ONE-MONTH SUMMER INTERNSHIP (ONLINE) on

MACHINE LEARNING AND DEEP LEARNING APPLICATIONS IN MODERN POWER SYSTEMS

(WITH HANDS-ON SESSIONS)

01st June – 30th June, 2026

5:30 PM - 8:30 PM (Weekdays)

Organized By:

Department of Electrical Engineering

Parala Maharaja Engineering College

(A Govt. Engg. College Affiliated to BPUT Rourkela)

Berhampur, Odisha, India

Internship Coordinator and Instructor

Dr. Suryalok Dash

Assistant Professor

Dept. of Electrical Engineering, PMEC Berhampur

Teaching Assistant:

Mr Swagat Prasad Nanda

Machine Learning Project Associate

CSIR-IMMT, Bhubaneswar

About PMEC and EE Dept.

Parala Maharaja Engineering College (PMEC), Berhampur, established in 2009, is a premier government engineering institution in South Odisha and an autonomous college affiliated to BPUT since 2021. Spread over 80 acres, the institute offers multiple B.Tech, M.Tech, and Ph.D. programs, with a strong focus on academic excellence and research. It is being developed as a centre of excellence by the Government of Odisha.

The Department of Electrical Engineering, established in 2009, offers undergraduate and postgraduate programs with a focus on power systems and emerging technologies. The department emphasizes strong fundamentals along with applications in areas such as smart grids, renewable energy, and modern electrical systems. It is committed to developing skilled engineers capable of solving real-world challenges.

About the Internship

This one-month online internship is designed for senior undergraduate and postgraduate engineering students interested in applying Machine Learning and Deep Learning techniques to modern power system problems. Participants will learn fundamental ML/DL concepts and implement models using Python, Scikit-learn, and PyTorch through guided hands-on sessions on Google Colab.

Specifically, the internship will cover the followings:

- Machine Learning Fundamentals
- ML and DL model implementation using PyTorch
- Load and Renewable Energy Forecasting Application
- Fault Detection in Power Systems
- Power Quality Disturbance Detection
- Electricity Theft Detection
- Non-Intrusive Load Monitoring (NILM)

Who Should Attend?

Senior Undergraduate (Electrical / Electrical and Electronics / Energy / Related Engineering streams) students and Postgraduate students with basic knowledge of python programming.

Expected Outcomes

After successful completion of the internship, participants will be able to:

- Use modern tools and platforms like NumPy, Pandas, Scikit-learn, PyTorch, and Google Colab
- Develop various predictive ML/DL models using PyTorch
- Apply ML/DL techniques to analyze power system data
- Develop AI solutions for smart grid applications.

Internship Fee and Deadline

Registration Fee: 999/-

GST (18%) : 180/-

Total: : ₹1179/-

Scan the QR code to pay

Last Date to apply: ~~**15.05.2026**~~ **25.05.2026**

How to Apply?

Interested candidates should apply by registering via the following registration link

https://forms.gle/ogKazUr9xAmfaRwk8

or

by scanning the **QR code**

Certification

Participants will receive a Summer Internship Certificate upon meeting attendance criterion and mini-project submission/ evaluation requirements.

Contact Information

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Internship Coordinator and Instructor: Dr. Suryalok Dash, Assistant Professor, Dept of EE, PMEC-Berhampur
Teaching Assistance: Mr. Swagat Prasad Nanda, Machine Learning Project Associate, CSIR-IMMT, BBSR

WEEK - 01 (Date: 01.06.2026 to 05.06.2026) **Module Name: Python Refresher, Data Science Workflow & Core Machine Learning Algorithms**		
Date and Topic Name	**Lecture Contents**	**Hands-on Practice and Assignment**
Day -1 (Dt: 01.06.2026) **Topic:** **Internship Overview and Python Refresher**	● Motivation and Internship Overview ● AI in modern power systems ● Python Refresher ● NumPy basics	● Basic operations in python ● Numerical computation using NumPy
Day -2 (Dt: 02.06.2026) **Topic:** **Data Handling (using Pandas) and Visualization**	● Introductions to Data Frames,CSV data handling ● Data cleaning and Handling Missing values ● Basic Preprocessing techniques ● Data Visualization using Matplotlib	● Load real energy dataset ● Data cleaning and Handle the missing data ● Exploring the dataset using Plotting
Day -3 (Dt: 03.06.2026) **Topic:** **Introduction to Machine Learning and ML Workflow**	● Intro to Machine Learning (ML) ● ML workflow ● Normalization/scaling, Feature-target concept ● Train-test split	● Generate a toy dataset ● Train a tiny ML model using the Toy dataset
Day -4 (Dt: 04.06.2026) **Topic:** **Regression Models**	● Regression concepts ● Linear Regression ● Loss functions for regression model ● Evaluation metrics for regression model	● Linear regression example using House price prediction dataset
Day -5 (Dt: 05.06.2026) **Topic:** **Classification Models**	● Classification concepts ● Logistic Regression ● Loss functions for classification model ● Evaluation metrics for classification model	● Logistic regression example using IRIS and Brest cancer dataset

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WEEK - 02 (Date: 08.06.2026 to 12.06.2026) Module Name: Machine Learning and Deep Learning Algorithm Foundations		
Date and Topic Name	**Lecture Contents**	**Hands-on Practice and Assignment**
Day -6 (Dt: 08.06.2026) **Topic:** Classification Models	● Decision Tree ● Support Vector Machine (SVM)	● Classification example using IRIS/ Brest cancer dataset
Day -7 (Dt: 09.06.2026) **Topic:** **Clustering Algorithms**	● k-means clustering	● K-means clustering using IRIS Dataset ● Mall customer dataset (As assignment)
Day -8 (Dt: 10.06.2026) **Topic:** **Introduction to Deep Learning**	● Neural network intuition ● Dense neural networks ● Activation functions ● Backpropagation and Optimization concept ● Train vs validation loss visualization	● PyTorch basics and Tensor operations ● Neural network regression using PyTorch (House price prediction dataset) ● Compare with Linear regression Model ● Assignment to Modify network parameters
Day -9 (Dt: 11.06.2026) **Topic:** **Convolutional Neural Network (CNN)**	● Convolution concept ● CNN intuition	● Simple CNN demo notebook. (MNIST Dataset) ● Compare with Logistic regression ● CNN architecture observation exercise
Day -10 (Dt: 12.06.2026) **Topic:** **Recurrent Neural Network (RNN)**	● Sequential Model concepts ● RNN ● Long Short Term Memory (LSTM)	● Simple LSTM demo notebook for weather forecasting

WEEK - 03, 04, 05 (Date: 15.06.2026 to 30.06.2026) Module Name: ML and DL in Real Power System Problems		
Date and Topic Name	**Lecture Contents**	**Hands-on Practice and Assignment**
Day -11 and 12 Dt: 15.06.2026 and 16.06.2026 **Topic:** **Electric Load and Solar Power Forecasting**	● Importance of Forecasting in modern power system ● Forecasting Techniques (Classical and Modern) ● Time-series feature preparation for training ML/DL models	● Load and solar power forecasting using ARIMA, ML (Support Vector Regression), and DL (LSTM) models ● Compare algorithms ● Assignment: Feature modification study

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Day -13 and 14 Dt: 17.06.2026 and 18.06.2026 **Topic:** **Power System Fault Detection and Classification**	● Faults in power system and its consequence ● Discussion of fault detection techniques ● PS fault datasets ● Synthetic fault data generation techniques	● Fault classification using ML and DL model ● Features/parameter tuning and Comparison study ● Assignment: Study of a Research paper on fault detection
Day -15 and 16 Dt: 19.06.2026 and 22.06.2026 **Topic:** **Power Quality Disturbance (PQD) Detection in Power System**	● Introduction to power quality in power system ● Common power quality disturbances and their causes ● Common PQ datasets ● Feature extraction from electrical signals	● PQ classification using ML and DL Model ● Features/parameter tuning and Comparison study ● Assignment: Study of a Research paper on PQ detection
Day -17 and 18 Dt: 23.06.2026 and 24.06.2026 **Topic:** **Electricity Theft Detection**	● Introduction to non-technical loss and theft of electrical power ● Common datasets ● Smart meter data analysis and Anomaly detection framework	● Anomaly detection using ML and DL Model ● Features/parameter tuning and Comparison study ● Assignment: Study of a Research paper on anomaly detection
Day -19 and 20 Dt: 25.06.2026 and 26.06.2026 **Topic:** **Non-intrusive Load Monitoring (NILM)**	● Introduction of NILM and Energy disaggregation ● Popular NILM datasets and their analysis	● Energy disaggregation using REFIT dataset ● Assignment: Study of a Research paper on NILM
Day -21 29.06.2026 **Topic:** **Discussion on Advanced DL Model and Applications, Project Selection**	● Introduction to advanced DL models like Transformer,Graph Neural Networks and Physics-informed ML ● Other advanced applications of DL in PS ● Mini project task discussion	● Selection of any one research paper and Implementation as a part of Mini project
Day -22 30.06.2026 **Topic:** **Discussion, Feedback Valedictory Program**	● Mini project proposal presentation ● Student Discussion on internship outcomes ● Feedback collection ● Quiz test ● Valedictory Program	
Mini Project submission deadline : 07.07.2026		
Distribution of Certificate: 10.07.2026		