrial practices. It also strengthened my analytical and problem-solving skills through hands-on learning and market research.

Objectives of the project: To understand and analyze the manufacturing process of metallic stearates like calcium and zinc stearate, along with a basic technical and market analysis to identify scope for improvement and demand trends.

Tool used: Reactors, laboratory ovens, air-lift systems, silos, chimneys, conveyors, HDPE bagging machines; lab tools like melting point apparatus, humidifier, weighing scales, mesh classifiers; software tools like Microsoft Excel, Google Scholar, online research databases, Indian Standards database, FDA Database.

Details of Papers/patents: Studied ISI standard papers including IS 2519 (Calcium Stearate), IS 2520 (Zinc Stearate), IS 2521 (Magnesium Stearate), IS 9681 (Stearic Acid) and a few other regulatory reports to understand quality specifications, testing methods and regulatory benchmarks.

Brief description of the working environment: The working environment at Sungold Suppliers Pvt. Ltd., Kota was professional, disciplined, and highly learning-oriented. The plant staff, engineers, and R&D team were approachable and supportive, always willing to explain processes and answer questions. I was encouraged to observe live operations on the shop floor, interact with plant staff and participate in discussions about process improvements. Facility maintained cleanliness and operational efficiency throughout.
The company expected sincerity, punctuality and a willingness to learn from all interns. Regular feedback sessions with the mentor helped in tracking progress and refining our approach to the project.

During the course of the internship, I gained hands-on exposure to the manufacturing process of high-purity metallic stearates, starting from raw material procurement to product packaging and dispatch. I learned how industrial-scale reactors, air-lift systems, silos, and automated packing units operate. I also observed the working of QC labs and the methods used for testing parameters like melting point, moisture content, and bulk density. In the latter part, I explored international market trends and regulatory requirements like REACH, FDA, and GMP.
Overall, the PS-I experience bridged the gap between theory and practice, offering valuable insights into both the technical and commercial sides of chemical manufacturing.

Academic courses relevant to the project: Chemical Process Calculations, Principles of Economics, Fluid Mechanics, Engineering Chemistry, Technical Report Writing, Heat Transfer, Chemical Engineering Thermodynamics, Material Science

Learning Outcome: Gained hands-on understanding of metallic stearate production, quality testing methods, process optimization techniques, and insights into current market demand and industrial applications.

PS-I station: Central Public Works Department (CPWD) - Pune, Pune

Student

Name: YASHVARDHAN SHAHU MOTE(2023A4PS0255G)

Student Write-up:

PS-I Project Title: STREAMLINING QUOTATIONS AND THEIR JUSTIFICATIONS AT CPWD, AND DEVELOPING A MONITORING SYSTEM TO TRACK THE PROGRESS OF A PROJECT.

Short Summary of work done: We automated manual labour of typing description, unit and rate of all the items which are used in justification document used in CPWD

Objectives of the project: To streamline tendering process and reduce errors in tender

Tool used: Excel

Details of Papers/patents: -

Brief description of the working environment: The work environment is really nice. There were no hard deadlines.

Academic courses relevant to the project: yes

Learning Outcome: Excel

PS-I station: Central Public Works Department (CPWD) - Pune, Pune

Student

Name: VIJAYANT JOSHI(2023A7PS0030G)

Student Write-up:

PS-I Project Title: STREAMLINING QUOTATIONS AND THEIR JUSTIFICATIONS AT CPWD, AND DEVELOPING A MONITORING SYSTEM TO TRACK THE PROGRESS OF A PROJECT.

Short Summary of work done: During PS-I, we worked on a project titled "Streamlining Quotations and Their Justifications at CPWD, and Developing a Monitoring System to Track the Progress of a Project." The core objective was to automate and optimize the process through which CPWD engineers justify project quotations based on component-level analysis. We began by studying the traditional workflow of CPWD's cost estimation and material requirement processes. A macro-enabled Excel system was developed to replace manual calculations. The engineer inputs an item code and quantity into a structured Justification sheet, which then triggers a VBA macro to pull relevant component breakdowns from a datasheet. Using proportional calculations, the system determines the required quantity and total cost of each component based on standardized rates from a basic_rate sheet. The output is displayed in a Project_Monitor sheet, where the engineer can view the component code, its description, total quantity needed, and overall cost — all calculated dynamically. The macro also runs automatically upon saving the workbook, ensuring real-time updates. Additionally, we developed an interactive Excel dashboard to visualize budget tracking, labor deployment, project milestones, and tender status. This dashboard integrates tightly with the justification logic, providing CPWD with a comprehensive project monitoring and decision-support tool.

Through this project, we learned about government procurement workflows, Excel automation with VBA, and principles of structured data modeling for real-world applications.

Objectives of the project: Automate quotation justification calculations, ensure transparency and accuracy, link quotation inputs to real-time monitoring, standardize the format for quotation justification, create a dynamic and interactive monitoring dashboard, enable event-driven automation (macro integration), support decision-making for engineers and administrators.

Tool used: We utilized various software tools but mainly Microsoft Excel, VBA scripts and Python.

Details of Papers/patents: N/A

Brief description of the working environment: The working environment during PS-I was collaborative, technically engaging, and aligned with real-world civil infrastructure practices followed by CPWD (Central Public Works Department). We worked primarily with macro-enabled Excel systems and data files used by CPWD engineers to justify quotations for construction items. The workflow simulated the actual documentation, estimation, and material tracking that occur in public sector infrastructure projects.
From the company's perspective, the expectation was to develop a tool that would streamline the item justification process by automating component-wise calculations and linking them to real-time project monitoring. The goal was not only to improve speed and accuracy but also to standardize the format and structure of the data used in budgeting and planning.
During the internship, we learned to work with structured spreadsheets, VBA macros, and data models that closely reflect actual government engineering practices. We developed the ability to parse, manipulate, and normalize data across multiple sheets (Justification, datasheet, basic_rate), build a live-updating monitoring tool, and ensure the solution was user-friendly for engineers. Moreover, we gained insight into how public sector projects track material consumption, labor deployment, and financial progress — and how digital tools can modernize this process.
The experience sharpened our technical problem-solving, attention to detail, and ability to design for real users in an engineering environment.

Academic courses relevant to the project: Software Tools and Programming
Provided the foundation for writing logic-driven macros using VBA in Excel and understanding how to automate repetitive engineering calculations.
Data Structures and Algorithms
Helped in designing efficient lookup mechanisms and mapping structures such as dictionaries and search logic to match item codes and calculate derived quantities.
Database Management Systems (DBMS)
Concepts like relational mapping and normalization were directly applied in linking data between the Justification, datasheet, and basic_rate sheets in Excel.
Engineering Drawing and Estimation

Gave insight into the basics of construction items, unit measurements, and the need for quantity justification in infrastructure projects.
Construction Planning and Management
Supported the development of the dashboard for tracking labor, budget, and project progress, using timeline planning and resource tracking techniques.
Applied Mathematics
Concepts like proportion, rounding, and cumulative calculations were used in component-wise quantity derivation and cost estimation.
Spreadsheet Modeling and Decision Support Systems (if applicable)
Helped apply spreadsheet functions, pivot tables, conditional formatting, and data visualization techniques to create the monitoring dashboard.

Learning Outcome: Understanding of CPWD Estimation Workflows
Gained in-depth knowledge of how CPWD engineers justify quotations, including the structure of item-wise justifications, component breakdowns, and rate applications used in government tendering and budgeting.
Hands-On Experience with Excel Automation and Macros
Learned how to write and integrate VBA macros within Excel to automate complex calculations, trigger real-time updates, and link sheets for dynamic reporting.
Data Structuring and Relational Mapping
Developed the ability to design and work with structured data models across multiple Excel sheets (Justification, datasheet, basic_rate, Project_Monitor), applying principles similar to relational databases.
Formula-Based Dynamic Reporting
Built dashboards using Excel functions (e.g., MATCH, VLOOKUP, IFERROR, ROUND, etc.), pivot tables, and conditional formatting to create meaningful and interactive visualizations.
Debugging and Code Normalization in Excel
Understood how Excel interprets numbers (e.g., auto-removing leading zeros) and implemented techniques like string formatting (Format$(..., "0000")) to ensure accurate code matching and calculations.
User-Centric Interface Design
Focused on designing an intuitive system for CPWD engineers, where minimal input effort results in a comprehensive component-level cost analysis and tracking.
End-to-End Project Monitoring Logic
Learned to connect initial estimation (quotation input) to material consumption tracking and budget monitoring, enabling a complete feedback loop within a single Excel-based solution.
Version Control and Event Handling in Excel
Integrated macro triggers on workbook save (Workbook_BeforeSave) to ensure that the monitoring system updates seamlessly without manual intervention.

PS-I station: Central Public Works Department (CPWD) - Pune

Student

Name: AAYUSH KHODKE(2023B1A10658G)

Student Write-up:

PS-I Project Title: Streamlining quotations and their justifications at CPWD, and developing a monitoring system to track the progress of a project.

Short Summary of work done: We developed an automation tool for the simple use of tendering process and quoatation making using VBA, also developed a project monitoring dashboard for the easy tracking of CPWD projects

Objectives of the project: Making Tender project easier for the CPWD People

Tool used: Advanced Excel, VS Code, Python, VBA

Details of Papers/patents: N/A

Brief description of the working environment. They were very understanding about our problems even though everyone was an Officer there. Working environment couldn't have been better.

Academic courses relevant to the project: CP

Learning Outcome: Use of VBA and advanced Excel

PS-I station: Centre for Railway Information Systems, Infrastructure - New Delhi, New Delhi

Student

Name: MOHIT BUGALIA(2023D2TS1247P)

Student Write-up:

PS-I Project Title: Real-Time Signal Monitoring Dashboard

Short Summary of work done: During my Practice School-I (PS-I) internship at the Centre for Railway Information Systems (CRIS), I was assigned the task of developing a Real-Time Signal Monitoring Dashboard. The objective was to create a web-based interface to visualize voltage and current signal data for various railway assets deployed across multiple locations. I designed and implemented a full-stack application using Flask for the backend, PostgreSQL as the database, and Plotly.js with AJAX for the frontend graphs and interactivity. Initially, the system was set up to extract data from a local SQLite database, which was later transitioned to a live PostgreSQL database (managed via pgAdmin 4) to ensure real-time data accessibility. The dashboard features dynamic dropdown filters for selecting locations and asset codes, real-time plotting of 8 voltage/current parameters with color-coded anomaly detection, and graph updates in 30-minute time windows in an infinite loop. Additionally, I implemented graph export functionality (PDF/CSV) and data filtering based on defined thresholds. I also handled advanced frontend requirements such as smooth graph animations, dynamic range setting for better readability, and user-friendly UI enhancements. Multiple rounds of debugging and backend optimizations were done to ensure robust performance and seamless user experience. Towards the end of the internship, I shared the complete solution in a GitHub repository for future interns to continue work and extend deployment. This project helped bridge theory with practice and gave me a solid understanding of real-world system integration, full-stack development, and data visualization for infrastructure monitoring.

Objectives of the project: The primary objective of the project was to develop a real-time signal monitoring dashboard for CRIS using Flask and PostgreSQL. It aimed to visualize live voltage/current data, detect anomalies using threshold logic, enable infinite graph cycling, and provide export functionalities to enhance infrastructure monitoring and decision-making efficiency...

Tool used: Software Tools: Flask – Python web framework for backend API development PostgreSQL with pgAdmin 4 – For structured database storage and management Plotly.js – For interactive, real-time graph plotting on the frontend HTML, CSS, JavaScript (AJAX, jQuery) – For building and styling the frontend interface Python – For data processing, filtering logic, and backend operations VS Code – Primary code editor and IDE for development Docker (Optional) – For environment setup and local testing (if used) Git & GitHub – For version control and code collaboration Chrome DevTools – For frontend debugging and real-time testing Hardware Tools: Standard Development Laptop/PC – With internet connectivity and sufficient RAM Local PostgreSQL Server – Hosted on development machine for database operations

Details of Papers/patents: None

Brief description of the working environment:
The expectations from the company were clear: to understand the technical infrastructure, apply logical thinking, and contribute to the ongoing development of live signal monitoring dashboards used in Indian Railways. I was expected to work with actual datasets, maintain data consistency and reliability, and ensure user-friendly visualization of electrical parameters (voltage and current) across multiple assets and locations.
The learning curve was steep yet highly enriching. I gained hands-on experience in full-stack development using Flask for backend APIs and Plotly.js for dynamic frontend graph rendering. I also learned how to integrate PostgreSQL databases using pgAdmin 4, and implement AJAX-based interactivity for real-time data updates. Critical debugging, efficient querying, performance tuning, and frontend-backend synchronization were key technical skills acquired.
Overall, this internship enhanced my understanding of scalable systems, industry-grade software development practices, and how IT systems like CRIS support real-time decision-making in large public-sector infrastructures. It also helped improve my communication, documentation, and time management skills...

Academic courses relevant to the project: Object-Oriented Programming,
Database Systems,
Computer Networks,
Human-Computer Interaction,
Data Structures and Algorithms,
Web Technologies,
Software Engineering etc ....

Learning Outcome: Through this project, I gained hands-on experience in developing full-stack web applications using Flask, PostgreSQL, and JavaScript (Plotly). I learned to handle live data visualization, implement dynamic filters, and design scalable, user-friendly dashboards. Additionally, I understood how to integrate backend logic with frontend visualization, manage database queries efficiently, and implement real-time anomaly detection with effective UI enhancements and export features...

PS-I station: Claravest Technologies Private Limited, Navi Mumbai

Student

Name: DEEPINDER SINGH PRUTHI .(2023A2PS0290P)

Student Write-up:

PS-I Project Title: AI Valuation tools

Short Summary of work done: Worked on a proof of concept- AI valuation tool to figure out fractional real estate valuation

Objectives of the project: Research for the AI tool they're planning to build

Tool used: None

Details of Papers/patents: None

Brief description of the working environment: Good experience had fun working with so experienced founders.

Academic courses relevant to the project: yes

Learning Outcome: PropTech sector and formal communication

PS-I station: CRRI- Computer Centre & Networking, New Delhi

Student

Name: PALAK GOYAL(2023A7PS0396G)

Student Write-up:

PS-I Project Title: GUI optimization for speed violation Tool

Short Summary of work done: This project focuses on optimizing speed limits on urban roads in India using real traffic data. It introduces a new metric called Speed Ratio (SR) to measure speed variability and assess driving behavior. By analyzing percentile speeds and applying k-

means clustering, the study categorizes risk levels and establishes a strong inverse relationship between SR and optimal speed limits. A penalty-based model recommends safer speed limits between 35–50 km/h. The project combines statistical analysis and machine learning to support data-driven, safety-oriented traffic planning

Objectives of the project: The objective of this project is to optimize speed limits on urban roads in India by analyzing real-world traffic data and driver behavior. A new metric called Speed Ratio (SR) is introduced to assess speed variability using percentile speeds. By applying clustering techniques, driving behavior is categorized into risk levels, and a strong inverse relationship between SR and ideal speed limits is established. A penalty-based optimization model is then used to recommend appropriate speed limits ranging from 35 to 50 km/h, ensuring improved compliance, reduced violations, and enhanced road safety.

Tool used: python ,upside,gui

Details of Papers/patents: no

Brief description of the working environment: Really good

Academic courses relevant to the project: yes

Learning Outcome: This project provided valuable insights into the use of data-driven methods for traffic speed management. It introduced the Speed Ratio as an effective metric to assess driving behavior and speed variability. Through clustering and regression analysis, the study demonstrated how driver compliance and risk levels can be quantitatively evaluated. The project also highlighted how optimal speed limits can be scientifically recommended using real-world data, contributing to safer and more efficient urban traffic systems. Additionally, it reinforced skills in statistical analysis, traffic behavior modeling, and practical application of machine learning techniques like k-means clustering.

PS-I station: CRRI- Computer Centre & Networking, New Delhi

Student

Name: KANIK KUMAR .(2023A7PS0575P)

Student Write-up:

PS-I Project Title: Design and development of Web-Based vehicle indent Management System

Short Summary of work done: During my 8-week internship at CSIR-Central Road Research Institute (CRRI), I worked on the project titled "Design and Development of a Web-Based Vehicle Indent Management System", under the Computer Centre and Networking Division. My primary responsibility was backend development, where I built core modules using Python and integrated them with a relational database to manage vehicle booking requests. The system was designed to streamline the government vehicle requisition process, involving three roles: Employee, HOD, and Transport Head. I implemented key backend functionalities such as user authentication, role-based access control, indent form processing, and workflow tracking. I also contributed to API development for frontend-backend integration and ensured proper data validation and security. Throughout the internship, I collaborated with the development team, followed a structured development approach, and submitted weekly progress reports. This experience gave me hands-on exposure to real-world government software systems and enhanced my technical, problem-solving, and project management skills.

Objectives of the project: To design a web application for vehicle booking for government employees of CRRI

Tool used: Software Tools: Programming Language: Python Framework: Flask/Django (as applicable) Database: SQLite / MySQL API Development: RESTful APIs using Python Frontend (for integration): HTML, CSS, JavaScript (basic level, if applicable) Version Control: Git IDE: VS Code / PyCharm Project Management: Weekly Progress Reports and Documentation (Word, Excel) Hardware Tools: Standard Desktop/Laptop System Internet Connectivity for remote collaboration and deployment CRRI's internal network and systems for testing and access control

Details of Papers/patents: None

Brief description of the working environment: During my PS-I at CSIR-Central Road Research Institute (CRRI), I was placed under the Computer Centre and Networking Division. The working environment was professional yet collaborative, where interns were encouraged to take initiative and deliver quality work. I worked under the guidance of experienced scientists and technical staff who provided valuable feedback throughout the internship. Regular discussions, weekly reviews, and task-based progress tracking ensured a structured workflow.

The expectations from the organization were clear: to understand the problem statement thoroughly, contribute effectively to the development of the web-based vehicle indent management system, and demonstrate professionalism in both communication and documentation. We were expected to meet deadlines, maintain clean code, and follow standard development practices.

The learning experience was highly enriching. I developed strong backend development skills using Python and relational databases, and gained exposure to REST API design and integration.

I also learned about government workflow systems and how digital solutions are implemented to improve efficiency. This project helped me improve my problem-solving ability, logical thinking, and understanding of full-stack development processes.
Overall, the PS-I experience gave me a hands-on understanding of working in a government R&D environment and provided a strong foundation in software development and project execution.

Academic courses relevant to the project: Database management system and few others

Learning Outcome: Backend Development Skills: Strengthened my knowledge in backend technologies using Python, REST APIs, and database integration for real-world applications.
Project Workflow Understanding: Understood the end-to-end lifecycle of software development—from requirement gathering to deployment and testing.
Government Workflow Exposure: Learned how digital systems are designed to streamline and digitize manual government workflows.
Team Collaboration: Improved communication and coordination by working under the mentorship of experts and aligning tasks with team objectives.
Problem Solving: Tackled practical challenges in form validation, role-based access, and workflow management within tight timelines.
Documentation and Reporting: Enhanced my skills in maintaining clear project documentation and weekly progress reporting

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PS-I station: CRRI- Computer Centre & Networking, New Delhi

Student

Name: DEEPAYAN MUKHERJEE .(2023A8PS0682P)

Student Write-up:

PS-I Project Title: PASSANGER CARRYING UNIT ANALYSIS FOR URBAN SPEED LIMIT OPTIMIZATION

Short Summary of work done: My Practice School-I project was conceptualized as a fo cused case study in accident data analysis using modern computational tools. The primary objective was to collect, clean and analyze large volumes of real-world traffic accident data from a major

urban region and to extract actionable insights that could inform speed regulation and infrastructure planning. A significant component of the study involved preparing the data for conversion into Passenger Car Units (PCU)—a standardized measure that translates diverse vehicle types into a common unit of traffic flow. This lays the groundwork for a more equi table and precise analysis of traffic congestion and its relationship with accident severity. The project's final objective is to support CRRI's efforts in developing statistical mod els that optimize urban speed limits, balancing safety imperatives with the need for efficient mobility.

Objectives of the project: The project was conceptualized with the intent of enabling data-informed decisions in urban traffic policy, specifically focusing on speed limit optimization through scientific analysis of accident data.

Tool used: Python, Pandas, Matplotlib

Details of Papers/patents: na

Brief description of the working environment: The working environment was pleasant and relaxed. The company mentors fostered a holistic environment which favored creativity, growth and learning.

Academic courses relevant to the project: NA

Learning Outcome: A combination of programming libraries, technical standards, and analytical frameworks were utilized to execute the various stages of this project. Each tool was selected for its relevance to data preprocessing, visualization, or transport system modeling.

PS-I station: Eastern Estate Construction and Developers Private Limited - Tech, Bhubaneshwar

Student

Name: ANNIKA DAVULURI(2023A4PS0006G)

Student Write-up:

PS-I Project Title: BRICKLAYING AND REBAR TYING ROBOTS AND SURVEILLANCE SYSTEMS + NEXT GENERATION SITE SELECTION

Short Summary of work done: During my internship at Eastern Estate Construction and Developers, I worked on two main projects. The first one focused on automation in construction, where I researched the use of bricklaying and rebar-tying robots on construction sites. I studied how these technologies can reduce manual labour, improve efficiency, and what challenges come with their implementation, especially in the Indian construction sector. Midway through the internship, our project was changed, and we were assigned a new task — to identify potential land parcels for upcoming residential projects. We began by understanding the company's requirements and market trends. After that, we focused on Tier 2 and Tier 3 cities near growing industrial areas, since those locations offer affordable land and have rising demand for housing from new employees moving in. We created a criteria matrix to rate each site, used tools like Google Earth and GIS platforms to study locations, and shortlisted the top five parcels. Our team then presented a detailed comparison, including pros and cons of each option, backed by maps, tables, and site-specific data. Based on feedback, we kept refining our research and explored further details like infrastructure access and development potential. Overall, the internship helped me learn how to handle real-world problems, work with data, and communicate findings clearly. It also gave me a better understanding of how the construction and real estate industry operates from both a technical and planning point of view.

Objectives of the project: Market research on products, costing, technical specifications, and applications of automation systems and robots for rebar tying, surveillance systems in construction sites. Second half was about scouting new land parcels and potential sites for luxury residential projects

Tool used: Ai tools, gis systems, google earth

Details of Papers/patents: -

Brief description of the working environment: The internship was conducted entirely online, which meant most of our communication happened over video calls, emails, and shared documents. We were expected to be self-motivated and manage our time well, since tasks were given with flexible deadlines. Regular check-ins were held to discuss progress, ask questions, and receive feedback. Although remote, the mentors were approachable and supportive, and we were encouraged to take initiative, work in teams, and think critically about real-world challenges in the construction and real estate sector.

Academic courses relevant to the project: Trw, material science, manufacturing processes, mechanisms and machines, math

Learning Outcome: Learnt about the current market scene in the field of construction revolutions, automation applications for safety and increasef efficiency. Also learnt how to

present relevant information and conduct product and requirement-specific research to optimise further projects.

PS-I station: Eastern Estate Construction and Developers Private Limited - Tech, Bhubaneshwar

Student

Name: SURJOT SINGH SAWHNEY(2023A4PS0763H)

Student Write-up:

PS-I Project Title: Research on Autonomous Vehicles and Sewage Treatment Plants

Short Summary of work done: Compared EECD's vehicle fleet with similar Indian and Global projects. Recommended which vehicles are better to use on basis of costs and quality. Then chose a technology for the STPs which EECD might use in its townships. Designed the plant and the pilot.

Objectives of the project: To compare EECD's construction fleet with the others and choose which is best. Choose technology and design an STP pilot for EECD's townships

Tool used: Google Docs, Sheets, Slides

Details of Papers/patents: NA

Brief description of the working environment: A standup schedule was given to us according to which we were supposed to complete the parts of the research and present it to the mentors.

Academic courses relevant to the project: NA

Learning Outcome: autonomous vehicles, sewage, treatment plants, automation

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PS-I station: Eastern Estate Construction and Developers Private Limited - Tech, Bhubaneshwar

Student

Name: DIVY AGRAWAL .(2023A7PS0658P)

Student Write-up:

PS-I Project Title: Website design intern

Short Summary of work done: We made the company website design look good

Objectives of the project: Improve website design

Tool used: React

Details of Papers/patents: N/A

Brief description of the working environment: Remote, so fine

Academic courses relevant to the project: No

Learning Outcome: Industrial experience

PS-I station: Hyphen SCS Pvt Ltd, Noida

Student

Name: LAKSHYA SRIVASTAVA(2023A4PS0058G)

Student Write-up:

PS-I Project Title: ROI and IRR model

Short Summary of work done: ROI and IRR MODEL along with warehouse cost calculator.

Objectives of the project: To make an ROI and IRR model for different warehouse clusters throughout the country.

Tool used: Excel, VS code, canva, MS powerpoint, Word

Details of Papers/patents: No

Brief description of the working environment: good

Academic courses relevant to the project: None

Learning Outcome: Info about Grade A and Grade B warehouses

PS-I station: Hyphen SCS Pvt Ltd, Noida

Student

Name: N SAI SIDDHARTHA(2023A4PS0917G)

Student Write-up:

PS-I Project Title: Warehouse Approvals in India for Model National Logistics Policy

Short Summary of work done: This project undertook a first-of-its-kind effort to decode, analyse, and streamline India's fragmented warehousing approval framework in line with the Model National Logistics Policy. Through extensive research, detailed mapping, and systematic data organization, it has laid critical groundwork for simplifying and standardizing warehouse permissions across the country. Over 700 state-specific permissions were identified, consolidated into 150 unique permissions, and further streamlined into 70+ common heads, enabling nationwide harmonization. A state-permission applicability matrix and phase-wise Gantt charts were developed to provide policymakers and developers with clear, actionable roadmaps for project approvals. Deep-dive analyses of key logistics states—Delhi,

Maharashtra, Tamil Nadu, and West Bengal—yielded region-specific best practices and improvement opportunities. Recommendations include a standardized modular approval package and a unified digital clearance platform to simplify procedures, enhance transparency, and reduce delays. The project also delivered significant professional learning—ranging from regulatory analysis and cost modelling to structured data management and policy problem-solving. The findings and tools created serve as a scalable foundation to accelerate warehouse development, reduce administrative complexity, and strengthen India's position as an efficient, integrated, and globally competitive logistics hub.

Objectives of the project: Analyse and Streamline the fragmented Warehouse Approval Framework across India

Tool used: Excel, PPT, Google Sheets, Google Docs, Government Databases

Details of Papers/patents: Results were submitted in a form of Pitch Deck at FICCI's 3rd Logistics Committee Meeting.
I am Currently co-authoring a policy report to publish my findings as Hyphen's IP

Brief description of the working environment: Working Environment was excellent. Everyone was provided an individual desk and snacks and tea were available for everyone in the office at all times.
Mentors were supportive throughout the internship and thought guidance was provided at every step.
Discipline, Commitment to word and delivery within deadlines were my key learnings.

Academic courses relevant to the project: NA

Learning Outcome: Hands on experience in Policy research, Policy Analysis, Data Analytics, Cost Modelling and Report Creation.

PS-I station: Hyphen SCS Pvt Ltd, Noida

Student

Name: DIBYANSH RAI(2023B3PS0852G)

Student Write-up:

PS-I Project Title: 1. Optimising Warehouse Approvals In India, 2.ROI/IRR Model for Warehouses

Short Summary of work done: I finished two projects with my team of interns from different campuses of BITS Pilani, during my PS-I at HyphenSCS. A streamlined workflow was followed, starting at problem definition and expected inputs and outputs. Then I collected extensive data from authoritative sources using web scraping, OCR and AI agents. Next, I structured these data into machine readable and meaningful formats, before applying analysis frameworks such as SWOT. I brainstormed over the results of my research of over 150 warehouse related approvals, with 700+ unique state-specific instances, to understand the regulatory framework and attempt to standardize it. I created visualizations to achieve this, using matrices, gantt charts, swot boards, and histograms. I also created a 3-module framework for approvals that cover the core requirements, additional (sectoral, zonal or infra based) approvals, and voluntary best practices. My report and presentation recieved critical acclaim at FICCI's national meeting on Model National Logistics Policyand got applauded by bureaucrats and executives alike.

Objectives of the project: 1. To research the fragmented landscape of warehouse related regulatory body approvals in India in detail, and give a recommendation for standardized approvals across India, for submission to Model National Logistics Policy by FICCI. 2. To create and train a regression based model that calculates the ROI and IRR for building/upgrading a warehouse of any given specifications/infrastructure in any location of India. Key advantage: exhaustive dataset of regional rates and costs for accurate and highly localised analysis.

Tool used: Excel, Perplexity AI, Google Colab, PowerBI

Details of Papers/patents: I am currently drafting a detailed report on the warehouse approval scenario in India and its comparison with international leaders, along with detailed state by state analyses and other sections on policy/developments like PM Gati Shakti Yojana that are currently in the works. HyphenSCS will publish this report together with FICCI.

Brief description of the working environment: The working environment was friendly, interaction and questions were encouraged. The work was demanding, and there were strict expectations regarding reporting times and deadlines. I expected a high-paced workflow and lucrative, impactful projects at a fast growing startup, and HyphenSCS met with those expectations gracefully. Our batch of 11 students, cumulatively finished 8 or more projects during our PS-I and all of the outputs were immediately used and had a direct impact on operations, accessibility and visibility.

Academic courses relevant to the project: 1. ECON F343 : Economic Analysis of Public Policy
2. ECON F412 : Securities Analysis and Portfolio Management
3. ECON F355 : Business Analysis And Valuation
4. ECON F212 : Fundamentals of Finance and Accounting

5. ECON F241 : Econometric Methods
6. ECON F213 : Mathematical and Statistical Methods

Learning Outcome: 1. Data Collection
2. Data Reporting
3. Analysis Frameworks
4. Financial Modelling
5. Report Creation
6. Presentation Skills/Pitch Deck

PS-I station: Hyphen SCS Pvt Ltd, Noida

Student

Name: ADITYA MITTAL(2023B4AA0875G)

Student Write-up:

PS-I Project Title: DESIGN, DATA, and DEPLOYMENT: Advancing Warehousing Systems at Hyphen SCS

Short Summary of work done: Made investor deck, website for investor, wikipedia page and tutorial videos for the company

Objectives of the project: The objective of this project was to enhance Hyphen SCS's warehousing systems by improving the Warehouse Portal's UI/UX and backend integration, developing a cohesive brand identity, creating onboarding and promotional media, compiling warehouse and equipment data with compliance standards, and preparing an investor pitch deck—ultimately strengthening the company's digital infrastructure, operational efficiency, and market presence.

Tool used: Excel, Figma

Details of Papers/patents: NA

Brief description of the working environment: The work environment was fine.

Academic courses relevant to the project: Pns

Learning Outcome: Learnt UI/UX, colour grading, advanced excel

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PS-I station: National Institute of Hydrology, Roorkee

Student

Name: CHAYANK GULATI .(2023B1A11307P)

Student Write-up:

PS-I Project Title: Designing a carbon based adsorbent for the removal of microplastic from water ecosystem

Short Summary of work done: We designed a Graphene oxide aerogel and optimised it and also developed hydrogel beads that can filter out impurities like arsenic and other heavy metals. The aerogel can also remove dyes and microplastic from water ecosystem. And we had tested the results which are found to be giving 99% removal rate. This technology will get patened soon after the few development carried out and we will get the credit for its R&D

Objectives of the project: Designed and optimised the adsorbent that can remove microplastic, dyes, and other harmful impurity like Arsenic and other heavy metals

Tool used: UV- vis spectrophotometer, LC-ICP MS, zeta potential analyser, SEM, XRD, EDS.

Details of Papers/patents: We designed a Graphene oxide aerogel and optimised it and also developed hydrogel beads that can filter out impurities like arsenic and other heavy metals. The aerogel can also remove dyes and microplastic from water ecosystem. And we had tested the results which are found to be giving 99% removal rate. This technology will get patened soon after the few development carried out and we will get the credit for its R&D.

Brief description of the working environment: Everyone was friendly and helping and there's a lot to learn, everyone has a great knowledge and I was able to apply my knowledge gained from college in R&D. And I was able to get hands on sophisticated instruments.

Academic courses relevant to the project: Instrumental methods of analysis

Learning Outcome: Hands on high end equipments for research and learn the R&D

PS-I station: National Institute of Hydrology, Roorkee

Student

Name: AYUSH PATEL .(2023B4A11143P)

Student Write-up:

PS-I Project Title: Development of cost-effective and efficient adsorbents for removal of arsenic in water treatment

Short Summary of work done: During my PS-I at the National Institute of Hydrology, Roorkee, I worked on the project *"Development of Cost-effective and Efficient Adsorbents for Removal of Arsenic in Water Treatment"*. The objective was to synthesize and characterize low-cost adsorbents capable of effectively removing both As(III) and As(V) from contaminated water. I prepared graphene oxide (GO) aerogels and chitosan-based composite beads incorporating red mould and biochar using hydrothermal, freeze-drying, and bead formation techniques. These materials were optimized for structural stability and adsorption performance. The composites were analyzed using advanced instrumentation such as SEM, EDS, FTIR, XRD, Zeta Potential Analyzer, and ICP-MS to determine morphology, surface chemistry, crystallinity, surface charge, and elemental composition. Experimental studies assessed arsenic removal efficiency at different pH levels, dosages, and in the presence of competing ions. Results showed >99% removal of As(V) across all tested dosages and up to 99.9% removal of As(III) at higher dosages, without the need for pre-oxidation—a significant advantage over many conventional methods. Zeta potential studies confirmed pH-dependent charge reversal, explaining the adsorption behavior. The internship enhanced my technical skills in material synthesis, water treatment experimentation, and analytical techniques, while providing insights into the challenges of translating laboratory results to field applications. The findings indicate strong potential for scalable, sustainable solutions for arsenic-contaminated regions.

Objectives of the project: Develop Cost-effective Adsorbents: Create efficient and low-cost adsorbents (e.g., chitosan-based composite beads and graphene oxide aerogels) for arsenic

removal from water. Optimize Material Compositions: Study combinations like chitosan with red mould and biochar to enhance arsenic adsorption efficiency. Evaluate Performance: Assess adsorbents for removing both As(III) and As(V) under varying pH, dosage, and competing ion conditions. Characterize Materials: Use analytical techniques (SEM, FTIR, XRD, EDS) to understand structural and functional properties. Assess Practicality: Test regeneration, reusability, and cost-effectiveness for real-world applications. Compare with Existing Technologies: Benchmark performance against commercial adsorbents to identify advantages. Design Future Applications: Propose scalable, sustainable solutions for arsenic-affected communities.

Tool used: During the project, hardware tools included ICP-MS with LC interface (Agilent 7850), SEM with EDS, Zeta Potential Analyzer (Malvern Zetasizer), digital ultrasonic cleaner, magnetic stirrer, hot air oven, freeze dryer, hydrothermal autoclave, pH meter, centrifuge, and weighing balance. Software tools comprised ICP-MS MassHunter, SEM–EDS analysis software, Zetasizer software, and MS Excel for data analysis and result interpretation.

Details of Papers/patents: No papers or patents were produced during the course of this PS-I project.

Brief description of the working environment: The PS-I was carried out at the National Institute of Hydrology (NIH), Roorkee, in a collaborative and research-driven environment. The laboratory setup was well-equipped with advanced analytical instruments such as ICP-MS, SEM-EDS, and Zeta Potential Analyzer, enabling high-precision experiments. Work culture emphasized scientific rigor, safety protocols, and systematic documentation, with regular guidance from the project supervisor and research staff. Expectations from the institute included sincere effort in experimental work, adherence to timelines, careful handling of equipment, and maintaining accuracy and reproducibility of results.

The internship provided exposure to both theoretical and practical aspects of water treatment research, specifically targeting arsenic removal. I learned material synthesis techniques such as graphene oxide preparation, hydrogel aerogel formation, and chitosan-based composite bead fabrication. I gained hands-on experience in sample preparation, operating analytical instruments, and interpreting characterization results. The project also enhanced my understanding of adsorption mechanisms, pH-dependent surface chemistry, and the influence of competing ions on removal efficiency.

Beyond technical skills, the PS-I helped me develop problem-solving abilities, time management, and teamwork in a professional research environment. I learned to analyze results critically, identify anomalies, and plan further experiments accordingly. The experience strengthened my interest in environmental engineering solutions and provided insights into the challenges of translating lab-scale results into scalable, real-world water treatment systems.

Academic courses relevant to the project: Relevant academic courses to your PS-I project include:

* Environmental Science
* Environmental Engineering
* Water and Wastewater Treatment
* Chemistry
* Materials Science
* Chemical Engineering Principles
* Analytical Techniques in Chemistry
* Nanomaterials and Applications
* Environmental Pollution and Control
* Biotechnology Fundamentals (for biosorbent concepts)

Learning Outcome: The project provided significant learning outcomes, including hands-on experience in synthesizing and characterizing adsorbents like chitosan-based composites and graphene oxide aerogels. It enhanced understanding of arsenic removal mechanisms, such as electrostatic interactions and surface complexation, under varying pH and dosage conditions. The use of advanced analytical techniques (SEM, FTIR, ICP-MS) improved technical skills in material characterization. The study also highlighted the importance of cost-effectiveness, scalability, and real-world applicability in water treatment technologies. Additionally, collaboration with experts and troubleshooting experimental challenges strengthened problem-solving and research capabilities. Overall, the internship deepened knowledge of environmental remediation and sustainable solutions for arsenic contamination.

PS-I station: Prestige Estates Projects Limited, Hyderabad

Student

Name: PRANAV KUMAR M .(2023A2PS0259P)

Student Write-up:

PS-I Project Title: Construction and Management

Short Summary of work done: During my PS-I at Prestige Group, I gained exposure to high-rise residential construction projects, particularly at Prestige Clairemont, Prestige Beverly Hills, and The Prestige City. I observed the complete project cycle starting from land acquisition,

approvals, and planning to execution and handover. My learnings covered architectural, structural, and MEP design coordination, along with site execution practices such as reinforcement detailing, slab cycle with Mivan shuttering, concreting, curing, and finishing works. I also learned about safety measures, quality control checks, and the functions of various corporate departments like Planning, Contracts, CRM, and Architecture. Overall, this internship gave me practical insights into how large-scale construction projects are planned, executed, and managed.

Objectives of the project: To know how high rise buildings are constructed

Tool used: AutoCAD, Revit, MS Excel, Concrete Mix Design Tools, Bar Bending Schedule Calculations, On-site Surveying Equipment.

Details of Papers/patents: None

Brief description of the working environment: The working environment at Prestige Group was highly professional and collaborative. At the corporate office, I interacted with multiple departments, each contributing to different aspects of a project. At the project sites, execution engineers, safety officers, and quality teams worked in coordination to ensure smooth progress. My expectations were to understand the functioning of a construction company, learn the roles of engineers, and observe how designs are executed on-site. These expectations were fulfilled as I learned about structural reinforcement detailing, safety protocols, slab cycles, finishing processes, and post-construction approvals. The company provided opportunities to see real-time problem-solving, quality inspections, and safety enforcement. The experience gave me a holistic understanding of large-scale construction management.

Academic courses relevant to the project: Construction planning and technology, Surveying, Civil engineering materials.

Learning Outcome: Mivan technology formwork, large scale coordination and construction site plans.

PS-I station: 505 Army Base Workshop-Manufacturing, New Delhi

Student

Name: ARYADITYA SINGH BASISTH .(2023ABPS0802P)

Student Write-up:

PS-I Project Title: Remanufacturing of certain internal components to decrease weight thereby improving power to weight ratio

Short Summary of work done: Identified the assemblies of the the tank, analysed weight distribution of the assemblies, critical components from function and weight concerns. Analysed current materials being used, their rational. Based on the analysis suitable material alternative research was done which fulfilled function and design requirements. Basic FEM simulations was done using ansys to justify material reccomendation.

Objectives of the project: Finding solutions of reducing weight of MBT T72

Tool used: Ansys 2025 R1 student version

Details of Papers/patents: Na

Brief description of the working environment. Expectation was hands on experience in the functioning of the systems.

Academic courses relevant to the project: Material science

Learning Outcome: Improved knowledge in material science, and design of machine elements. Learned more about fem and fem based simulation softwares.

PS-I station: Maheshwar Rolling Mills Pvt Ltd - Accounting and finance, Gwalior

Student

Name: ADAMYA SHUKLA .(2023A2PS1369H)

Student Write-up:

PS-I Project Title: KPI Dashboard

Short Summary of work done: During my PS-I at Maheshwar Rolling Mills Pvt. Ltd., I worked on the development of a Financial Performance Dashboard and KPI Tracker using Microsoft Excel. The objective was to provide the company with an efficient and visual representation of key financial indicators such as Cost per Ton, Revenue per Ton, Gross Margin, Working Capital Cycle, Inventory Turnover Ratio, Debt-to-Equity Ratio, Accounts Receivable Days, and ROI. My tasks involved collecting and cleaning financial data, creating pivot tables, designing KPI cards, generating monthly trend graphs, and integrating slicers for interactivity. I also ensured that the Excel dashboard was user-friendly and could be updated regularly with new data. Toward the end of the internship, I proposed a scalable Python-based prototype using Dash for interactive dashboarding. Although the implementation remained in Excel, the prototype served as a vision for future digital transformation. The work helped the company make more informed and timely financial decisions.

Objectives of the project: To do financial analysis using python and excel made dashboard

Tool used: Hardware: Personal Laptop Software: Microsoft Excel, Python (VS Code), Pandas, Plotly, Dash, Openpyxl, Google Sheets, Windows OS

Details of Papers/patents: None

Brief description of the working environment: The working environment at Maheshwar Rolling Mills was collaborative and encouraging. As a student intern, I was given the freedom to explore and implement innovative data visualization ideas while receiving guidance from my mentor and team members. Regular interactions with the finance team helped me understand how financial KPIs affect operational decisions in a manufacturing setup. The company expected interns to be proactive, punctual, and solution-oriented. They provided access to real-world financial data, which enabled me to enhance my analytical and dashboarding skills. I learned how to interpret financial statements, structure raw data, design user-centric dashboards, and present insights effectively. I also gained exposure to corporate workflows, decision-making practices, and the importance of automation in financial reporting. This experience significantly improved my technical skills in Excel and Python, and also developed my communication, time management, and problem-solving abilities. Overall, it was a valuable learning experience that bridged academic knowledge with industry practices.

Academic courses relevant to the project: Finance and Accounting
Data Analysis and Interpretation
Project Management
Programming Fundamentals
Spreadsheet Modeling and Business Analytics

Learning Outcome: Learnt a lot of things like coding , management , conversation skills etc

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PS-I station: 505 Army Base Workshop-Mechatronics, Delhi

Student

Name: UTKARSH PANDEY(2023A7PS0388G)

Student Write-up:

PS-I Project Title: RE-DESIGNING OF EXTERNAL COMPONENTS FOR REDUCTION IN THERMAL SIGNATURE

Short Summary of work done: During my 8-week Practice School 1 internship at 505 Army Base Workshop, Delhi, I worked on a project focused on the reduction of heat signature emitted by tanks (T-72 and T-90) during operation. The initial weeks involved understanding the thermal emission sources and exploring active solutions like Auxiliary Power Units (APUs). In the later stages, our team shifted focus to passive heat reduction techniques, particularly radiative cooling using low-cost, scalable materials. We researched and built a working model of a DIY radiative cooler using Scotch tape and aluminum foil, demonstrating its effectiveness in lowering surface temperature through infrared heat emission. The model served as a proof of concept for integrating passive methods into military applications. Throughout the internship, I gained valuable insights into embedded systems, thermal physics, real-world constraints in defense engineering, and the importance of innovation with limited resources. The experience greatly enhanced my technical, research, and communication skills.

Objectives of the project: RE-DESIGNING OF EXTERNAL COMPONENTS FOR REDUCTION IN THERMAL SIGNATURE

Tool used: 3M Long Lasting Scotch Tape Reynolds Wrap Aluminum Foil Low-Density Polyethylene Sheet (for convection shielding) Scissors, cutters, and mounting tools Measuring Instruments: Infrared Thermometer Ambient Temperature Sensors Stopwatch (for time-based thermal comparisons) Software Tools: MATLAB/Simulink – for modeling APU control logic and thermal simulations Microsoft Word/PowerPoint – for documentation and presentations Google Scholar/SPIE Library – for research and literature review

Details of Papers/patents: NA

Brief description of the working environment: The working environment at 505 Army Base Workshop was professional, structured, and collaborative. We operated in a defense engineering setup with access to technical staff, mechanical bays, and research support. Our tasks were carried out in a combination of indoor lab spaces and outdoor test areas, depending on the experiment. Regular interactions with mentors and army personnel helped us understand real-world constraints and practical implementation challenges. The environment encouraged teamwork, discipline, innovation, and problem-solving under realistic operational conditions.

Academic courses relevant to the project: Courses like Embedded Systems, Software Engineering, and Simulation & Modeling were directly relevant in designing control logic and drafting the SRS for the APU.
Knowledge from Computer Architecture and Cybersecurity helped in understanding system integration and secure operation.
These subjects collectively supported the development of real-time, software-driven solutions for thermal signature reduction.

Learning Outcome:
Over the course of this 8-week internship at 505 Army Base Workshop, the most significant learning outcome was developing a deep, application-driven understanding of **thermal signature reduction techniques**, particularly through **passive radiative cooling**. By researching and building a functional model using simple materials like Scotch tape and aluminum foil, I learned how fundamental thermal principles can be leveraged for real-world defense applications. This experience not only strengthened my technical skills in system design and problem-solving but also taught me how to approach engineering challenges with practical innovation under real constraints.

PS-I station: 515 Army Base Workshop, Bengaluru

Student

Name: ADITH BABULAL .(2023AAPS0207H)

Student Write-up:

PS-I Project Title: Surveillance drone Vr camera integration

Short Summary of work done: Integration of VR gimbal camera on surveillance drone to provide first person experience

Objectives of the project: Integrating Gimbal camera on Surveillance drone

Tool used: Motors, eagle cad, c++

Details of Papers/patents: None

Brief description of the working environment: Government job

Academic courses relevant to the project: Control systems, microcontrollers

Learning Outcome: Drone technology

PS-I station: 515 Army Base Workshop, Bengaluru

Student

Name: KARTHIKEYA REDDY PATANA .(2023AAPS1115H)

Student Write-up:

PS-I Project Title: LIGHTNING DETECTION AND WEATHER MONITORING SYSTEM

Short Summary of work done: Apart from working on the two projects mentioned above, each person was allotted a specific division in the 515 ABW and got to explore the mechanisms and workflow there. The divisions included Aviation, Simulator Mfg Division, Auxillary Engg Division, etc)

Objectives of the project: Detect lightning activity and estimate proximity, Monitor weather parameters: temperature, humidity, rainfall, pressure, and wind, Deliver alerts via SMS (GSM/SIM800L) and LoRa radio.

Tool used: Python3, Raspberry Pi, KiCAD, Arduino

Details of Papers/patents: provided in PS Diary

Brief description of the working environment: Decent working environment- working with groups.
Academic courses relevant to the project: C programming, Micro Processors and Interfacing

Learning Outcome: Two projects namely,
1. Object detection using YOLO integrated on Raspberry Pi
2. Lightning Detection and Weather Monitoring System

PS-I station: 515 Army Base Workshop, Bengaluru

Student

Name: AMAN RINKESH DEVNANI .(2023B4A41026P)

Student Write-up:

PS-I Project Title: Optimising Kamikaze drone frames

Short Summary of work done: Learnt 3D modeling on fusion 360 and aerodynamics of drone flight

Objectives of the project: Optimising Kamikaze drone frames

Tool used: Fusion 360

Details of Papers/patents: N.A.

Brief description of the working environment: The people are very good and helpful and teach nicely.

Academic courses relevant to the project: N.A.

Learning Outcome: Learnt 3D modeling on fusion 360 and aerodynamics of drone flight

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PS-I station: 609 EME BATTALION, Meerut

Student

Name: ARINJAY JAIN(2023A7PS0346G)

Student Write-up:

PS-I Project Title: OCCO (On-field Communication and Control Operation)

Short Summary of work done: The OCCO project focused on improving military vehicle tracking using RFID technology. Since real RFID hardware wasn't available, the team simulated vehicle movement data using Python. This data was stored and managed in a MySQL database, allowing for automated logging and retrieval. A user-friendly dashboard was built with Next.js to display real-time analytics. It showed vehicle distribution across lanes, checkpoint activity, and other key metrics. Filters were added to sort data by unit, vehicle type, and purpose, making it easier to analyze. The system was designed to work offline, addressing a major limitation of the old browser-dependent setup. This makes it more reliable for military use in remote or secure locations. While the prototype uses simulated data, it lays the groundwork for future integration with actual RFID hardware. The project highlighted the importance of offline functionality and secure data handling in military applications. Next steps include deploying the system on secure servers and adding real-time alerts for missed scans. Overall, OCCO provides a strong foundation for modernising military logistics tracking.

Objectives of the project: Remove the manual work which was required to view the status of each vehicle required in the battlefield

Tool used: Python, Pandas, Matplotlib, MySQL, mysql-connector-python, Next.js

Details of Papers/patents: Not as such

Brief description of the working environment: The working environment of the company/station was very good, everyone was nice and cooperative. Since it was an Army

station, it was very chill and calm. We also had accommodation which was very helpful as since it was inside the Army area only, we had flexibility to work either in rooms or in the office area.
There were not as such expectations related to IT stuff since we knew it was an Mechanical sector but other expectations were fulfilled like watching how Army works and to roam in their area and view all types of vehicles they use.
During PS, I learned how the create a front-end and back-end of a project and then how to link them to create a proper working model.

Academic courses relevant to the project: Database Management (DBMS), Data Structures (DSA)

Learning Outcome: Got to know how to create front-end and back-end and then how to connect them.

PS-I station: 609 EME BATTALION, Meerut

Student

Name: SHOURYA MISHRA(2023A7PS0475G)

Student Write-up:

PS-I Project Title: OCCO

Short Summary of work done: During my PS-I at the Indian Army's OCCO (Offline Combat Convoy Operations) project, I contributed to building a secure RFID-based vehicle tracking system that can operate in isolated environments without internet. I helped integrate RFID data collection from field checkpoints with a central system hosted locally using XAMPP. My work involved backend development using Flask to handle Excel uploads of vehicle scan data and storing it securely in MySQL. I also worked on visualizing the data using React, creating components for bar and pie charts, lane-based vehicle distribution, and real-time tracking features. The platform was tested with simulated data for robustness, with emphasis on how convoy logs are inserted, interpreted, and visualized. Furthermore, I helped replace mocked data with real-time MySQL queries and corrected inconsistencies in vehicle tracking logic, improving accuracy and reliability of the system.

Objectives of the project: To build a secure, offline-capable RFID-based vehicle tracking system for the Indian Army. Enable real-time convoy monitoring, checkpoint logging, and data visualization without dependency on public internet. Replace manual processes with digital record-keeping and improve data integrity.

Tool used: Software: Flask, React.js, MySQL, XAMPP, Git, Canva, Excel Hardware: RFID scanners (simulated), Army-hosted local servers Other: Chart.js/Recharts (for visualization), VS Code

Details of Papers/patents: none

Brief description of the working environment: The working environment was collaborative, with expectations of high responsibility and attention to security due to the sensitive nature of the domain. Regular reviews and feedback ensured we followed strict timelines and maintained code quality. The organization valued independent problem-solving and proactive communication.
The Army personnel provided domain-specific inputs, especially on how convoy movements and checkpoints function operationally. This helped bridge the gap between software implementation and real-world use cases.
I learned how to work with legacy systems, offline hosting, and data privacy constraints. Additionally, I gained experience in converting user requirements into technical solutions, simulating field data, and developing systems that are both practical and secure for real-world defense applications.

Academic courses relevant to the project: Computer Networks
Database Systems
Software Engineering

Learning Outcome: Practical experience with full-stack development involving Flask, React, and MySQL.
Gained insights into RFID-based tracking systems and handling real-time operational constraints.
Understood the importance of data security and offline-first system design in defense applications.
Learned to simulate and visualize vehicle movement using actual field data.

PS-I station: Adani Power Limited., Gondia

Student

Name: HARSH RAJ(2023A4PS1098G)

Student Write-up:

PS-I Project Title: PREDICTIVE MAINTENANCE AND EFFICIENCY IMPROVEMENT IN SUPERCRITICIAL THERMAL PLANTS

Short Summary of work done: • Studied fatigue and life of supercritical boiler tubes (221+ bar, 374 °C), focusing on thermal and hoop stresses and erosion from fly ash in flue gas, ash, and coal flow. Researched ML and physics-based predictive maintenance. Built a Python-based non-linear curve fitting model to calibrate empirical erosion parameters using historical data, predicting future thickness loss based on runtime and flue gas velocity. • Developed a Record Management System for tracking operations and maintenance of 12 industrial assemblies like Soot Blower, Gear Reducer, Electromotor, etc. Used Excel as a database across 5 power units with a GUI via Tkinter and pandas. Added labelled images, automatic date logging, dynamic filtering (by date range, unit, assembly/component), tree view for remarks, PDF export, and a built-in SOP. • Analyzed feedwater heaters in modified regenerative supercritical Rankine cycles. Derived indicators like TTD, DCA, TR from raw data, calculated FWH efficiencies, and studied trends using Python and Power BI. Compared heater performance across two levels (-25, 0) over all power units, identifying best and worst performers. Trained a Linear Regression ML model to optimize control valve settings for efficiency using top 30% thresholds within load bands, achieving $R^2 = 0.8$ and F1 = 0.88.

Objectives of the project: To study supercritical thermal power plants and build a model to predict thickness of a boiler tube based on runtime and flue gas velocity, and to analyse raw feedwater heater data, calculate performance indicators and plot and analyse trends against controllable parameters and efficiency using Matplotlib and Power BI, and work on efficiency maximization by creating an ML model. Also built some side projects like an O&M Management System for entry and extraction of records of industrial assemblies across all 5 power units using Tkinter on Python and MS Excel.

Tool used: Python, NumPy, pandas, Tkinter, scikit-learn, Matplotlib, MS Excel, Power BI, VBA

Details of Papers/patents: N/A, got an LOR

Brief description of the working environment: Great work environment with supportive and intellectual employees, along with good stay and food facilities.

Academic courses relevant to the project: Applied Thermodynamics, Computer Programming, Probability and Statistics

Learning Outcome: Supercritical Thermal Plants, Feedwater Heaters, Boiler Tubes, Machine Learning, Data Analysis, Excel, Power BI, Python, VBA

PS-I station: Advanced Systems Laboratory, DRDO, Hyderabad

Student

Name: ARSHEYA SINGH PARMAR .(2023A3PS0304P)

Student Write-up:

PS-I Project Title: Power Distributuon and Management in Launch Vehicles

Short Summary of work done: During my internship, I simulated relay dynamics and analysed fault responses in EMR, SSR, and SSPC-based protection circuits using LTSpice. I studied power distribution architectures in launch vehicle avionics, focusing on fault tolerance, sequencing strategies, and redundancy mechanisms. My work also involved studying various DC-DC converter topologies and battery chemistries suitable for space-grade reliability. Additionally, I explored sensing techniques critical for accurate power monitoring and protection. This study helped build a foundational understanding of power management systems used in aerospace applications, particularly those requiring high reliability, robustness, and efficient fault handling in harsh operational environments.

Objectives of the project: Understand power architectures, fault tolerance and detection in high power critical systems

Tool used: LTspice

Details of Papers/patents: NA

Brief description of the working environment: I worked in a friendly and supportive environment where learning was encouraged. My mentors were approachable and always ready to help, making it easy to understand new concepts. I felt comfortable asking questions.

Academic courses relevant to the project: Power Electronics, Electronic Devices

Learning Outcome: Learned about the different power architectures, battery chemistries, relays, SSPC used in high power critical systems along with individual simulations

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PS-I station: Advanced Systems Laboratory, DRDO, Hyderabad

Student

Name: SAKSHAM AGARWAL(2023A3PS0521G)

Student Write-up:

PS-I Project Title: Power Distribution and Management in Launch Vehicle Avionics

Short Summary of work done: The project focused on developing reliable power distribution for launch systems. I worked with relays for controlled power routing, steering diodes to prevent back-feed, and implemented protection schemes against overcurrent, reverse polarity, and surges. Additionally, I performed case study analyses of aerospace power architectures to identify best practices and improve fault tolerance. This work enhanced my understanding of high-reliability electrical systems and their integration in mission-critical operations.

Objectives of the project: To design and implement an efficient, reliable, and fail-safe power distribution and management system for launch operations, ensuring optimal allocation, monitoring, and control of electrical power to all critical subsystems during pre-launch, launch, and post-launch phases.

Tool used: S/w tools - LTSpice

Details of Papers/patents: Nan

Brief description of the working environment: During my PS-I at DRDO – ASL, Hyderabad, I worked in a disciplined, research-focused environment with strict safety and confidentiality norms. Expectations included professionalism, timely task completion, and precision in technical work. I gained hands-on experience with relays, steering diodes, and protection schemes in power distribution, along with case study analysis of aerospace systems. The

internship enhanced my understanding of high-reliability electrical design, fault tolerance, and the demands of defense R&D.

Academic courses relevant to the project: Power System

Learning Outcome: To understand and apply principles of electrical power generation, conversion, distribution, and redundancy management in high-reliability launch systems, with a focus on real-time monitoring, fault tolerance, and ensuring uninterrupted power supply to mission-critical subsystems under dynamic launch conditions.

PS-I station: Advanced Systems Laboratory, DRDO, Hyderabad

Student

Name: DHIPIN MITRA BOLLADA .(2023A8PS0453H)

Student Write-up:

PS-I Project Title: Ground Instrumentation Technologies for missile Subsysytems

Short Summary of work done: We were assigned our professors after the first week , we learnt about the working principle of the sensors and their , specifications as they are important to use the sensors and while learning, we saw the bonding procedures for Strain Gauge, Thermocouple and say so sensors attached to Subsystems , the next 3-4 weeks were just us attaching sensors to the missile parts and taking readings when busy and just sorting graphs when we were free, then we went through some case studies for bigger projects to understand the sensors and then, the last few days were spent making report and sorting data.

Objectives of the project: To use Sensors and Data Acquisition Systems to measure important parameters of missile subsystems, this data is used to check their functionality

Tool used: We learnt Various Bonding Procedures and used Catman to look at the measured values from the sensors.

Details of Papers/patents: none

Brief description of the working environment: it was great environment.

Academic courses relevant to the project: Mostly 3rd Year Courses like TMT , EIIT etc. up till 2nd year, SNS and Electrical Sciences are useful

Learning Outcome: Working Principle of the sensors and Data Acquisition used in DRDO for measuring important parameters of missile subsystems .

PS-I station: Advanced Systems Laboratory, DRDO, Hyderabad

Student

Name: SAI THEJA REDDY KAMASANI .(2023AAPS0263H)

Student Write-up:

PS-I Project Title: Reconstructing a signal samples at Sub-Nyquist freq

Short Summary of work done: I got the chance to visit several advanced labs and facilities. The scale and complexity of the systems being built was honestly mind-blowing and gave a real sense of how engineering works in national defense. Our project involved reconstructing under-sampled signals using machine learning and FPGAs. Different teams worked on different parts — the ML side was handled by another group, while I focused on building the hardware pipeline using Simulink, Verilog, and Vivado. That being said, be ready to wait for days if not weeks for small things to approved. You'll definitely need a lot of patience.

Objectives of the project: Build a GRU

Tool used: Matlab, Simulink, Vivado

Details of Papers/patents: NA

Brief description of the working environment: You'll be assigned to a specific branch (like Electrical, Communication, or Mechanical) based on your stream. No worries about being mismatched, it's usually sorted well. The project is decided by the scientists, so you don't really get to choose.

The work environment is quite formal, and things move slowly.
That said, once you're in, the schedule is pretty relaxed, realistically around 4 days a week, 6 hours a day.

Academic courses relevant to the project: SNS, EEC lab(for matlab)

Learning Outcome: Developed hands-on experience with Simulink for modeling signal processing pipelines, and used Vivado for synthesizing and optimizing Verilog designs targeting FPGA deployment.

PS-I station: Advanced Systems Laboratory, DRDO, Hyderabad

Student

Name: SHREYAS ASHOK MEHER(2023AAPS0646G)

Student Write-up:

PS-I Project Title: AFDX over Ethernet(AoE) communication protocol for avionics communications.

Short Summary of work done: I documented the code for the implementation of AFDX communication protocol for missile systems in DRDO. It is used to provide deterministic and fault free communication between the missile and ground systems. This is part of the checkout phase of missile launch. The code was already written in C and C++, with the documentation spanning 46 pages.

Objectives of the project: To document the code for AFDX communication protocol used for missile systems.

Tool used: C language

Details of Papers/patents: None

Brief description of the working environment: The work environment was very helpful, our mentor was willing to help us in every step and was very approachable. He also organised mock

presentations for us so that we solidify our understandings of the AFDX protocol and the API used before we started working on the original code. Overall it was an enriching experience.

Academic courses relevant to the project: C programming

Learning Outcome: Documentation methodologies for software, Socket programming in C.

PS-I station: Advanced Systems Laboratory, DRDO, Hyderabad

Student

Name: SWARNEEL BHATTACHARJEE .(2023AAPS0695H)

Student Write-up:

PS-I Project Title: A Study Of MIL-STD-1553B Real Time Communication Protocol

Short Summary of work done: I was tasked with sutdying the MIL-STD-1553B protocol, and then was tasked with writing documentation of SINT(C), ASL, DRDO authored code for simulating the same using DDC's Mini Ace Cards

Objectives of the project: To study the protocol and write documentation for SINT(C), ASL, DRDO authored code for simulating the same

Tool used: Redhat Linux, Vim

Details of Papers/patents: N/A

Brief description of the working environment: Students were expected to work on the computer system provided for the same.

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

Learning Outcome: Learnt about Real Time Avionics Communications protocols, learnt concepts in Socket programming and Inter Process Communication with Linux

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PS-I station: ASHA OIL FOODS PVT. LTD, Dhule

Student

Name: DEVANG MISHRA .(2023A7PS1103H)

Student Write-up:

PS-I Project Title: Identifying consumer trends and proposing cost effective tech solutions

Short Summary of work done: Cost effective tech solutions

Objectives of the project: Proposing cost effective tech solutions

Tool used: Tech solutions

Details of Papers/patents: No

Brief description of the working environment: Proposing cost effective tech solutions

Academic courses relevant to the project: TRW

Learning Outcome: Learnt about cost effective tech solutions

PS-I station: ASHA OIL FOODS PVT. LTD, Dhule

Student

Name: KRRISH GIRISH AGRAWAL(2023A8PS0830G)

Student Write-up:

PS-I Project Title: Market trends and tech-driven strategies and Backward Integration : Expansion into Cotton Ginning and Pressing Operations

Short Summary of work done: In PS i had plan to move upstream into cotton ginning and pressing, paired with targeted strategies for competing in India's cottonseed oil industry. It reviews the market landscape, profiling key competitors and crafting a roadmap for vertical integration. The backward integration aims to cut costs by bypassing intermediaries, ensure a stable supply of raw materials, and introduce new revenue through cotton lint sales

Objectives of the project: This comprehensive project combines strategic planning for backward integration with competitive market analysis to address both immediate operational opportunities and long-term competitive positioning for Asha Oil Foods Limited. The integrated objectives are structured to provide actionable insights for strategic decision-making.

Tool used: Excel,CRM Tools,

Details of Papers/patents: None

Brief description of the working environment: It was very good

Academic courses relevant to the project: Fin courses

Learning Outcome: The comprehensive analysis reveals significant strategic opportunities through backward integration combined with targeted competitive positioning strategies. The results demonstrate both financial viability and competitive advantages achievable through integrated operations.

PS-I station: ASME India Private Ltd, Gurgaon

Student

Name: VEDANT CHAWLA .(2023A4PS0430P)

Student Write-up:

PS-I Project Title: Student Engagement

Short Summary of work done: The work involved the backgrounds of planning a major hackathon, from problem statement templates to evaluation rubrics to designing the submission form. it also involved making informative emails, and posters and reaching out the institutions for participation at the conference.

Objectives of the project: To increase student engagement at the IMECE 2025 conference partiuclarly engineers in an around the rural areas of hyderabad

Tool used: No tools used primarily, work involved researching and making documents mostly.

Details of Papers/patents: None

Brief description of the working environment: Work environment was extremely friendly, students were able to communicate effectively and clearly with the instructor for the work assigned, and if any mistakes were made the instructor always made it a point to make it a learning for the student rather than then a punishment. Learning focused majorly on planning an event and the logistics of it, along with publicity.

Academic courses relevant to the project: Technical Report Writing

Learning Outcome: Planning,Logistics of the event along with designing publicity posters

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PS-I station: ASME India Private Ltd, Gurgaon

Student

Name: VISHAL PARASHURAM DHABALI .(2023B2A40881P)

Student Write-up:

PS-I Project Title: IMECE Focus Group – Engaging with Start-up and Innovation Engagement

Short Summary of work done: During my internship at ASME, I was actively involved in organizing flagship events like IMECE, focusing on increasing student participation and promoting manufacturing excellence. My responsibilities included coordinating with stakeholders, managing logistics, and curating content relevant to the engineering and manufacturing sectors. I contributed to the evaluation of student-led startups, particularly in deep tech areas such as energy, mobility, and robotics, with a special emphasis on regions like Andhra Pradesh, Telangana, and Karnataka. Additionally, I assisted in consulting projects aimed at improving manufacturing processes and team dynamics within Indian companies. This experience provided me with a comprehensive understanding of the intersection between engineering innovation, event management, and industry engagement

Objectives of the project: To organize and execute impactful startup and manufacturing events such as IMECE for students. To promote manufacturing excellence and student engagement within the engineering community. To research and support student-led startups with a focus on deep tech sectors in India. To evaluate and provide consulting for manufacturing excellence and team-building initiatives in Indian companies

Tool used: Microsoft Office Suite (Excel, PowerPoint, Word) Event management platforms (e.g., Eventbrite, Google Forms) Communication tools (Slack, Zoom, Email) Data analysis tools for startup evaluation

Details of Papers/patents: No papers or patents were produced during this internship.

Brief description of the working environment: The working environment at ASME was collaborative and dynamic, with a strong emphasis on teamwork and innovation. The company expected interns to demonstrate initiative, adaptability, and a willingness to learn. Regular interactions with professionals and students fostered a culture of knowledge sharing and continuous improvement. I learned the importance of meticulous planning, stakeholder communication, and adaptability in executing successful events. Exposure to consulting and evaluation of startups provided valuable insights into the challenges and opportunities within the Indian manufacturing and startup ecosystem

Academic courses relevant to the project: Manufacturing Processes
Industrial Engineering and Management
Project Management
Entrepreneurship and Innovation
Data Analysis and Decision Making

Learning Outcome: Gained practical experience in event planning and execution for large-scale engineering events.

Developed skills in evaluating startups and understanding investment potential in the Indian industrial ecosystem.
Enhanced knowledge of manufacturing excellence practices and consulting methodologies.
Improved teamwork, leadership, and project management abilities

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PS-I station: Bhabha Atomic Research Centre (BARC), Visakhapatnam

Student

Name: MUDIT WALIA .(2023A4PS0414P)

Student Write-up:

PS-I Project Title: Heat optimisation for graphite heater in an LaB6 cathode thermionic Electron gun

Short Summary of work done: Ran multiple simulations with different models and compared results for best case and did further resaerch on reasonings and theory about the same

Objectives of the project: Heat optimisation for the setup

Tool used: Ansys, Matlab

Details of Papers/patents: None

Brief description of the working environment: Great working environment helpful and very informative

Academic courses relevant to the project: Heat transfer

Learning Outcome: Factors affecting radiation and use of ansys

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PS-I station: Bhabha Atomic Research Centre (BARC), Visakhapatnam

Student

Name: DANDU YASHWANTH VARMA .(2023A4PS0458P)

Student Write-up:

PS-I Project Title: Magnetic Pulse Welding and the Post Weld characterization

Short Summary of work done: This project focused on the design and analysis of expansion and compression coils for Magnetic Pulse Welding (MPW)—a solid-state technique ideal for joining dissimilar metals without inducing thermal distortion. The work began with a comprehensive literature review that consolidated existing knowledge and technologies, with findings regularly discussed with the project guide. The experimental phase involved participation of demonstration in both expansion and compression MPW setups, resulting in the successful synthesis of Cu–Al, Al–SS, and Cu–SS joints using defined input parameters. To optimize coil performance, electromagnetic and thermal simulations were carried out in COMSOL Multiphysics, aiding in refining the coil geometry for enhanced magnetic field strength and efficient heat dissipation. Post-weld characterization was conducted through both non-destructive testing (Helium Leak Testing) and destructive methods, ensuring that the joints met the necessary mechanical and structural integrity requirements.

Objectives of the project: This project designed and analyzed the expansion and compression coil for Magnetic Pulse Welding (MPW), a solid-state process ideal for joining dissimilar metals without thermal distortion. Electromagnetic and thermal simulations in COMSOL Multiphysics optimized coil geometry for high magnetic field strength and heat dissipation. Then the Post Weld Characterization is done (both non-destructive and destructive) to ensure the weld is structurally sound.

Tool used: COMSOL, Fusion360

Details of Papers/patents: None

Brief description of the working environment: The working environment was quite encouraging. The guides were approachable and consistently assigned tasks, offering regular support and guidance. They helped me with my assignments and fostered a learning atmosphere. Rather than treating the experience as a mere evaluation, they genuinely aimed to instill a passion for their work in me.
For the expectations, the company expected me to apply theoretical concepts to real-world challenges, carry out detailed simulations and experiments, and produce measurable

outcomes. Additionally, I was required to work independently from my room, manage my time efficiently, and collaborate effectively with team members to meet project objectives.
During the internship, I gained practical experience in manufacturing processes working with advanced tools like COMSOL for simulation and Fusion360 for designing the induction coil. Collaborating with experienced mentors helped me enhance my research and problem-solving abilities. I also developed a strong understanding of the importance of accurate documentation and strict adherence to lab safety protocols.

Academic courses relevant to the project: Manufacturing Processes, Heat Transfer

Learning Outcome: The internship provided a valuable learning experience with significant knowledge transfer from the guides at BARC. I gained practical exposure to simulation tools like COMSOL and developed skills in technical report writing and documentation.

PS-I station: Bhabha Atomic Research Centre (BARC), Visakhapatnam

Student

Name: SHASHWAT JHA .(2023A4PS0801H)

Student Write-up:

PS-I Project Title: Design and analysis of magnetic pulse welding

Short Summary of work done: We designed the coil in fusion 360 software and then imported the file in COMSOL and performed the simulations over there. We also saw the experiments being done in the lab and then we also did a helium leak test , which happens to be a post weld test , to check whether the weld is leak proof or not.

Objectives of the project: The objectives were to design and simulate the magnetic field and heat transfer in and around the coil in magnetic pulse welding technique. We did the same in COMSOL software.

Tool used: We used COMSOL and fusion 360 .

Details of Papers/patents: N/A

Brief description of the working environment: The working was extremely good including very understanding guides/mentors. My expectations were to learn something new in this internship and safe to say that I have learned about a completely new technology along with 2 new softwares and some new concepts.

Academic courses relevant to the project: Material science, EEE , M3

Learning Outcome: Learned great deal about the COMSOL software and fusion 360 software. Also got to know about the magnetic pulse welding technology, which is solely being performed at barc visakhapatnam across India.

PS-I station: Bhabha Atomic Research Centre (BARC), Visakhapatnam

Student

Name: KRISHNA ROHAN KOTAGIRI .(2023A4PS1377H)

Student Write-up:

PS-I Project Title: Design and Analysis of Expansion and Compression coil

Short Summary of work done: During our PS-I at BARC, Vizag, we designed and analyzed expansion and compression welding coils for Magnetic Pulse Welding (MPW) through electromagnetic and thermal simulations. We developed 3D models in Fusion 360, conducted coupled thermal studies, and performed experimental welds on dissimilar metals (Al-Cu, Cu-SS, Al-SS). Post-weld tests, including helium leak detection and Wire EDM, validated joint integrity. Our work contributed to optimizing MPW coil performance for industrial applications in nuclear, automotive, and aerospace sectors.

Objectives of the project: The objective of this project is to design and analyze expansion and compression welding coils for Magnetic Pulse Welding (MPW), optimizing their performance for high-strength, solid-state joining of dissimilar metals without thermal distortion.

Tool used: Software: COMSOL and Autodesk Fusion

Details of Papers/patents: NA

Brief description of the working environment: The working environment was highly conducive, with supportive guides who regularly assigned meaningful tasks. They actively assisted me with assignments and viewed this as an opportunity to foster my passion for their field, rather than merely treating it as an evaluative exercise. Their mentorship made the experience both enriching and inspiring.

Academic courses relevant to the project: EEE F111- Electrical Sciences basics
ME F220 - Heat Transfer
ME F219 - Manufacturing Process

Learning Outcome: Using COMSOL Multiphysics, I simulated electromagnetic and thermal behaviors of MPW coils, analyzing magnetic flux distribution and Lorentz forces. The software helped optimize coil designs for efficiency and validate cooling performance, bridging simulations with experimental results. This strengthened my skills in Multiphysics modeling and problem-solving for real-world welding applications.

PS-I station: Bhabha Atomic Research Centre (BARC), Visakhapatnam

Student

Name: ADITHYA KRISHNA KANTH MEDURI .(2023A7PS0144H)

Student Write-up:

PS-I Project Title: Contingency Analysis of Power System using Machine Learning and Pandapower

Short Summary of work done: The internship involved the development and deployment of a Graph Neural Network (GNN)-based model for contingency analysis in complex power systems. The objective was to improve the accuracy and speed of identifying critical system contingencies under varying operational conditions. Traditional methods are often computationally intensive, particularly for large-scale networks. To address this, the GNN model was trained using a combination of historical data from standard IEEE bus systems and real-world site data obtained during the project. This allowed the model to better capture practical

system behavior and variability. The model was evaluated on benchmark test systems and demonstrated strong performance in ranking contingencies based on key risk metrics such as voltage violations and line overloads. This work emphasized the effectiveness of graph-based machine learning approaches in enhancing the reliability and operational efficiency of modern power grids.

Objectives of the project: To deploy a scalable and fast Machine Learning-based framework for N-1 Contingency Analysis in Power Systems by simulating outages on IEEE test systems, with the goal of identifying critical scenarios that may lead to voltage or loading violations and enabling quicker, more efficient screening.

Tool used: Python libraries - Pandapower, Pytorch, Scikit-learn, Plotly, Pandas

Details of Papers/patents: -

Brief description of the working environment: The Bhabha Atomic Research Centre (BARC) facility in Visakhapatnam offers a research-driven and structured work environment, ideal for internships focused on nuclear science, power systems, and radiation technology. Interns can expect to work on real-world scientific problems under the guidance of experienced scientists, often contributing to projects involving reactor systems, instrumentation, or environmental applications. The Vizag site combines advanced infrastructure with a collaborative atmosphere, encouraging learning and innovation. Exposure to both theoretical and applied research is common, with occasional integration of site-specific operational data. The overall work culture is professional, process-oriented, and aligned with national research goals. Interns are expected to be self-motivated, technically sound, and adaptable to a disciplined research environment, making the experience both challenging and enriching.

Academic courses relevant to the project: Machine learning, Object Oriented Programming, Data structures and Algorithms.

Learning Outcome: Experience and Understanding of Machine Learning, Working with Python and Jupyter Notebook, Understanding of the workflow of AI and ML Models.

PS-I station: Bhabha Atomic Research Centre (BARC), Visakhapatnam

Student

Name: NIKHILESH YALLANKI .(2023AAPS0168H)

Student Write-up:

PS-I Project Title: Modbus Communication using STM32 Microcontrollers

Short Summary of work done: Over the course of this project, I explored STM32 microcontroller programming, UART communication, and Modbus RTU protocol in depth. I began with basic STM32 tasks like LED blinking and serial data transfer using STM32CubeIDE and STM32CubeProgrammer. Using all three USART ports of the STM32 Blue Pill Plus Clone, I implemented a complete data communication chain: receiving user inputs from PuTTY (USART1), interacting with Simply Modbus Slave software (USART2), and transmitting data to an 8-channel Analog Output (AO) module over RS485 (USART3). I successfully configured the STM32 as a Modbus master to read and write from various memory areas. I also implemented ADC data acquisition in polling, interrupt, and DMA modes, enabling fast and accurate sampling of analog voltages. The ADC values were converted into voltages, transmitted over UART, and visualized in terminal software and OriginPro. I interfaced the AO module to convert digital signals into 0–20 mA analog currents, verified using oscilloscope analysis across a load resistor. Additionally, I developed a two-board STM32 setup to capture analog inputs using one board and regenerate corresponding PWM signals using the other. I faced and resolved multiple challenges related to communication, scaling, voltage shifts, and signal distortion. Tools like PuTTY, Simply Modbus, Tera Term, OriginPro, and a digital oscilloscope were used throughout for debugging, visualization, and validation. This project gave me valuable hands-on experience in embedded systems, serial communication, real-time signal handling, and system-level integration.

Objectives of the project: How can Modbus communication be effectively implemented using STM32 microcontrollers for reliable data exchange in embedded and industrial applications?

Tool used: Hardware Equipment: STM32 Blue Pill Plus Clone, USB to TTL converter, RS485 to TTL converter, RS485 to USB converter, ST-Link Programmer, Modbus RTU Analog Input 8CH, Modbus RTU Analog Output 8CH, Optical Fibers, Fiber Optic Modem, Function Generator, Digital Oscilloscope, DC Power Supply Software Requirements: STM32CubeIDE, STM32CubeProgrammer, Modbus Poll, PuTTY, Simply Modbus Slave, Simply Modbus Master, SSCom, STM32CubeMX

Details of Papers/patents: -

Brief description of the working environment: The working environment during my PS-I was both professional and supportive. My project involved implementing Modbus RTU communication with STM32 Blue Pill Plus Clone microcontrollers, Analog Input and Output modules, and optical fiber interfacing. The project was technically challenging yet highly rewarding. Despite having a packed schedule, my mentor consistently made time to guide me,

offering valuable insights and helping me overcome obstacles throughout the internship. The organization maintained strict standards regarding discipline and punctuality, which pushed me to stay focused, committed, and work with full dedication. These expectations helped strengthen my confidence and work ethic. I successfully established reliable Modbus communication across multiple modules and verified data transmission and signal handling through various tests and debugging tools. I was especially motivated when I was informed that my work would potentially be implemented near the actual project site. Knowing that my contributions could support a real-world system at a reputed research center made the experience more meaningful. Overall, PS-I was a significant learning journey that not only enhanced my technical knowledge but also taught me the importance of discipline, perseverance, and real-time problem-solving in a professional environment.

Academic courses relevant to the project: Computer Programming, Microprocessing & Interfacing, Mechanics Oscillations and Waves, Digital Design, Microelectronic Circuits, Electrical and Electronic Circuits Laboratory

Learning Outcome: - Gained proficiency in STM32CubeIDE, STM32CubeProgrammer, and ST-Link for embedded development and debugging.
- Understood UART and RS485-based serial communication, and successfully implemented Modbus RTU protocol on STM32.
- Configured STM32 as both Modbus master and slave, interfacing with AI and AO modules using various Modbus memory types.
- Developed ADC programs in polling, interrupt, and DMA modes; applied signal filtering and analyzed AC/DC inputs.
- Visualized and analyzed serial data using Tera Term and OriginPro; validated Modbus frames and CRC.
- Explored real-time signal transmission between two STM32 boards using USART and PWM reproduction with low-pass filtering.
- Enhanced problem-solving skills by debugging hardware/software issues and optimizing performance across modules.

PS-I station: Bhabha Atomic Research Centre (BARC), Visakhapatnam

Student

Name: LAKSHYA JAGNANI .(2023B2A40912P)

Student Write-up:

PS-I Project Title: Contingency Analysis of Power Systems using Pandapower and Machine Learning

Short Summary of work done: We used the Pandapower library to simulate N-1 contingency cases where one component like a line, transformer, bus, or generator is taken off and collected the resulting system data. This data included voltage and loading levels, which were used to label whether each case was critical or not. We then converted this data into graph form, representing buses as nodes and connections as edges, and trained a Graph Neural Network (GNN) model using PyTorch Geometric. The GNN learned to predict whether a future contingency would be critical, based on patterns in the graph. Finally, we tested this model on new IEEE bus systems to validate its accuracy and visualized the predicted critical elements using color-coded plots.

Objectives of the project: To develop a quick and scalable Machine Learning-based framework for Contingency Analysis in Power Systems, aimed at detecting critical faults under single-element (N-1) outages, learned by simulating line, transformer, bus, and generator outages using the Pandapower library.

Tool used: We used Jupyter Notebook as the development environment for implementing and testing our project. The Python library Pandapower was utilized to perform power flow analysis and simulate N-1 contingency scenarios on various power system test cases. To build and train the Graph Neural Network (GNN) model, we employed PyTorch Geometric, which provides efficient tools for graph-based deep learning. Additionally, Scikit-learn was used for handling data preprocessing tasks and computing evaluation metrics.

Details of Papers/patents: N/A

Brief description of the working environment: The working environment was great at BARC. Mobile phones, laptops or any other gadgets were not inside the BARC campus. I gained a deep understanding of how government organizations operate, how research is conducted, and how it is applied in real-world scenarios. Since the research work at BARC work is not focused in the CS/IT domain, there are not a lot of scientists that undergo their Research work in these domains, so you have to put in a lot of efforts yourself to do projects in these domains. BARC also provided us with accomodation in their guest house located far away (50kms) from the BARC Campus

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

Learning Outcome: Learnt to do power flow analysis using Python library Pandapower. Learnt a lot from scratch about Machine Learning & Deep Learning. Our focus was on Graph Neural Networks and PyTorch Geometric was used to code the model. Since the project was related to

Power Systems, so we also explored the basics and working of power systems and contingency analysis.

PS-I station: Bhabha Atomic Research Centre (BARC), Visakhapatnam

Student

Name: MANAS PAGRANI .(2023B5AA1132P)

Student Write-up:

PS-I Project Title: Automation of Florescence Correlation Spectroscopy Setup

Short Summary of work done: In the case of florescent light obtained from an Florescence Correlation Spectroscopy setup, fluctuations in the intensity of light contain information about diffusion rates and concentration of the florophores, which can be further extrapolated to know about higher order properties like rates of reactions, changes in size and shape of molecules which correspond to biological phenomena such as protein dynamics,intracellular transport etc. My work was centered around building a Data Acquisition system for Florescence Correlation Spectroscopy. This is achieved by recording analog signal received from a light intensity detecting sensor(PMT) and then processing the intensity data recorded on some time interval to obtain an Autocorrelation curve. Initially I used an Arduino Uno and wrote a simple program to poll its Analog to Digital Converter (ADC) every ms and to stream the converted values over the serial connection. A Labview VI was built to record and process serial data to obtain an Autocorrelation curve. To ensure there was no packet loss during recording, a Producer Consumer Architecture was employed. This setup was used to analyze light from test sources such as florescent emissions from a solution of Rhodamine 6G dye,diode lasers and ambient light with a sample rate of 1kSa/s, which seemed to be somewhat inadequate for FCS experiments. Hence to improve our sample rate we switched to a STM32 microcontroller based device with a USB FS peripheral. I implemented a double buffer mechanism on the STM32 which allowed for continuous polling of the ADC using a DMA controller. A CDC stack configured for bulk transfers moved the buffer on half and full transfer DMA interrupts. Using this method we settled on a stable sample rate of 100kSa/s.

Objectives of the project: To develop a Data Acquisition and Analysis System for use in Florescence Correlation Spectroscopy

Tool used: Hardware:- Arduino Uno, STM-32 Nucleo Board(F446ZE)),Photodiodes,Photomultiplier Tube(PMT); Software:- LabView,STM32CubeIDE, Arduino IDE

Details of Papers/patents: -

Brief description of the working environment: The working environment was relatively casual, with no strict expectations or deadlines. While that offered flexibility, it also meant the pace of work was often slow,particularly during the first three weeks when internet access was unavailable, making even basic research or troubleshooting difficult.
The shift away from core physics into electronics was somewhat disappointing, given my initial expectations. However, the project still provided some worthwhile technical exposure. I gained hands-on experience with microcontrollers, communication protocols, and aspects of signal processing. Whenever I needed help or access to resources, it was generally available.
Overall, the experience was mixed. While the setting allowed for independent learning and exploration, the lack of structure and deviation from physics-specific work left me feeling somewhat underwhelmed. Still, it helped me understand the practical challenges of interfacing electronics with experimental setups.

Academic courses relevant to the project: C Programming

Learning Outcome: 1. Gained knowledge of USB protocol and implementation of Communication Device Class (CDC) on embedded devices.
2.Learned LabView programming and various architectures used in it to improve data processing speeds.

PS-I station: Central Institute of Road Transport - Electrical & Electronics, Pune

Student

Name: ARYAN BHARDWAJ .(2023A3PS0316P)

Student Write-up:

PS-I Project Title: Hydrogen Fuel Cells in Electric Vehicles

Short Summary of work done: During my two-month internship under the project titled Hydrogen Fuel Cell in Electric Vehicles, I was involved in understanding and analyzing the feasibility of hydrogen fuel cells as an alternative energy source for electric mobility. The project began with extensive literature review and technical research on the working principles of proton exchange membrane (PEM) fuel cells, their advantages over conventional lithium-ion batteries, and their potential to reduce carbon emissions. I explored key components such as fuel cell stacks, hydrogen storage systems, and power control units. I studied various hydrogen production methods, including electrolysis and steam methane reforming, and compared their efficiency and environmental impact. A significant part of my work involved examining the integration of hydrogen fuel cells into EV architectures, focusing on energy efficiency, vehicle range, and system safety. Additionally, I assessed recent developments and case studies of hydrogen-powered vehicles by major automotive companies to understand real-world applications and challenges. I also contributed to a mini-report summarizing technical findings and proposed recommendations for future research in fuel cell technologies. Overall, the internship enhanced my understanding of clean energy technologies, exposed me to ongoing innovations in green mobility, and strengthened my research, analysis, and technical documentation skills.

Objectives of the project: The primary objective of the project was to explore the integration of hydrogen fuel cells into electric vehicles (EVs) as a sustainable alternative to conventional energy sources. The project aimed to understand the working principles of hydrogen fuel cells, evaluate their efficiency and environmental impact, and analyze the challenges of implementation in automotive systems. It also focused on studying hydrogen storage technologies, fuel cell design, and control systems in EVs. A key goal was to assess the viability of hydrogen as a long-term solution for clean mobility and its potential to reduce carbon emissions in the transportation sector.

Tool used: Hardware (H/w): N/A Software (S/w): MATLAB/Simulink – used for modeling, simulation, and performance analysis of hydrogen fuel cell systems in electric vehicles.

Details of Papers/patents: NA

Brief description of the working environment: The PS-I internship provided a semi-structured, research-oriented environment. Work hours were officially from 10:00 AM to 4:00 PM, Monday to Friday, with weekends off. The schedule was flexible, and the overall atmosphere was informal. We were allotted a separate room equipped with all basic amenities such as Wi-Fi, air conditioning, desks, and chairs, creating a comfortable space for focused work. However, the environment felt more like a college library than a corporate setting, lacking the real-world industrial exposure one might expect from an internship.
The mentors met with us only 3–4 times throughout the duration, which limited our opportunities for regular guidance and feedback. This somewhat stalled the pace of our learning, as we had to rely heavily on self-study and online resources to make progress.

Despite these limitations, the project helped build my understanding of hydrogen fuel cells and their potential application in electric vehicles. Using MATLAB/Simulink, I gained hands-on experience in modeling and analyzing fuel cell performance. I also improved my skills in technical research, documentation, and independent learning.
While the experience fell short in terms of corporate exposure and mentor engagement, it did offer a quiet, resource-rich setting to explore the technical aspects of clean energy technologies in depth.

Academic courses relevant to the project: Control Systems, Electrical Machines, Physical Chemistry.

Learning Outcome: During the internship, I gained a solid understanding of hydrogen fuel cell technology and its application in electric vehicles. I learned about the electrochemical processes involved in power generation, fuel cell architecture, and system integration with EV drivetrains. Exposure to hydrogen storage methods and safety protocols enhanced my awareness of practical challenges. I developed skills in analyzing energy efficiency, emission reduction, and system optimization. The experience deepened my knowledge of sustainable energy solutions and sharpened my research and technical communication skills, preparing me for future work in green transportation and renewable energy technologies.

PS-I station: Centre for Military Airworthiness & Certification (CEMILAC), DRDO, Bangalore

Student

Name: HARISHANKAR PADMAKUMAR .(2023A4PS0403P)

Student Write-up:

PS-I Project Title: Aerodynamic Analysis of Airfoils: Impact of High-lift devices on lift coefficient and study of various subsystems of Indian military fighter aircraft.

Short Summary of work done: The initial week mostly involved introduction to the work done at CEMILAC, followed by learning of the basics of Aerodynamics and revising Fluid Mechanics concepts. Following this, we began to work in Ansys Fluent and got ourselves familiarised with

the software and then began simulations of flow over airfoils and presented the results. The weeks after this we were involved in the learning of different aircraft subsystems from the experts in each and then made presentations and reports about the same. Towards the end of PS, we were taken to site visits to some aircraft assembly and testing facilities which was quite an insightful and enriching experience.

Objectives of the project: To understand the various subsystems of the Indian Military Fighter aircraft and study their structure and applications. To visualise and analyse the flow of air over standard air foils and understand the impact of high lift devices such as flaps on the same.

Tool used: Ansys Fluent, PowerPoint

Details of Papers/patents: None

Brief description of the working environment: The working environment is not very intense. Though it may seem slightly laid back initially, as you engage yourselves with the learning and work assigned you tend to find yourself busy. All of the staff and scientists are quite busy in their work so you may not always find yourself occupied. They take time out to guide you and mentor you throughout. They expect you to be able to sit and read and understand some reports and data on your own as well. They also expect you to show good professionalism while in the office. The learning from PS-I was it taught me how to maintain work ethic and how to conduct myself in an office environment.

Academic courses relevant to the project: Fluid Mechanics, Mechanics of Solids,

Learning Outcome: Developed a detailed understanding of the various flight crucial subsystems for an indigenously developed Military fighter aircraft. Understood how these various subsystems are structured, what are their applications, how they function and behave in different flight environments. Also learned the basics of aerodynamics, ranging from lift, drag and flow over air foils and the variation of coefficients of lift and drag over an air foils. Also gained insight into how high lift devices like Flaps and Slats change the airflow over air foils and hence change lift and drag and impact flight and stability.

PS-I station: Delhi Metro Rail Corporation (DMRC) - Civil, New Delhi

Student

Name: VIDHI JAIN .(2023A2PS0904H)

Student Write-up:

PS-I Project Title: DMRC - Civil Project

Short Summary of work done: I observed and documented key construction activities under Package DC-07 of the Delhi Metro, including tunneling methods (TBM, NATM, Cut-and-Cover), structural components (D-walls, anchors, slabs), and safety practices. I also studied project planning documents, construction drawings, contract types, and interacted with site engineers to understand real-time challenges and execution processes.

Objectives of the project: Study of Tunnel Boring anfd Civil Construction Techniques at Delhi Metro Rail Corporation

Tool used: None

Details of Papers/patents: None

Brief description of the working environment: DMRC - Civil as a station is a great opportunity to learn about the core civil aspects, and observe the theoretical classroom learnings in actual sites, but for someone who wants to make a contribution to the actual works, who wants to be working in a project, DMRC does not provide that experience. Here, its more about training the intern about the workings rather than letting the intern do some work, which is somewhat understandable considering its a government organization with large, high-cost projects (mine was ₹1758 cr.), and the interns who come here through PS1 are just 2nd year students (Not trained enough to be able to handle the works). Overall, its a good experience for understanding the core civil works and life, make good connections and network with high ranking government officials, and get future guidance from them, just not for students who want to 'work' on a project within civil core.

Academic courses relevant to the project: Mechanics of Solids, Civil Engineering Materials, Surveying, Construction Planning and Technology, Soil Mechanics

Learning Outcome: This internship provided invaluable practical exposure to real-world civil engineering practices, especially in underground metro construction. I gained a deeper understanding of tunneling techniques, construction methodologies like Top-Down and Bottom-Up, interpretation of technical drawings and codes, and on-site problem-solving. Additionally, interacting with experts and witnessing large-scale infrastructure execution enhanced both my technical knowledge and professional outlook.

PS-I station: Delhi Metro Rail Corporation (DMRC) - Civil, New Delhi

Student

Name: OM SENGUPTA .(2023A2PS0927H)

Student Write-up:

PS-I Project Title: Civil-DMRC

Short Summary of work done: During my Practice School-I at Delhi Metro Rail Corporation (DMRC), I gained practical exposure to underground metro construction, with a focus on tunneling and station building activities. I visited key construction sites such as the Sarita Vihar Launching Shaft (SVLS) and Tughlakabad Station, where I observed various phases of civil engineering work. I studied both top-down and bottom-up methods of station box construction, learning their step-by-step execution, along with associated techniques such as diaphragm wall installation, dewatering systems, temporary strutting, and slab casting. This helped me understand the structural planning involved in deep excavation projects. In tunneling works, I observed the operation and components of Tunnel Boring Machines (TBMs), including the cutter head, shield, screw conveyor, and segment erector. I learned about segmental lining systems, how precast rings are installed inside the tunnel, and waterproofing using gaskets. I was also introduced to the New Austrian Tunneling Method (NATM) used in shaft and cross-passage construction. Through interactions with engineers and supervisors, I gained insights into safety practices, geotechnical considerations, and construction sequencing. Technical drawings, method statements, and site briefings helped me relate fieldwork to theoretical concepts.

Objectives of the project: Understanding and learning about Metro infrastructure and tunneling operations in Delhi metro

Tool used: Tunnel Boring Machine (TBM), Diaphragm Wall Grab, Hydraulic Jack, Total Station, Dewatering Pump

Details of Papers/patents: N.A

Brief description of the working environment: The working environment at DMRC was professional, safety-focused, and highly structured, with strict adherence to timelines and protocols. Interns were expected to be punctual, observant, and proactive in learning from

engineers and supervisors. The company provided valuable exposure to real-time underground metro construction processes. During PS-I, I gained practical knowledge of tunneling methods, station excavation techniques, and geotechnical challenges. Site visits, technical briefings, and interactions with experts helped bridge the gap between academic concepts and field applications, significantly enhancing my understanding of civil engineering in large-scale infrastructure projects

Academic courses relevant to the project: Analysis of Structures, mechanics of solids, Soil mechanics, Construction planning and technology, Surveying.

Learning Outcome: Tunneling operations and sub-station building through different procedures in phase 4 golden line of DMRC

PS-I station: Delhi Metro Rail Corporation (DMRC) - Electronics, New Delhi

Student

Name: AKSHIT GILL .(2023A3PS0371H)

Student Write-up:

PS-I Project Title: Signalling, CBTC, ATP and Data Transformation

Short Summary of work done: Understand the basic working the metro system on Magenta line of Delhi Metro, using Pandas to make a data transformation programe to convert an excel file containing hex codes to binary.

Objectives of the project: Understand the basic working the metro system on Magenta line of Delhi Metro, using Pandas to make a data transformation programe to convert an excel file containing hex codes to binary.

Tool used: Python, Pandas

Details of Papers/patents: N/A

Brief description of the working environment: It was good environemnt.

Academic courses relevant to the project: None, maybe some CS courses that I am not aware of

Learning Outcome: Understanding massive systems and their breakdown, Pandas, Python, Excel

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PS-I station: Delhi Metro Rail Corporation (DMRC) - Electronics, New Delhi

Student

Name: RAKSHAM RAJ .(2023AAPS0725P)

Student Write-up:

PS-I Project Title: Signalling and CBTC

Short Summary of work done: During my PS-I at DMRC (Delhi Metro Rail Corporation), I was exposed to both conventional and advanced signalling systems with a focus on CBTC (Communication-Based Train Control). I studied the functional blocks of CBTC including the ATS (Automatic Train Supervision), ATP (Automatic Train Protection), and ATO (Automatic Train Operation). I attended technical sessions and site visits at stations like Nehru Enclave, where I observed simulation tools and live monitoring of train operations. I also learned about ATS supervision patterns, station-level interlocking, and the significance of log data in failure analysis. We examined train movement logs, interpreted symbols on the simulation interface, and studied the process of fault detection and mitigation. Apart from CBTC, I explored auxiliary systems such as TCMS (Train Control and Monitoring System), CCTV integration, power backup architecture, and depot operations. The internship also involved studying technical documents, preparing reports, and understanding the functional testing methods. Overall, the experience gave me a strong foundation in railway signalling, automation, and system-level coordination required in urban metro systems.

Objectives of the project: To study the Communication-Based Train Control (CBTC) system and its sub-systems and to observe the practical implementation of signalling, interlocking, ATS, TCMS, and communication systems in metro operations.

Tool used: ATS Simulation Software Log Analysis Tools,Station Computer Monitoring System, MS PowerPoint and Word for documentation.

Details of Papers/patents: none

Brief description of the working environment: The working environment was structured, collaborative, and highly informative. Our mentors, including senior engineers and trainers at DMRC, guided us through each technical domain with patience and clarity. Sessions were a blend of theory and field exposure, which made the learning process engaging. Regular visits to operational metro stations allowed us to visualize how signalling and control systems function in real time.
The company expected interns to be punctual, attentive, and proactive in learning. We were encouraged to ask questions, participate in discussions, and prepare documentation summarizing our learnings. The training emphasized practical exposure to SCADA-based monitoring, ATS patterns, interlocking logic, and handling of emergency scenarios through system logs.
We also learned the critical role of redundancy, safety protocols, and international standards (like SIL-4) in signalling systems. A highlight of the learning was understanding how different sub-systems such as TCMS, CCTV, intercom, and power backup are interconnected in a smart transportation system. The internship provided not just technical knowledge, but also professional discipline, communication skills, and an appreciation for the complexity behind metro automation.

Academic courses relevant to the project: none

Learning Outcome: Gained insight into CBTC architecture including subsystems like ATS, ATP, ATO, and interlocking.
Understood real-time train supervision and control via Station Computer and OCC.
Learned about failure analysis using train log data.
Understood the role of hardware like ballises, and point machines in signalling.

PS-I station: DHIO Research & Engineering Pvt. Ltd, Bengaluru

Student

Name: DODLOLLA RITHISH RAO .(2023A4PS0603H)

Student Write-up:

PS-I Project Title: Simulation of Galvanic Corrosion and Mechanical Deformation in Dissimilar Metals using COMSOL Multiphysics

Short Summary of work done: I worked on various problems in comsol multiphysics and learnt about comsol and worked on galvanic corrosion with deformation on magnesium model

Objectives of the project: To study the phenomenon of galvanic corrosion and its impact on dissimilar metal joints in corrosive environments such as saltwater (NaCl solution).

Tool used: Comsol multphysics 6.3

Details of Papers/patents: No

Brief description of the working environment: It was good.
Academic courses relevant to the project: Solid mechanics,fluid mechanics,heat transfer

Learning Outcome: Gained hands-on experience with FEA tools like ANSYS or COMSOL to simulate mechanical behavior of materials and structures under different loading conditions.

PS-I station: Eclipse Prism Medical Device Pvt. Ltd, Navi Mumbai

Student

Name: VEDAANT DEEPAK DESAI(2023A4PS0320G)

Student Write-up:

PS-I Project Title: Designing and development pf a smartband

Short Summary of work done: Did thorough research on various other smartband companies and created a list of pcb,materials required etc .worled on selecting and finalising the materials to be used ,created a rough design and contacted various industryand companies .

Objectives of the project: To create and finalise a basic design and features of a smartband

Tool used: Fusion 360,chatgpt ,various market softwares

Details of Papers/patents: No patents

Brief description of the working environment: The working environment was very supportive and approachable,the mentors and project lead helped alot .

Academic courses relevant to the project: EG,material science

Learning Outcome: Got to learn a lot about the industry and learned various designing software

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PS-I station: Gas Turbine Research Establishment-DRDO, Bengaluru

Student

Name: HEMANTH PEMMASANI (2023A4PS0679H)

Student Write-up:

PS-I Project Title: 3D Model Preprocessing Of Small Turbo Fan Engine(STFE)And Study Of Design Of Experiments(DOE) For Additive Manufacturing Parameter Optimization

Short Summary of work done: internship at the Gas Turbine Research Establishment (GTRE), DRDO, focused on creating a high-fidelity display prototype of a Small Turbo Fan Engine (STFE) using additive manufacturing (AM). The project, titled "3D Model Preprocessing of Small Turbo Fan Engine (STFE) and Study of Design of Experiments (DOE) for additive manufacturing parameter optimization", had two primary objectives. First, the project established a comprehensive 3D model preprocessing workflow. This involved correcting errors, optimizing the mesh, and adjusting wall thickness to prepare the digital STFE model for 3D printing. The process also included segmenting the model and selectively removing features to improve the printability and assembly of the engine's complex, thin-walled components. Second, the project utilized the Design of Experiments (DOE) methodology to optimize AM parameters. A factorial experimental approach and subsequent ANOVA analysis were used to study the

impact of variables like laser power, scan speed, layer thickness, and hatch spacing on the tensile strength and surface roughness of the printed parts. This allowed for the identification of optimal parameter settings to enhance the quality and manufacturing efficiency of the prototype. In addition to the main project, the internship involved visits to various specialized modules within GTRE, DRDO. These visits provided a broad understanding of STFE subsystems, including component design, control systems, non-destructive testing, and material analysis. The overall result of the internship is a repeatable, data-driven workflow that integrates digital preprocessing with experimental process optimization for producing accurate display prototypes of complex aerospace assemblies using AM.

Objectives of the project: Perform 3d model preprocessing on STFE, Learn DOE and apply it to optimize AM process. Learn how R&D sector works

Tool used: UGNX(CAD software) , JMP(statistics tool)

Details of Papers/patents: none

Brief description of the working environment: Working environment was nice and scientists were helpful and answered all the doubts.

Academic courses relevant to the project: Engineering graphics, PNS, applied thermodynamics, Manufacturing processes, Fluid mechanics, heat transfer.

Learning Outcome: learnt 3D model preprocessing, Design of experiments and learnt how different gas turbines and its various subsystems work.

PS-I station: Honda Motor Cycle and Scooter India Pvt. Ltd - Manesar, Gurgaon

Student

Name: ABHI PRUTHI .(2023A4PS0463P)

Student Write-up:

PS-I Project Title: Generation points identification of hardware in marshal carriers

Short Summary of work done: During my PS-I at Honda Motorcycle and Scooter India Pvt. Ltd. (HMSI), Manesar, I worked on the project titled "Generation Point Identification of Hardware in Marshal Carriers." The goal was to identify areas on the main assembly line where reusable hardware (screws, bolts, etc.) was being lost during vehicle assembly and transported unknowingly to the underground pit via marshal carrier jigs, conveyor gaps, or workstation mishandling. I began with a genba study to understand the carrier movement and observed repetitive loss patterns across multiple bike models such as the CB350 H'ness, Unicorn, and XBlade. I collected model-wise data, tracked part-wise fall rates per hour, and extrapolated quarterly loss volume and cost. The study estimated a quarterly hardware loss of ~100,000 pieces, translating to ₹30,000–₹50,000 per quarter depending on part value. I proposed multiple corrective measures, including the installation of hardware catch trays, a weekly jig clearance SOP, and operator micro-trainings to reduce mishandling. I also evaluated the cost-benefit of automating the segregation process using a sorting and washing system, factoring in running costs and ROI. The project projects a net annual savings of ₹5.16 lakh with a long-term ROI over 10–12 years. Overall, the project enhanced my understanding of real-world production systems, cost analysis, lean manufacturing, and solution-oriented thinking in a fast-paced industrial environment.

Objectives of the project: The objective of this project was to identify and analyze the generation points of hardware loss—such as bolts, screws, and washers—along the marshal carriers and main assembly line at HMSI Manesar. By collecting model-specific data and observing loss trends on the shopfloor, the project aimed to quantify the financial and operational impact of this recurring issue. It further sought to propose practical corrective measures, including hardware trays, weekly jig clearance SOPs, operator training, and a pilot automation setup for sorting and washing. Ultimately, the goal was to build a sustainable, cost-effective strategy to minimize wastage and improve line efficiency.

Tool used: During the course of the project, I primarily used manual tools and common office software to carry out analysis and documentation. On the hardware side, I relied on visual inspection aids during genba walkthroughs and utilized marshal carrier jigs and workstation setups to observe and study hardware loss patterns. Mesh trays and weighing scales were used to estimate the volume of fallen hardware. For data handling and documentation, I used Microsoft Excel to record model-wise observations, calculate shift-wise and quarterly losses, and perform cost analysis. Microsoft Word was used for drafting detailed reports, documenting SOPs, and maintaining logs of findings, while Microsoft PowerPoint helped in preparing presentations and communicating results effectively to mentors and team members.

Details of Papers/patents: NA

Brief description of the working environment: During my PS-I at Honda Motorcycle & Scooter India Pvt. Ltd. (HMSI), Manesar, I experienced a highly structured and efficiency-driven industrial environment. The shopfloor operations were well-coordinated, with each department functioning under strict timelines and quality controls. My work was centered around the Main

Assembly Line and the Marshal Carrier System, where I conducted genba studies to identify hardware wastage patterns.
The company expected PS-I students to work independently, take ownership of their assigned projects, and deliver actionable insights. Regular progress meetings were held with mentors who encouraged problem-solving, data-driven decision-making, and adherence to safety and lean manufacturing standards.
This internship significantly enhanced my understanding of assembly line operations, waste minimization techniques, and cost-benefit analysis. I learned how small inefficiencies, like hardware falling into pits, can lead to significant financial and operational losses over time. I also developed soft skills such as communicating with line operators, aligning proposals with shopfloor realities, and preparing professional documentation and presentations.
Overall, my time at HMSI was a valuable learning experience that blended technical observation with real-world manufacturing challenges and fostered a strong foundation in industrial problem-solving.

Academic courses relevant to the project: Courses like Workshop Practice and Manufacturing Processes provided foundational understanding of fasteners, assembly tools, and production techniques—critical for identifying hardware loss on the shopfloor. Materials Science and Engineering helped in classifying and evaluating different types of hardware materials for potential reuse. From a systems perspective, Mechanisms and Machines offered insights into the mechanical motion of marshal carriers and conveyors, which contributed to hardware drop-offs.
Additionally, Probability and Statistics was instrumental in analyzing hardware fall trends, projecting quarterly and annual losses, and validating recovery estimates. Management-oriented courses like Principles of Management enabled me to evaluate corrective actions, plan SOPs, assess cost-saving proposals, and frame a viable return on investment (ROI) plan. These interdisciplinary learnings came together to help me connect theory with industrial practice and contribute effectively to the project.

Learning Outcome: Through this project, I gained hands-on exposure to real-world manufacturing challenges, particularly in lean production and loss analysis on a fast-paced assembly line. I learned how to perform genba-based root cause identification, analyze hardware loss data, and propose cost-effective corrective measures with quantifiable ROI. The experience also enhanced my understanding of standard operating procedures, production-floor ergonomics, and the financial trade-offs involved in automation. Additionally, I developed skills in stakeholder communication, visual documentation, and report preparation aligned with industrial expectations.

PS-I station: Honda Motor Cycle and Scooter India Pvt. Ltd - Manesar, Gurgaon

Student

Name: KRISHANU BHATIA(2023A4PS1083G)

Student Write-up:

PS-I Project Title: Engine Assembly, Functions and Top Defects

Short Summary of work done: During my Practice School-I internship at Honda Motorcycle and Scooter India (HMSI), Manesar, I was assigned to the engine assembly line, where I gained practical exposure to various manufacturing and quality control processes. My primary task involved observing and analyzing defects occurring during engine assembly, with a particular focus on leakages (head cover, side cover, and valve), neutral switch issues (leakage, breakage, wire NG), and lifter assembly damage. Over the first few weeks, I collected and monitored defect data per shift, identifying recurring problems and estimating defect rates relative to daily engine output. Using the 4M (Man, Machine, Method, Material) analysis, I helped identify root causes—mainly related to human error and material quality. In the following weeks, I actively participated in defect detection processes, including air leak testing using calibrated machines and soap solution methods. I also gained hands-on experience at the repair station by dismantling and reassembling engines with minor defects. Additionally, I assisted shopfloor operations such as verifying engine model labeling (domestic vs export), supporting operators during peak production, and learning about quality monitoring systems like torque tracking, Andon alerts, and Poka-Yoke mechanisms. This internship enhanced my technical understanding of engine manufacturing, real-time defect management, and collaborative shopfloor practices in a lean production environment.

Objectives of the project: The primary objective of this project was to gain a comprehensive understanding of the engine assembly operations at HMSI Manesar, including the sequence of subassemblies, working stations, and quality control procedures. A key focus was to identify and analyze the most common defects occurring during assembly—particularly leakage issues, neutral switch-related defects, and lifter assembly damage. The project aimed to apply the 4M (Man, Machine, Method, Material) framework to determine the root causes of these defects, with a particular emphasis on human error and material-related failures. Additionally, the project sought to observe and participate in the defect detection and repair process, including leak testing and rework of defective engines. Another important objective was to assist in shopfloor monitoring tasks such as model verification, label accuracy, and general support to line operators, thereby contributing to overall process improvement and operational efficiency.

Tool used: Hardware Tools: DC Torque Tools – Digitally controlled torque wrenches used for precise tightening of bolts and fasteners. Leak Testing Machine – Used for air pressure-based leak detection across engine joints and covers. Soap Solution Spray Equipment – For visual leak detection through bubble formation at defective joints. Engine Carriers & Fixtures – Custom carriers and jigs used to hold engines during assembly and inspection. Basic Hand Tools – Spanners, screwdrivers, torque wrenches, and alignment tools for engine repair and assembly. Software Tools: MES (Manufacturing Execution System) – Tracks engine assembly status, torque data, operator IDs, and testing results. Torque Monitoring System – Logs and displays torque values in real-time for every critical fastening operation. Defect Tracking Dashboards – Used for daily defect recording, rejection analysis, and trend monitoring

Details of Papers/patents: NA

Brief description of the working environment: The working environment at HMSI Manesar was highly structured, disciplined, and process-driven. The engine assembly line operated on strict takt-time, with a focus on precision, quality, and teamwork. Operators, supervisors, and support staff followed well-defined standard operating procedures (SOPs), ensuring a smooth and synchronized workflow. The shopfloor was equipped with digital torque tools, real-time data displays, and Andon systems for immediate issue escalation. Cleanliness, safety, and 5S practices were maintained rigorously across all stations.

The company expected interns to observe diligently, follow all safety and dress code norms, and respect the discipline of the manufacturing environment. We were encouraged to ask relevant questions, document observations, and contribute meaningfully where possible. Active participation and curiosity were appreciated by mentors and shopfloor staff alike.

During the PS-I internship, I gained practical exposure to the functioning of a modern two-wheeler manufacturing facility, especially in engine assembly and defect management. I learned how to analyze defect patterns, apply the 4M root cause methodology, and assist in real-time leak testing and repair. Hands-on experience at the repair station gave me a better understanding of internal engine components and rework procedures. I also understood the importance of traceability, process discipline, and quality control in high-volume production. This experience helped me bridge the gap between academic knowledge and real-world industrial practices.

Academic courses relevant to the project: Thermodynamics – Provided foundational understanding of engine cycles, heat transfer, and combustion processes.

Manufacturing Processes – Helped in understanding machining, assembly line operations, and component fitment techniques.

Engineering Mechanics – Useful in analyzing mechanical forces and motion within engine components.

Product Design and Development – Related to understanding part integration, tolerances, and design considerations for assembly.

Quality Control and Reliability Engineering – Directly relevant for defect analysis, inspection techniques, and process control.

Electrical and Electronic Devices – Supported understanding of components like the neutral switch and continuity testing.
Automobile Engineering (if taken as an elective) – Helped relate theoretical knowledge to practical engine systems and diagnostics.
Data Analysis & Statistics – Useful in analyzing defect trends, rejection rates, and process performance.

Learning Outcome: During the course of my internship at HMSI Manesar, I gained valuable insights into the structure and workflow of a high-volume engine assembly line. I developed a strong understanding of how precision, sequencing, and standardized procedures are critical to achieving consistent output quality. Through real-time defect analysis and the application of the 4M root cause framework, I learned how even minor deviations in material quality or human handling can lead to functional issues in assembled engines. Working at the repair station provided hands-on exposure to dismantling, diagnosing, and reassembling engines, deepening my understanding of internal engine mechanics. I also learned how air pressure testing and soap solution techniques are used for leak detection, reinforcing the importance of accuracy in testing protocols. Additionally, I became familiar with production data tracking, labeling processes, and the importance of coordination between operators, supervisors, and quality teams. This experience has enhanced my problem-solving ability, technical knowledge, and practical understanding of quality assurance in a modern manufacturing environment.

PS-I station: Honda Motor Cycle and Scooter India Pvt. Ltd - Manesar, Gurgaon

Student

Name: SHANKARGOUDA HIREGOUDAR(2023A4PS1232G)

Student Write-up:

PS-I Project Title: New equipment study for AGV line

Short Summary of work done: Worked on the AGV line at HMSI, focusing on studying equipment and identifying issues affecting operation. Supported maintenance activities by helping prepare part lists, failure analysis, and standard checklists. Assisted in troubleshooting, reducing downtime, and suggesting Kaizen improvements to enhance system reliability and safety.

Objectives of the project: Studying AGV line equipment to identify potential issues that could disrupt operation.

Tool used: excel, word doc

Details of Papers/patents: New equipment study of AGV line

Brief description of the working environment: The working environment at HMSI was professional, disciplined, and focused on safety and efficiency. The plant followed standardized procedures, with clear responsibilities assigned to each team. Teamwork and timely communication were emphasized, especially in maintenance operations.
The company expected interns to be punctual, observe industrial protocols, maintain safety norms, and show a willingness to learn. We were encouraged to ask questions, understand systems deeply, and contribute wherever possible.

Academic courses relevant to the project: Manufacturing Processes, Machine Design

Learning Outcome: Understood AGV system components and workflow.

PS-I station: Honda Motor Cycle and Scooter India Pvt. Ltd - Manesar, Gurgaon

Student

Name: NAVYAM GOYAL .(2023B3A41001P)

Student Write-up:

PS-I Project Title: Appearance Defects Generation Points Indentification

Short Summary of work done: During my PS-I at Honda Motorcycle & Scooter India Pvt. Ltd. (HMSI), Manesar, I worked on the project titled “Appearance Defect Generation Point Identification.” The objective was to identify the root causes of surface defects like scratches on fuel tanks and covers during assembly. I conducted model-wise and station-wise analysis, focusing on key problem areas such as jig handling, tight workspaces, and fuel filling operations. Using two months of defect data, I extrapolated the annual cost impact and proposed practical

corrective measures like protective paddings, layout rearrangements, and operator training. I also created a 12-week implementation plan. The project enhanced my understanding of real-time quality issues, data analysis, and process improvement within a live production environment.

Objectives of the project: To identify root causes of scratches on fuel tanks and covers during assembly and analyze their model-wise/station-wise occurrence. To propose cost-effective corrective actions to reduce rework, improve quality, and enhance customer satisfaction.

Tool used: Hardware: Measuring tools, inspection jigs, premate gun, frame line setup Software: Microsoft Excel (for data analysis), PowerPoint (for presentation), Google Sheets

Details of Papers/patents: N/A

Brief description of the working environment: The working environment at Honda Motorcycle & Scooter India Pvt. Ltd. (HMSI), Manesar was highly professional, disciplined, and safety-focused. The plant followed a structured workflow with clearly defined responsibilities at each station. I was placed in the Assembly Frame Department, where I got to observe the detailed process of two-wheeler manufacturing—from frame loading to final assembly. The support from my mentor and the engineers on the shop floor was exceptional, and they encouraged curiosity and practical learning.

The expectations from the company were clear: understand the process flow, identify problems based on real-time observations, and propose implementable solutions. I was treated as a part of the team and was expected to take ownership of the project deliverables. Timely reporting, on-ground inspection, and data accuracy were considered essential.

During my PS-I, I learned to connect theoretical knowledge with practical problems. I gained hands-on exposure to root cause analysis, quality control practices, handling industrial tools, and analyzing real production data. The project taught me how small visual defects can lead to large financial losses and how preventive action is more cost-effective than reactive rework.

Overall, it was an eye-opening experience that helped me develop a deeper understanding of shop floor challenges, teamwork, and the continuous improvement culture followed in world-class manufacturing facilities like HMSI.

Academic courses relevant to the project: Manufacturing Processes
Engineering Graphics & Design
Principles Of Management
Probability and Statistics

Learning Outcome: Gained hands-on experience in root cause analysis, defect tracking, and implementing practical quality improvement solutions in a live manufacturing environment.

PS-I station: Honda Motor Cycle and Scooter India Pvt. Ltd - Narasapura, Kolar

Student

Name: JASPER KANISHK BALAN(2023A4PS0264G)

Student Write-up:

PS-I Project Title: Increasing efficiency in the assembly engine process

Short Summary of work done: In my Practice School-I internship at Honda Motorcycle and Scooter India Pvt. Ltd. , I was assigned to Line 4, focusing primarily on the engine assembly process for Activa and Dio scooters. My main assignment was to explore ways to improve the efficiency of the assembly engine line, with an emphasis on identifying potential automation opportunities. To begin with, I familiarized myself with the sub-assembly and main assembly flows, recording each step's cycle time, associated parts, and critical inspection points. I translated this information into a value stream map that helped visualize the overall workflow and highlight bottlenecks. Along the way, I studied operation sheets in detail, noting several discrepancies between documented procedures and actual shop-floor practices. I flagged inefficiencies, missing torque confirmations, improper sequencing, and frequent minor defects like part mix-ups, marking errors, and wear-related failures. I also worked with the machine assembly team, observing machining processes for the cylinder block, crankshaft, and cylinder head, which gave me a deeper understanding of the engine's core. This internship gave me not only a technical foundation in manufacturing systems but also a real appreciation for the challenges of ensuring quality and precision in mass production.

Objectives of the project: Increasing efficiency and reducing defects preferably but not limited to modes of automation

Tool used: N.A.

Details of Papers/patents: None

Brief description of the working environment: The working environment at Honda Motorcycle and Scooter India Pvt. Ltd. (HMSI) was highly structured, safety-conscious, and efficiency-driven. From day one, interns were expected to adhere to strict safety protocols, dress codes, and punctuality standards. The company encouraged discipline, teamwork, and respect for standardized procedures on the shop floor. My interactions with engineers, supervisors, and

associates gave me a sense of the discipline and rigor required in large scale manufacturing.During my time at HMSI, I was given the responsibility to understand and analyze the engine assembly process with the goal of suggesting efficiency improvements. This expectation pushed me to go beyond passive observation and actively engage with line processes, operation sheets, and data collection. I learned to work independently, document real-world deviations, and communicate findings in a structured format.
Through hands-on exposure to machining stations and assembly lines , I developed a stronger grasp of lean manufacturing, process flow, and root cause analysis. The experience taught me how engineering theory translates into real-world production and helped shape a more practical, detail-oriented approach to problem-solving.

Academic courses relevant to the project: 1. Manufacturing process
2.Production Engineering
3.IC engines

Learning Outcome: 1. Understanding of Engine Manufacturing Processes
2. Interpretation and Evaluation of Operation Sheets
3.Use of Value Stream Mapping
4.Exposure to Industrial Equipment and Tools

PS-I station: Honda Motor Cycle and Scooter India Pvt. Ltd - Narasapura, Kolar

Student

Name: ARJUN SRIRAM(2023A4PS0318G)

Student Write-up:

PS-I Project Title: Improving efficiency and reducing rejections on engine sub assembly line

Short Summary of work done: In this project, I worked on improving efficiency and reducing rejections on the engine sub-assembly line. My work involved observing the line closely to understand the different processes and identifying areas where time was being lost or mistakes were happening. I collected data on production, cycle times, and rejection rates, and used simple tools like Pareto analysis to find the major causes of rejections. I also supported line

managers and workers in day-to-day activities, which gave me a better understanding of the practical challenges they face. Based on my observations, I suggested small improvements such as better handling of parts, maintaining proper checks at critical stages, and reducing minor delays in the process. These efforts not only helped in minimizing rejections but also in making the line more efficient. Through this, I learned how small changes in process flow and attention to detail can bring measurable improvements in both quality and productivity.

Objectives of the project: To look for areas of improvement by which cycle time can be reduced and improve processes to yield fewer rejections

Tool used: NA

Details of Papers/patents: NA

Brief description of the working environment: The working environment in the company was highly dynamic, with managers and staff focused on meeting strict production targets. I was given considerable freedom during my internship, which allowed me to explore and learn independently. I was allowed to choose the department I wanted to work in and was provided with a project title. Beyond that, there were no rigid expectations apart from preparing a detailed project report and delivering a short presentation to the department head at the end.
Since the managers were occupied with their responsibilities, they were unable to spend much time guiding me through the technical aspects of the project. As a result, most of my learning came from direct observation of the assembly line, analyzing available data files, and interacting with the workforce on the shop floor. The line workers, in particular, were very approachable and supportive, often helping me understand the processes and sharing information that gave me a starting point for my work.
This environment encouraged me to take initiative, think independently, and rely on my problem-solving skills to progress through the project. While more active involvement from managers could have given me deeper technical insights, the experience taught me the importance of self-learning and observation in an industrial setting. Overall, the freedom I was given, combined with the cooperation of the line workers, made the internship a valuable and practical learning experience.

Academic courses relevant to the project: Manufacturing processes
Principles of Management
Mechanisms and Machines
Engines Motors and Mobility

Learning Outcome: understanding of lean manufacturing principles and their application in an engine sub-assembly line
hands-on experience with process optimization techniques (cycle time reduction, takt time balancing, bottleneck identification)
ability to use quality control tools (pareto charts, fishbone diagrams, control charts) for analysing rejection causes

improved knowledge of root cause analysis and corrective/preventive action (CAPA) methods exposure to kaizen and continuous improvement culture in a live production environment

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PS-I station: Honda Motor Cycle and Scooter India Pvt. Ltd - Vithalapur, Ahmedabad

Student

Name: DHRUV GARG(2023B1A40678G)

Student Write-up:

PS-I Project Title: Analysis of manual rework station and leak testing machine

Short Summary of work done: Observed the production lines and suggested a few ways to improve it

Objectives of the project: Understanding the processes and suggesting alternatives and ways to improve it

Tool used: Na

Details of Papers/patents: Na

Brief description of the working environment: Working environment was decent.

Academic courses relevant to the project: yes

Learning Outcome: Many things.

PS-I station: Jindal Power Limited, Raigarh

Student

Name: ADITYA VIJAYWARGIYA .(2023A4PS0698H)

Student Write-up:

PS-I Project Title: EFFICIENCY ASSESMENT OF BOILER IN THERMAL POWER PLANT

Short Summary of work done: During my PS-1 at Jindal Power Limited (JPL), Tamnar, I worked on boiler efficiency assessment in 250 MW and 600 MW thermal power units using both direct and indirect methods. The 600 MW unit studied was a BHEL tangential-fired boiler with a 750 m^3 water holding capacity and 88.64 m tall furnace, integrated with APH, FD/ID fans, superheaters, reheaters, economizers, and ESP. Using live plant data, I calculated boiler efficiency as 88.07% (direct method) with steam rate of 7,32,000 kg/hr and coal GCV of 13,807.2 kJ/kg. The indirect method identified 11.625% losses, mainly due to dry flue gas, hydrogen combustion, and moisture in fuel, based on proximate and ultimate coal analysis (42% ash, 38.5% carbon). I also utilized the Distributed Control System (DCS) to monitor real-time parameters like O_2, CO, steam temperature, mill performance, and differential pressures, which helped me analyze combustion efficiency and air-fuel imbalance. This experience enhanced my understanding of boiler thermodynamics, instrumentation, and efficiency optimization in utility-scale power plants.

Objectives of the project: To find out boiler efficiency in Thermal power Plant

Tool used: Excel, Jupyter, Python, DCS

Details of Papers/patents: None.

Brief description of the working environment: The working environment at Jindal Power Limited (JPL), Tamnar was highly professional, technically rich, and safety-oriented. As an intern in a 3400 MW thermal power plant, I was granted access to observe and study live operations of both 250 MW and 600 MW boiler units under the guidance of experienced engineers and operations managers. The company maintained strict adherence to operational protocols, PPE compliance, and interdepartmental coordination, creating an industrial environment ideal for learning.

From the outset, my expectation was to understand how large-scale boilers operate in real-time—beyond textbooks—and how various subsystems integrate within power plant operations. JPL far exceeded this. I gained insights into tangential firing systems, furnace design, economizer functioning, soot blowing operations, and the importance of combustion tuning to enhance efficiency. The practical exposure to live parameters via Distributed Control System (DCS) allowed me to track and interpret real-time data on steam pressure, oxygen content, and flue gas losses.

I also appreciated the structured interactions with department heads, who explained component-wise plant architecture—from feedwater systems to ash handling—making complex systems easier to grasp. The team was welcoming and encouraged curiosity, which made technical discussions both accessible and engaging.
Overall, this internship helped me bridge the gap between theory and application, strengthened my fundamentals in thermodynamics and heat transfer, and gave me first-hand experience in performance diagnostics of utility-scale thermal boilers. It exceeded my expectations in every aspect—learning, exposure, and industrial discipline.

Academic courses relevant to the project: Applied Thermodynamics, Fluid Mechanics, Heat Transfer

Learning Outcome: Gained hands on and real-time experience in analyzing various components of 3400MW Thermal power plant. Learnt the utilization of Distributed Control System in evaluating various design & operational parameters of Power Plant.
Evaluated efficiency of thermal power plant using direct & indirect method.

PS-I station: L&T Heavy Engineering, IC, Surat

Student

Name: PRISHA PRAVEEN BHATT .(2023A4PS0465P)

Student Write-up:

PS-I Project Title: Robotic Solution for GTAW Welding

Short Summary of work done: Finalisation of robot requirements, and design of concepts for large scale application on the final job, performing mockups and testing of samples & materials used, sending out RFQs to multiple vendors, finalisation of concepts of gantry for large scale application, mech design of components in gantry

Objectives of the project: Development and testing of robot, implemented for welding on Nuclear reactor jobs

Tool used: Solidedge, ANSys, Hypermesh

Details of Papers/patents: None

Brief description of the working environment: Healthy work environment, engaging supervisors who were involved in our learning process from day one, got introduced to several aspects of manufacturing industry as well as a tour of different ICs in Hazira. Expectations were for students to understand industry as much as possible in the time frame, and bring fresh perspective on our projects.

Academic courses relevant to the project: Mechanisms and machines, manufacturing processes, mechanics of solids, POM, Material science, Adv mech sol

Learning Outcome: Robotics, CAD Modelling, Basics of machine design, Welding, Manufacturing line.

PS-I station: L&T Heavy Engineering, IC, Surat

Student

Name: PRIYANSHU JAIN .(2023B5A41332P)

Student Write-up:

PS-I Project Title: Supporting Development and Implementation of Robotic Solution for Grinding/Tube Trimming Process

Short Summary of work done: Being a part of an ongoing project allowed to work closely with the industry professionals. I was given the work to be in continuous touch with the robot vendor and take the updates for PROOF OF CONCEPT(POC) and I was also asked to prepare a base design for the new model.

Objectives of the project: Acquiring a robot for automating the tube trimming and WEP Process used in tube to tube sheet welding of steam generators.

Tool used: Solid Edge, Excel, PowerPoint, PPE Kits.

Details of Papers/patents: None.

Brief description of the working environment: All the co-workers, our seniors were really helpful.

Academic courses relevant to the project: Machine Design, Mechanics of Solids.

Learning Outcome: Machine Design, Industry Working Principles.

PS-I station: Lily Kitchenware - Online, Moradabad

Student

Name: ISHAAN SOMANI(2023A7PS0395G)

Student Write-up:

PS-I Project Title: Side profile generator for kitchenware

Short Summary of work done: The primary objective was to automate the generation and validation of side profiles for kitchenware products using machine learning. Traditionally, profile design and feasibility assessment are manual and time-consuming tasks. To address this, the team developed a pipeline integrating both generative and classification models. A Convolutional Neural Network (CNN) was trained to classify side profiles as feasible or unfeasible based on manufacturability. The CNN achieved over 91% validation accuracy, offering reliable performance in detecting unfeasible designs. For profile generation, a Bézier curve-based model was implemented, allowing variation through control point manipulation. Additionally, a Variational Autoencoder (VAE) was trained on feasible designs to sample new, realistic side profiles from the latent space, thus enhancing design diversity. The entire system was deployed through a Streamlit-based interactive user interface that enabled real-time visualization, feasibility prediction, and data export. This allowed designers to generate and validate curves intuitively without coding expertise. Overall, the project successfully combined deep learning with industrial design, creating a practical tool to assist in kitchenware development. Recommendations for future work include expanding the dataset with real-world profiles, refining the VAE with GANs, integrating with CAD tools, and deploying the system via

cloud platforms or mobile apps. The solution demonstrates the potential of AI in streamlining design workflows in manufacturing environments.

Objectives of the project: To check if the uploaded design is feasible or not according to manufacturability that is feasibility checker and to make a ml model that automatically generates curves as side profiles which are feasible.

Tool used: Python, TensorFlow, Keras, PyTorch, OpenCV, scikit-learn, Streamlit, Google Colab, Bézier Curve Equations

Details of Papers/patents: Ml model for curve generation

Brief description of the working environment: Online work environment and weekly progress discussions and related meetings.

Academic courses relevant to the project: Machine learning

Learning Outcome: Generative Ml model for real life usage.

PS-I station: Maruti Suzuki India Limited, Gurgaon

Student

Name: SWAGAT .(2023A4PS1050P)

Student Write-up:

PS-I Project Title: ATC gearbox data analysis

Short Summary of work done: ATC plots made using excel

Objectives of the project: To make scatter plots of ATC gearbox

Tool used: Excel

Details of Papers/patents: Nil

Brief description of the working environment: Good environment

Academic courses relevant to the project: yes

Learning Outcome: Excel, and maruti suzuki's internal software

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PS-I station: Mechanical Workshop, NE Railway, Gorakhpur

Student

Name: SUYASH SAMARTH(2022ABPS1604P)

Student Write-up:

PS-I Project Title: Air-Brake System in L.H.B. Coaches

Short Summary of work done: During my internship session at the Mechanical Workshop, I undertook a comprehensive study of the advanced braking technology used in modern Indian Railways. My work began with studying the technical manuals and regulatory documents provided by the mentor to understand the design, key components and working principles of air brake systems, with a particular focus on LHB coaches. I observed and documented the roles of various components and also participated in routine maintenance activities and functional checks of emergency braking devices. Additionally, I developed technical documentation skills and prepared a detailed report and presentation.

Objectives of the project: Study the technical principles behind air brake systems and their application in modern Indian Railway operations.

Tool used: Diagnostic Software for WSP and Brake Control Panels, Air-Brake Simulator, PEASD, Air Pressure Gauges and Test Rigs

Details of Papers/patents: Research Designs and Standards Organization (RDSO) Handbooks and Maintenance Manuals.

Brief description of the working environment: The railway workshop provided a dynamic and safe working environment. Facilities were well-equipped with modern diagnostic tools and specialized equipment with strict adherence to safety protocols.
My expectations from the Railway Workshop was to gain exposure to real-world maintenance and troubleshooting practices. I got opportunities to observe and participate in hands-on activities under expert supervision and mentorship from experienced technicians. The learning experience enhanced my problem-solving skills, understanding of safety standards and ability to document technical findings effectively.

Academic courses relevant to the project: Core Mechanical Engineering Courses, Fundamentals of Railway Engineering, Basics of Hydraulic and Pneumatic Controls, Workshop Practice.

Learning Outcome: 1. Comprehensive understanding of Air Brake Systems with in-depth knowledge about its design, working principles and components.
2. Acquired hands-on experience in Maintenance and Troubleshooting Skills involved with Railway Carriage repair.
3. Developed skills in interpreting and analyzing test reports and performance data to assess system effectiveness and compliance.
4. Improved critical thinking and analytical skills by understanding real-world engineering challenges.

PS-I station: Mechanical Workshop, NE Railway, Gorakhpur

Student

Name: AMRITESH RAI .(2023A4PS0457P)

Student Write-up:

PS-I Project Title: Description if LHB wheels and bearings

Short Summary of work done: I was intorduced to the working and purpose of the workshop which is mainly ioh and poh of coaches and repair. Then various elements of LHB coaches were discussed like the ones mentioned above. We were also taken to the workshop to show the

practical workings of those elements . Then I was taught about my project which is wheels and bearings in further detail

Objectives of the project: To understand the workings of LHB wheel and bearings

Tool used: The tools used were the tools that are used in lhb coaches and were basically shown to help us understand their workings

Details of Papers/patents: It was on wheels and bearings discussed wheel components, wheel parameters, wheel defects and ctrb bearing components and parameters

Brief description of the working environment: It was helpful and easy going

Academic courses relevant to the project: Mechanics of solid, manufacturing processes

Learning Outcome: Learnt about lhb coaches and it's various elements design and working principle like wheels, bearings, air brake system, anti skid system, etc

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PS-I station: ONGC, Kakinada, Kakinada

Student

Name: MALLIKARJUNA VARAPRASAD KODIMYALA(2023B4A40637H)

Student Write-up:

PS-I Project Title: Overview of fluid dynamics and pipeline flow

Short Summary of work done: we have visited the mallavaram plant which is situated in ponicherry border we were assigned a mentor there and we had the oppurtunity to see the entire plant and know how actually oil and gas from the oil rigs flow through pipe lines and how the machineries refine it and do the refining process to sale that

Objectives of the project: To study the process of the oil ,gas refining

Tool used: Chatgpt,ONGC data

Details of Papers/patents: none

Brief description of the working environment: work environment is very good its we have to go to plant only once a week its not that hectic very lite and you can talk to many peers and employees of ongc for future careers in the core engineering its very nice to explore a MAHARATNA PSU like ONGC

Academic courses relevant to the project: Total knowledge on mechanics

Learning Outcome: Understanding of the working of the ONGC plant and the tendering systems their work life.

PS-I station: Ordnance Factory, Dehradun

Student

Name: ROHITH IYER(2023B5A10984G)

Student Write-up:

PS-I Project Title: Thermal sight scope

Short Summary of work done: We contacivrious persons working in factory to understand how the thermal scope is made . First we went through the lena generation process which was integral part of the scope and then went down into specifications of scopes , focusing on its structural design. We had a problem statement of how to to implement variable zooming system in the scope. Discussed many ideas to solve that problem.

Objectives of the project: To learn about the making and structure of thermal imaging scope used in rifels

Tool used: Factory machines , google scholars for research paper and also learnt 3-d simulation software used for making model of the scopes.

Details of Papers/patents: None

Brief description of the working environment: Working environment was good and people working in factory were ready to give us inputs and help us getting good knowledge to make report. Company didn't except much but as we introduced new things to them for solving the zooming system they told us that it was good idea .

Academic courses relevant to the project: Optics

Learning Outcome: Learnt about scopes specifications and problem statement to improve zooming system

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PS-I station: Pyrotech Electronics Pvt. Ltd., Udaipur

Student

Name: BHAVYA MEHTA .(2023A4PS0154P)

Student Write-up:

PS-I Project Title: Flat-Packing of 5-Fold Panel

Short Summary of work done: I researched and designed a flat-pack panel using Fusion 360, tested my 0.6 design prototypes (CAD) with ANSYS, and estimate reduction in packaging size is 15% and assembly time is 20%. I worked closely with engineers and fabricators in a hands-on R&D lab, learned sheet-metal fabrication limits, and improved my CAD, FEA, and project-management skills.

Objectives of the project: To develop a flat-pack packaging design for a 5-fold panel that reduces packaging volume by ≥15% and on-site assembly time by ≥20–25%, while optimizing material use and ensuring scalable manufacturability.

Tool used: Fusion 360, AutoCAD, SolidWorks, ANSYS.

Details of Papers/patents: None.

Brief description of the working environment: At R&D lab, I was working with the design, manufacturing, and quality engineers and spent most of my time in Fusion 360 making improved CAD models and drawings. Those weekly reviews and tips from senior engineers really sharpened my communication and showed me how every design goes through production, QC, and the project schedule.

Academic courses relevant to the project: Manufacturing Process

Learning Outcome: Gained knowledge on Industrial Manufacturing Process
Enhanced design-for-manufacture skills
Hands-on experience with CAD and FEA tools

PS-I station: Pyrotech Electronics Pvt. Ltd., Udaipur

Student

Name: DIVYANSH BOHARA .(2023A4PS0448P)

Student Write-up:

PS-I Project Title: Flat packing and developing of modular design for 5-fold panel

Short Summary of work done: We generated a 3D model from 2D CAD for the already manufactured 5-fold panel and then modified it according to flat packing and developed a modular design that can be suitable for transportation and easier assembly. We also had factory visits and interacted with the mentors and people working there, and the learnings gained were immense.

Objectives of the project: To identify ways to flat pack the 5-fold panel and make it suitable for transportation by reducing volume and costs.

Tool used: Laptop, Notepad, Fusion 360, Solidworks, AutoCAD, Ansys,

Details of Papers/patents: -

Brief description of the working environment: The working environment was great and the learnings were immense, the team of students was enthusiastic about learning and gaining knowledge about the various manufacturing processes, fabrication processes and the working of the industry.
The mentors were supportive and helped us to get comfortable with the working environment and various employees there helped us understand the processes and ways we can think for the project and develop a proper design.

Academic courses relevant to the project: Manufacturing Processes, Mechanics of Solids

Learning Outcome: Understanding the flat packing concept, fabrication process, manufacturing process, 3D modeling in AutoCAD, Solidworks and Fusion 360.

PS-I station: Ramco Steel Pvt. Ltd., Faridabad

Student

Name: ARPIT GUPTA(2023A3PS0506G)

Student Write-up:

PS-I Project Title: Lean process optimization and carbon footprint mapping

Short Summary of work done: Worked on projects and topics like OEE, SMED, cycle time, VSM, CBAM. Work majorly revolved around visiting shop floor areas and collection various production data.

Objectives of the project: -

Tool used: -

Details of Papers/patents: -

Brief description of the working environment: Working environment was very nice and people were ready to help. Mentor assigned was really good made us learn a lot during the PS. We were also given a good stipend at the end of the project which was very considerable.

Academic courses relevant to the project: It was not much use for EEE domain but would be very helpful for someone in mechanical

Learning Outcome: Learnt about the entire manufacturing industry process, about lean manufacturing and carbon border adjustment mechanism

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PS-I station: Ramco Steel Pvt. Ltd., Faridabad

Student

Name: BHAVY MANGLA .(2023A4PS1300H)

Student Write-up:

PS-I Project Title: Lean manufacturing

Short Summary of work done: We do OEE monitoring , cycle time study , SMED , CBAM , VSM , Audits by 5S , TIMWOOD(waste) , 7QC Etc

Objectives of the project: To improve the efficiency of the plant

Tool used: Excel, powerpoint presentation, autodesk inventor , check sheets , ms word

Details of Papers/patents: -

Brief description of the working environment: Working environment was good. Employees were motivating and were very helpful if we ask anything to them. We can do interaction with them easily.

Academic courses relevant to the project: Material science manufacturing process and management skill

Learning Outcome: Mostly how to get in contact with the operators how to improve their work and get to know about a company overview how a company functions.

PS-I station: Sapcon Instruments Pvt. Ltd., Indore

Student

Name: SAMEER BAJPAI(2023A4PS1211G)

Student Write-up:

PS-I Project Title: Level Sensors and FreeCAD Designing

Short Summary of work done: Some of the selected components for this project were Carabiner; Connecting rod, piston and piston-pin; Open-end wrench; Ball bearing; Gear; etc. We aimed to create models that reflect functional and manufacturable geometry, considering real-world constraints like dimensions and assembly compatibility. The design process of each model began by sketching a detailed 2-D profile on the required plane, based on predefined measurements and reference images, in Sketcher workspace. These sketches were then transformed into 3D solids using additive and subtractive features, such as Pad, Pocket and Revolution, in Part Design workspace. Subsequently, we round up edges, vertices and faces using Fillet in Part Design workspace and then ultimately (for multiple part projects like ball bearing) we join various separately designed parts of a component using Assembly(A2plus) workspace. We also learned about different level sensors, their working principle, which type of sensor is used where,etc. Also learned about manufacturing processes during workshop visit.

Objectives of the project: Gain Knowledge about intrumentation industry especially level sensor. To Learn using FreeCAD to design 3D models

Tool used: FreeCAD (designing), Lathing machine, differnet measuring tools, drawing machines etc in workshop (not operated by me just demonstration)

Details of Papers/patents: none

Brief description of the working environment: Mostly we worked in a designated office except for workshop visit. The seniors and mentors were open and helping in nature. We were just expected to maintain professional environment with good work ethics and give full efforts. Exposure to to work environment, designing fundamentals were what we learned from PS-I

Academic courses relevant to the project: Assist in CAD course in Mech, Instrumentation Industry Exposure

Learning Outcome: Understanding fundamentals of CAD software and sensor industry application.

PS-I station: Star Fab Tech, Ludhiana

Student

Name: KAVISH KUMAR(2023B1A30716G)

Student Write-up:

PS-I Project Title: Design and Process Understanding in CNC Laser and Plasma Cutting Systems

Short Summary of work done: During my Practice School-I at Star Fab Tech, I was exposed to the complete CNC fabrication workflow — from design to execution. I began with observing CNC Laser and Plasma cutting processes and then gradually moved on to working with AutoCAD Mechanical to create precise 2D part drawings. I also studied differences between laser and plasma cutting mechanisms, along with machine setup and cutting parameter control. In the subsequent weeks, I practiced part nesting using CypCut software, where I learned to optimize layouts for efficient material usage and generate cutting paths. I also observed the handling and refill process of assist gases like oxygen and nitrogen, and how they affect cutting quality. Additionally, I observed CNC Press Brake operations used for bending metal sheets post-cutting, and understood how punch–die systems are used in shaping components. I also engaged in manual inspection of cut sheets to understand edge quality, burrs, and dimensional accuracy. The internship also provided brief exposure to welding machine diagnostics, where I identified components like capacitors and transformers and observed fault detection using a multimeter. Alongside technical tasks, I participated in group discussions, quizzes, and report presentations that helped reinforce my learning. Overall, the internship helped me connect engineering theory with real industrial processes and build practical skills in CAD design, fabrication planning, and equipment understanding.

Objectives of the project: The main objective of this project was to understand the complete CNC fabrication workflow, from design creation in AutoCAD to actual cutting using laser and

plasma machines. It also aimed to explore nesting techniques using CypCut, observe post-cutting processes like bending using a CNC Press Brake, and gain exposure to basic electrical diagnostics through welding machine repair.

Tool used: Software Tools: AutoCAD Mechanical, CypCut. Hardware Tools: CNC Laser Cutting Machine, CNC Control Interface, CNC Plasma Cutting Machine, CNC Press Brake Machine, Multimeter, Manual Measuring Tools, Assist Gas Setup, and Safety Equipments.

Details of Papers/patents: N.A.

Brief description of the working environment: The working environment at Star Fab Tech was a blend of structured industrial processes and practical, hands-on learning. The company operated on a fabrication floor equipped with CNC Laser and Plasma cutting machines, welding units, and a CNC Press Brake. As an intern, I was allowed to observe and gradually engage in processes like design, nesting, and material inspection under supervision.
The company expected me to approach tasks with curiosity, maintain discipline, and actively seek understanding by observing ongoing operations. I was encouraged to ask questions, take notes, and reflect on how design and execution are linked. While I was not operating the machines directly, I was given the opportunity to use tools like AutoCAD and CypCut, and observe how the output changed based on different machine settings and parameters.
During the course of PS-I, I developed a practical understanding of how 2D CAD designs are used in real fabrication workflows. I learned how nesting helps optimize material usage and how assist gas types influence laser cutting quality. I also observed post-processing like bending using a Press Brake and understood basic fault diagnostics in welding machines.
Apart from technical exposure, PS-I also helped improve my observation, documentation, and communication skills through regular reviews, discussions, and report writing. Overall, the experience bridged theoretical learning with real industrial applications and offered valuable insight into the day-to-day working of a fabrication facility.

Academic courses relevant to the project: BITS F110: ENGINEERING GRAPHICS, ME F112: WORKSHOP PRACTICE

Learning Outcome: Through this project, I gained hands-on experience in creating and nesting CNC-ready designs, understood the operational workflow of laser and plasma cutting systems, and observed key post-processing steps like bending and quality inspection. I also developed practical skills in using AutoCAD and CypCut, learned the role of assist gases, and enhanced my understanding of electrical diagnostics through welding machine repair.

PS-I station: TATA Advanced Systems Ltd, Nagpur

Student

Name: MUKUNTH MAITHREYAN K .(2023A4PS0497H)

Student Write-up:

PS-I Project Title: Forming of Aluminium Parts in Aerospace Industry

Short Summary of work done: Understood the different forming processes and machines used in Aerospace industry, the role of manufacturing department, the entire process of developing a work order of operations for a component. Performed static structural analysis to understand springback, a phenomenon that occurs in manufacturing. Validated simulation results with real statistics.

Objectives of the project: Understanding of different forming processes used in Manufacturing

Tool used: ANSYS

Details of Papers/patents: NA

Brief description of the working environment: Very helpful and friendly mentors who were ready to clarify doubts and share their knowledge. Workplace ethics were always followed everywhere and employee safety was taken very seriously.

Academic courses relevant to the project: Manufacturing Processes

Learning Outcome: Important terms and processes used in manufacturing, roles and duties of manufacturing department, understanding of different machines used in machining, metals and alloys used.

PS-I station: Thyssenkrupp Automotive Body Solutions Pvt. Ltd., Pune

Student

Name: NIDHISH HARNE .(2023A4PS0460H)

Student Write-up:

PS-I Project Title: Calculations of PRB lift, General observation in BIW industry, and company operations

Short Summary of work done: During my PS-I tenure at ThyssenKrupp Automotive Body Solutions (May–July 2025), my primary project centered on analyzing and calculating critical parameters for the design of a Powered Roller Bed (PRB) lift, a key component in automotive Body-in-White (BIW) assembly lines. I learned about the detailed workings and roles of fixtures and PRB lifts, focusing on the selection and safety assessment of ball screws, LM guides, transmission shafts, and motors through engineering calculations and catalog comparisons. The process involved using manufacturer data, FEA, and practical design constraints to ensure operational safety and efficiency. Additionally, I gained exposure to various departments—Procurement and Supply Management (PSM), Store, Assembly, Quality, Safety/Maintenance, Simulation, Controls, and Layout—which allowed me to understand the complete workflow from concept to delivery, including hands-on experiences with 3D modeling, Excel-based simulations, and site visits to manufacturing and assembly units of industry clients (e.g., Indian and German OEMs). The experience bridged the gap between academic learning and real-world industrial practice, highlighting the importance of collaboration and standardized processes in automotive manufacturing

Objectives of the project: To make a calculator, used in component selection for a car assembly line, Understanding the functioning of various departments around the company, their functions, etc.

Tool used: Software/Simulation: Microsoft Excel (macros, Solver plug-in) CATIA Novoviewer (for 3D model viewing) Siemens Process Simulate (PS eMC), DELMIA (simulation) AutoCAD Mechanical 2018, Factory CAD, 3D MicroStation E-Plan (electrical design) ArcoCAD, FARO (for CMM/QA) Hardware: Servo motors, LM guides, transmission shafts (industrial components) Shop-floor inspection tools: Vernier caliper, height gauge, micrometer, bore gauge, slip gauge, Rockwell hardness tester FARO Quantum arm, FARO Vantage laser tracker (CMM) Milling machines, lathe, surface grinder, drills

Details of Papers/patents: No papers were published; but the design of the PRB was under patent

Brief description of the working environment: The working environment at Thyssenkrupp was collaborative, structured, and highly process-driven. As an intern, I was encouraged to interact

across multiple departments, which fostered holistic understanding of the manufacturing pipeline. Expectations centered around active learning, hands-on engagement, timely completion of assigned calculations, and effective use of available data and standards. The company placed value on independent problem-solving, safety adherence, and following documentation standards. My learning journey was multifaceted—ranging from technical calculations for PRB lifts to procurement workflow, quality assurance protocols, and tool room operations. I observed the power of standardized routines and ERP systems in ensuring quality and traceability of every part used in production. Site visits further expanded my perspective by revealing large-scale automation, robot use, and integration of global best practices. The company culture balanced mentorship and responsibility, enabling me to gain practical skills that complemented academic theory. Challenges like incomplete real-world data forced me to improvise and learn iterative problem-solving, enhancing both technical and soft skills

Academic courses relevant to the project: MOS, AMOS, manufacturing process, Workshop processes, material science.

Learning Outcome: Learnt about BIW
Technical Understanding of BIW Manufacturing
Mechanism and Design Calculations
Hands-on Software Skills
Interdepartmental Processes and Teamwork
Standardization and Industry Practice
Quality Assurance and Inspection
Shop Floor and Assembly Exposure
Vendor and Site Visit Experience
Critical Reflection and Growth
Soft skills

PS-I station: Thyssenkrupp Automotive Body Solutions Pvt. Ltd., Pune

Student

Name: PRANAV PRASHANT NANKAR .(2023A4PS0489H)

Student Write-up:

PS-I Project Title: PRB (Powered Roller Bed) design calculations

Short Summary of work done: PRB design parameters calculation, skid transfer profile optimization, power calculations, failure criterion in E-stop, load and stress modelling, critical parameters for preventing loading failure.

Objectives of the project: To find out power requirements and model the working of a PRB

Tool used: Advanced Excel

Details of Papers/patents: N/A

Brief description of the working environment: Learnings in PS-1 : Organizational structure, workflow and functions of major departments, Design in BIW industry

Academic courses relevant to the project: Mechanics of Solids, Advanced Mechanics of Solids, Mechanisms and Machines, Manufacturing Processes

Learning Outcome: Understood working of a PRB, its specifications, the components involved, constraints on skid transfer

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PS-I station: Thyssenkrupp Automotive Body Solutions Pvt. Ltd., Pune

Student

Name: CHINMAY RUTURAJ GOVILKAR(2023B2A30734G)

Student Write-up:

PS-I Project Title: Industrial Training in Automation

Short Summary of work done: During my Practice School-I at Thyssenkrupp Automotive Body Solutions, I worked on automation systems for the automotive Body-in-White sector, focusing on PLC programming, HMI design, and SCUBE architecture. My work included analyzing safety loops, zone management, RFID systems, and integrating devices like Schmersal interlocks, SICK scanners, and FANUC welding robots via PROFINET/Ethernet. I also gained exposure to E-Plan

electrical schematics and visited Gedia, Schmersal, and Sensopart to understand tooling, safety, and vision technologies. This internship enhanced my technical skills and deepened my understanding of modular, safe, and efficient industrial automation.

Objectives of the project: To get hands on experience in PLC programming and other tools for automation used in the automotive industry

Tool used: Siemens Simantic TIA Portal, WinCC Advanced

Details of Papers/patents: none

Brief description of the working environment: At Thyssenkrupp Automotive Body Solutions, the working environment was highly professional, collaborative, and safety-driven, with a strong emphasis on structured processes and adherence to industry standards. The company expected interns to quickly adapt to industrial workflows, follow safety protocols, and contribute meaningfully to ongoing projects. I was encouraged to take initiative, ask questions, and document work systematically. Through exposure to PLC programming, HMI design, SCUBE architecture, and robot integration, I gained practical insights into industrial automation. Additionally, industry visits broadened my understanding of related technologies, enhancing both technical expertise and problem-solving skills in a real-world manufacturing context.

Academic courses relevant to the project: Control Systems

Learning Outcome: Learning Siemens TIA Simantic software, Roboguide and understanding how to refer to various documentation and problem solving in a team

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PS-I station: Trijal Enterprise, Bhubaneshwar

Student

Name: OJAS GUPTA .(2023A1PS0168P)

Student Write-up:

PS-I Project Title: Supply chain optimization

Short Summary of work done: Learned about different applications of web based ordering, iot implementation, smart inventory management also did some case studies of different companies based on these applications.

Objectives of the project: To learn how to optimize the supply chain and make it efficient

Tool used: NA

Details of Papers/patents: NA

Brief description of the working environment: Environment was good and expectations were met from the company.

Academic courses relevant to the project: Supply chain minor courses.

Learning Outcome: Gain knowledge in the field of supply chain.

PS-I station: Trijal Enterprise, Bhubaneshwar

Student

Name: B ISHAAN PATRO .(2023A4PS0428P)

Student Write-up:

PS-I Project Title: Supply Chain Optimization

Short Summary of work done: During my Practice School-I internship at Trijal Enterprise, I focused on improving supply chain and inventory management through digital transformation. My work included researching smart inventory systems, IoT, and digital ordering platforms, as well as analyzing real-world case studies from global leaders. I mapped Trijal's processes to identify bottlenecks and recommended integration of RFID, IoT sensors, and cloud-based inventory management for real-time tracking and automation.

Objectives of the project: To Build a Supply chain model for the company

Tool used: None

Details of Papers/patents: None

Brief description of the working environment: The working environment at Trijal Enterprise was supportive and encouraged both collaboration and independent thinking. The company expected interns to be proactive, adaptable, and to deliver clear, well-researched recommendations. During PS-I, I gained hands-on insight into supply chain operations and digital transformation, learned to analyze real-world problems, and improved my technical and professional communication skills. Overall, the internship provided a strong bridge between classroom learning and industry practice.

Academic courses relevant to the project: Supply Chain Management

Learning Outcome: Learned ins and outs and supply chain for this industry and application of IoT in it.

PS-I station: Trijal Enterprise, Bhubaneshwar

Student

Name: HITARTH HIRANMAYA .(2023A4PS0751H)

Student Write-up:

PS-I Project Title: B2B MARKETING

Short Summary of work done: We prepared a B2B functional marketing model for Trijal enterprises and did real life data collection with random jewellery companies to prepare a realistic model.

Objectives of the project: Preparing a B2B model

Tool used: Excel, Sheets

Details of Papers/patents: N/A

Brief description of the working environment: Working was online so the Google meet environment was good.

Academic courses relevant to the project: Finance courses

Learning Outcome: We learned about interaction roles and management roles with making a successful B2B model

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PS-I station: Trijal Enterprise, Bhubaneshwar

Student

Name: TAMANNA .(2023A5PS1159P)

Student Write-up:

PS-I Project Title: Supply Chain Optimization

Short Summary of work done: During my Practice School-I internship at Trijal Enterprise, I focused on improving supply chain and inventory management through digital transformation. My work included researching smart inventory systems, IoT, and digital ordering platforms, as well as analyzing real-world case studies from global leaders. I mapped Trijal's processes to identify bottlenecks and recommended integration of RFID, IoT sensors, and cloud-based inventory management for real-time tracking and automation.

Objectives of the project: To build a supply chain model for the company

Tool used: None

Details of Papers/patents: None

Brief description of the working environment: The working environment at Trijal Enterprise was supportive and encouraged both collaboration and independent thinking. The company expected interns to be proactive, adaptable, and to deliver clear, well-researched recommendations. During PS-I, I gained hands-on insight into supply chain operations and

digital transformation, learned to analyze real-world problems, and improved my technical and professional communication skills. Overall, the internship provided a strong bridge between classroom learning and industry practice.

Academic courses relevant to the project: Supply chain management

Learning Outcome: Learned ins and outs and supply chain for this industry and application of IoT in it.

PS-I station: Trijal Enterprise, Bhubaneshwar

Student

Name: RISHITA SACHAN .(2023A7PS0613P)

Student Write-up:

PS-I Project Title: Supply chain optimization

Short Summary of work done: The project explored six key areas of supply chain modernization: smart inventory management systems, web-based ordering platforms, IoT integration, predictive analytics for demand forecasting, error-proofing and automation in manufacturing, and real-world IoT case studies.Through comprehensive secondary research and analysis of global industry examples (Amazon, Walmart, Sony), the team developed actionable recommendations tailored to jewelry manufacturing operations. Key outcomes included a 7-step digital transformation roadmap emphasizing RFID tracking for high-value items, automated inventory systems, environmental monitoring for precious metals, and web-based ordering portals.The project demonstrated that small-scale technology adoption—such as barcode scanning, digital dashboards, and simple automation tools—can significantly improve inventory accuracy, reduce manual errors, and enhance operational efficiency without overwhelming existing resources or infrastructure.

Objectives of the project: 1.Develop a smart inventory management system using real-time data analysis. 2. Integrate web-based ordering and product viewing with manufacturing software for error-free and faster processing. 3. Evaluate the impact of IoT on supply chain processes, reducing manual intervention and increasing automation.

Tool used: None

Details of Papers/patents: None

Brief description of the working environment: Gained hands-on understanding of how traditional industries can adopt modern technologies cost-effectively. Developed skills in secondary research, case study analysis, and translating complex technological concepts into practical business solutions. Learned to balance technological advancement with human expertise, understanding that digital tools should enhance rather than replace skilled craftsmanship. Enhanced collaborative working skills while contributing to real organizational challenges and strategic planning initiatives.

Academic courses relevant to the project: Supply chain

Learning Outcome: Technical Knowledge: Gained comprehensive understanding of modern supply chain technologies including smart inventory management systems, IoT integration, RFID tracking, predictive analytics, and web-based ordering platforms. Learned how these technologies can transform traditional manufacturing operations.Practical Application: Developed skills in adapting global case studies (Amazon, Walmart, Sony) to small-scale jewelry manufacturing contexts, demonstrating how digital transformation can be implemented cost-effectively in traditional industries.Research and Analysis: Enhanced ability to conduct secondary research, synthesize technical information, and create actionable recommendations. Developed a 7-step transformation roadmap integrating all studied technologies.Industry Insight: Understood that digital transformation doesn't require massive investment—small, phased implementations like RFID tagging and basic dashboards can yield significant improvements in accuracy, efficiency, and customer satisfaction.Collaborative Skills: Worked effectively in a team environment while contributing to real organizational challenges, bridging academic learning with industry needs.

PS-I station: Hodo stays, Bengaluru

Student

Name: GAURVANSHU SHIVRAN(2023A3PS0155G)

Student Write-up:

PS-I Project Title: Research & Market analysis of rental properties

Short Summary of work done: Prepared three different market analysis reports relevant to the operations of the work station of Hodo Stays, involved thorough analysis of three different regions in Bangalore. Involved detailed study of over 5000 properties to complete the task

Objectives of the project: Complete market research on three different projects for the work station

Tool used: Price Labs, Air Bnb, Perplexity Pro etc

Details of Papers/patents: No

Brief description of the working environment: Company boasts a workload heavy environment with a string of tasks that would last countless hours throughout the ps, I will suggest the students to put work hours of nearly 10-11 hours daily if you choose to enroll for this ps.

Academic courses relevant to the project: yes

Learning Outcome: Use of various platforms like AI, Price Labs etc & the structure used to undertake such analysis in the corporate world

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PS-I station: Hodo stays, Bengaluru

Student

Name: ADITYA KUMAR PANDA .(2023A7PS0670P)

Student Write-up:

PS-I Project Title: internal tools developer and automation

Short Summary of work done: During my Practice School-1 internship, I developed an intelligent Property Management System (PMS) tailored for the hospitality sector using low-

code platforms and AI technologies. The project involved building an internal admin dashboard using Retool, creating an AI-powered chatbot on BotSpace, automating workflows with Make.com, and deploying the complete system live using Streamlit Cloud. Data was managed through Google Sheets, integrated in real time with both the dashboard and chatbot. The dashboard allowed property managers to perform CRUD operations on listings and tenants, while the chatbot offered 24/7 guest support using Natural Language Processing (NLP) and Generative AI. Automated processes such as booking confirmations, rent reminders, and data syncing were handled using Make.com and Python scripts, reducing manual effort and improving efficiency. Throughout this project, I gained hands-on experience in software integration, cloud deployment, workflow automation, and chatbot development. I also learned how to work with APIs, design user-centric interfaces, and apply real-world problem-solving in a startup-like environment. Most importantly, I understood how different platforms can be connected to build smart, scalable, and low-maintenance systems that directly benefit users.

Objectives of the project: to make a chatbot

Tool used: openAPI, google colab, app script , make.com,github,streamlit,retool,botspace

Details of Papers/patents: chatbot i have made is they will used in their website

Brief description of the working environment: During my PS-I internship, I had the opportunity to work in a highly supportive and flexible startup environment. The working hours were adaptable, which allowed me to manage tasks efficiently and explore technologies at my own pace. The co-founders, especially Dilshad Sir, were extremely approachable and provided continuous guidance, making the experience both enriching and comfortable.
The company maintained a startup mindset — fast-paced, collaborative, and solution-oriented. Expectations were clear: build impactful tools using low-code platforms, automate workflows, and contribute to real-world deployments. I was encouraged to take ownership of my project and contribute ideas beyond the assigned tasks.
Throughout the internship, I gained practical experience in developing an intelligent Property Management System using Retool, BotSpace, Make.com, and Streamlit Cloud. I learned how to connect APIs, automate backend tasks using Python scripts, and deploy real-time tools that solve real business problems. I also explored Generative AI, NLP, and cloud deployment, which added great depth to my technical learning.
Overall, PS-I helped me understand how startups operate, how tools can be rapidly integrated to build scalable systems, and how user-centric product development works in a real-world setting. It was a technically rewarding and professionally inspiring experience.

Academic courses relevant to the project: You should have knowledge of python script or java script.

Learning Outcome: API integration, python script , deploying app online

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PS-I station: Indian Red Cross Society - Tech- Dehradun, Dehradun

Student

Name: MONA GUPTA .(2023A7PS0502P)

Student Write-up:

PS-I Project Title: Enhancing Digital Outreach and Youth Engagement through Red Cross Initiatives

Short Summary of work done: During our Practice School-I internship at the Indian Red Cross Society, Uttarakhand (26th May – 19th July 2025), we were actively involved in a range of fieldwork, content development, and coordination activities aligned with the organization's humanitarian goals. A major part of our contribution included planning and supporting events such as World Environment Day, Red Cross Stage-1 Quiz, and World Population Day competitions, along with handling outreach through social media and live-streams. We conducted field visits to Red Cross facilities in Chamba and Nagthat to assess underutilized hospital infrastructure. Based on our observations, we drafted detailed proposals, including one for converting the Nagthat property into a Wellness and Yoga Retreat Centre with support from the Uttarakhand Government. Our team also created over 30 bilingual brochures on first aid, emergency response, and health awareness, aimed at simplifying vital information for public use. We analyzed participation data for the Red Cross Stage-1 Quiz and prepared reports for submission to higher authorities. Through this internship, we gained valuable experience in project planning, field research, digital communication, report writing, and team collaboration, while contributing meaningfully to the organization's community outreach and development efforts.

Objectives of the project: 1)Create and maintain impactful content for IRCS Uttarakhand's social media channels (Instagram, Facebook, X, and LinkedIn) to increase public outreach and awareness. 2) To assist in planning and executing successful events like the YouTube live stream for World Environment Day, promoting environmental awareness and Red Cross initiatives. 3) To increase the awareness of IRCS' humanitarian activities by creating educational and entertaining postings about health, disaster preparedness, and social service. 4) To arrange and gather Youth Red Cross (YRC) member information in order to provide improved volunteer coordination and follow-up correspondence. 5) To acquire real-world experience in data management, media communication, and community involvement through realistic internship tasks.

Tool used: Canva, Google Forms, YouTube Live, Google Sheets/Excel, Google Docs

Details of Papers/patents: NA

Brief description of the working environment: The working environment at the Indian Red Cross Society, Uttarakhand was collaborative, impact-driven, and flexible. As interns, we were encouraged to take initiative, work in teams, and engage directly with senior officials, volunteers, and community stakeholders. Our work combined both on-field exposure and off-field content development, offering a holistic experience in a social sector organization.
The organization expected us to contribute meaningfully to ongoing activities such as event coordination, field visits, documentation, and public outreach. We were given responsibilities that aligned with real-world challenges—ranging from preparing reports for state and national submission to designing bilingual educational brochures and analyzing survey data. We were also trusted with representing the organization in community-driven events and awareness campaigns, which helped us develop professionalism and confidence.
Through this internship, we learned how to approach public health and disaster relief from a humanitarian and operational perspective. We developed key skills in report writing, project planning, visual communication, and digital outreach. The experience also enhanced our understanding of teamwork, communication, leadership, and the importance of social responsibility. PS-I provided us with a valuable opportunity to apply classroom knowledge in real-world settings while contributing to meaningful community impact.

Academic courses relevant to the project: yes

Learning Outcome: During our Practice School-I at the Indian Red Cross Society, Uttarakhand, we gained hands-on experience in field assessment, project planning, and social outreach. We contributed to real-world initiatives such as repurposing the Nagthat Hospital into a wellness centre, organizing state-level events like World Environment Day and Red Cross Stage-1 Quiz, and developing bilingual educational materials on first aid and public health. The internship enhanced our skills in digital content creation, live-streaming, data analysis, and formal reporting. It also strengthened our teamwork, communication, and professional ethics through collaboration with Red Cross officials, volunteers, and local communities, giving us a deeper understanding of humanitarian service and its social impact.

PS-I station: Indian Red Cross Society - Tech- Dehradun, Dehradun

Student

Name: NISHITA AGARWAL .(2023A7PS0600P)

Student Write-up:

PS-I Project Title: Tech and Marketing

Short Summary of work done: Managed a few events, called people, interacted with students, did on-site report assessments, got insight about non-profit organisation's work, visited few sites, managed warehouse, made brochures for first-aid, It was great experience because of people there and it was decent. Only it was a lot unrelated to my domain.

Objectives of the project: Marketing and Events for social outreach

Tool used: google sheets, canva, google docs, html , css, javascript, reactjs, youtube live

Details of Papers/patents: none

Brief description of the working environment: The company was good.

Academic courses relevant to the project: yes

Learning Outcome:

PS-I station: National Centre for Polar and Ocean Research (NCPOR) - Geoid on Oceanography, Goa

Student

Name: AARSHIA RAWAT .(2023B5AA0755H)

Student Write-up:

PS-I Project Title: SeisSnap: developing a Seismic Analysis Tool

Short Summary of work done: I developed SeisSnap: a python application that provides Seismic data processing a convenient GUI. With various features like: CSV editor, Seismic Viewer, Topography Viewer and a proper Project Repo Management and Spectral Analysis. Called 'SeisSnap', tailored for researchers, geophysicists, and students, SeisSnap eliminates the need for complex scripting by offering accessible tools to manage, visualize, and analyze seismic datasets efficiently.By combining versatility with ease of use, SeisSnap empowers users to focus on scientific insights rather than software complexity, making it a valuable asset in both academic and professional geoscience workflow. Read more in the website: https://seissnap.netlify.app/

Objectives of the project: developing a Seismic Analysis Tool

Tool used: Python, PySide6, PyVistas, Scipy, Numpy

Details of Papers/patents: SeisSnap website containg documentation: https://seissnap.netlify.app/

Brief description of the working environment: My mentor was incredibly supportive and encouraged independent exploration, which greatly enhanced my learning experience. He provided us with key resources to understand the fundamentals of Reflection Seismic Signal Processing and guided us in applying these concepts effectively. We were given the opportunity to observe and learn from an ongoing research project, where he offered valuable, constructive feedback and clearly outlined the challenging areas, helping us focus our efforts. He also introduced us to widely used tools in the field, certain hardware as well as software tools. He introduced us to OBS, hydrophones and some softwares such as Seismic Unix, which gave us practical exposure to industry-standard workflows. His approach of balancing guidance with autonomy allowed me to build both theoretical knowledge and hands-on experience, making the learning process both engaging and impactful.

Academic courses relevant to the project: Computer Programming ,DSA

Learning Outcome: Python, App development, hosting, Seismic Data Processing

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PS-I station: Tamil Nadu Startup and Innovation Mission (StartupTN), Chennai

Student

Name: SARJUN(2023B1A40663G)

Student Write-up:

PS-I Project Title: Investments

Short Summary of work done: Managing Databases, Cold Calling ,Organising. During my internship, I worked on various aspects of the startup ecosystem, including funding stages, sector analysis, and investor relations. I gained exposure to emerging industries such as climate-tech, deep-tech, space-tech, fintech, manufacturing, and solar energy, with a particular focus on climate-tech due to its global relevance and recent policy support. I studied the 2025 Union Budget's ₹72,200 crore Clean Plan and StartupTN's special GreenTech initiatives, understanding the benefits offered to green startups such as seed grants, free co-working space, accelerator programmes, and networking opportunities. I also learned the differences between accelerators and incubators, as well as strategies for prioritising startups based on sector potential and funding opportunities. In lead generation, I focused on identifying prospects in space-tech, solar energy, and manufacturing through in-depth research. My cold calling approach evolved significantly—by researching companies beforehand and adapting my communication style, I improved response rates. Additionally, I reviewed multiple startup pitch decks and attended investor meetings, gaining insight into how pitching strategies vary for venture capitalists, angel investors, and grant committees. This experience helped me understand the essential elements of compelling pitch decks and the nuances of tailoring pitches for different funding sources. new leads for fundings and mentoring opportunities Knowledge about Startups and Startup Funding

Objectives of the project: Learn about Investments in startups and startup culture in different states in India especially Tamil Nadu

Tool used: Spreadsheets

Details of Papers/patents: NA

Brief description of the working environment: Working Environment was one of the plus points in my internship. Everyone was very helpful and chill. Everyone was very friendly and open to us, treated us like peers.

Academic courses relevant to the project: Finance maybe

Learning Outcome: 1) Different Cold Calling Approaches
2)Startup Culture in TN

3) Startup Sectors in India and which has a good future potential
4)Funding Rounds and how they work and difference between each

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PS-I station: Tamil Nadu Startup and Innovation Mission (StartupTN), Chennai

Student

Name: HRITESH POLIREDDY(2023B4A30933G)

Student Write-up:

PS-I Project Title: Startup investment/Funding awareness and barriers in tamil nadu

Short Summary of work done: Managing data bases(google sheets) volunteering for events ,making calls to collect data/to inform them about different schemes and policies related to startups and convince them to come onboard

Objectives of the project: Measure the level of awareness and utilization of various startup funding schemes among Tamil Nadu startups, and identify key barriers to accessing these funds.

Tool used: Google sheets,social media

Details of Papers/patents: None

Brief description of the working environment: friendly mentors. good environment

Academic courses relevant to the project: Trw

Learning Outcome: how the startup ecosystem in Tamil Nadu works

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