COURSE PROSPECTUS

Name of the Group: IT

Name of the Course: Foundation Course in Machine Learning using Python

Course Code: 2022/EHW/NIELIT/05323

Starting Date: 02/09/2024 (Tentative)

Duration: 90 Hours

Course Coordinator: Ms. Manjiri Lavadkar, Project Engineer, Nielit Auarangabad.

Course Description:

This course is intended to teach learners end-to-end process of investigating data through a machine learning lens. It will make participant capable to extract and identify useful features that best represent your data, a few of the most important machine learning algorithms, and how to evaluate the performance of your machine learning algorithms.

Course Objectives:

The objective of this course is to enabling the student with basic knowledge on the techniques to build an intellectual machine for making decisions behalf of humans. This course covers the techniques on how to make learning by a model, how it can be evaluated, what are all different algorithms to construct a learning model.

Course Outcome:

- ✓ Implement and analyse existing learning algorithms, including methods for classification, regression, structured prediction, clustering, and representation learning.
- ✓ Integrate multiple aspects of practical implementation of machine learning: Data pre-processing, Regularization, and Model selections. Compare different paradigms for learning (Supervised, Unsupervised, etc.).
- ✓ Design experiments to evaluate and compare different machine learning techniques on real world problems.
- ✓ Employ probability, statistics, calculus, linear algebra, and optimization in order to develop new predictive models or learning method.

Expected Job Roles:

- Machine Learning Engineer
- Data Engineer
- Data Analyst

Course Structure:

Sr . No.	Topic	Hours
I	Fundamentals of Machine Learning Algorithm	
1.	Overview Python for Machine Learning • Python Data Types, Operators • Flow Control statements, Functions • Python Data structures	3 Hrs
2.	ML Libraries • Numpy • Pandas • Matplotlib • Seaborn	9 Hrs
3.	Statistics • Descriptive And Inferential statistics • Measures of Central Tendencies • Mean, Mode, Median, Standard Deviation • Z-Score, Outliers, Normal Distribution • Correlation, Covariance • Regression Theory	6 Hrs
4.	Machine Learning Introduction • Machine Learning Introduction • ML core concepts • Data Preprocessing	3 Hrs
II	Algorithms of Machine Learning	
1.	Linear Regression • Introduction to Linear Regression • How it works: Regression and Best Fit Line • Modeling and Evaluation in Python	6 Hrs

2.	Logistic Regression • Introduction to Logistic Regression • How it works: Classification & Sigmoid Curve • Modeling and Evaluation in Python	6 Hrs
3.	KNN • Introduction to KNN • How It Works: Nearest Neighbor Concept • Modeling and Evaluation in Python	6 Hrs
4.	K- Means Clustering • Understanding Clustering (Unsupervised) • K Means Algorithm • How it works : K Means theory • Modeling in Python	6 Hrs
5.	Principle Component Analysis (PCA) • Building Blocks Of PCA • How it works: Finding Principal Components • Modeling PCA in Python	6 Hrs
6.	Decision Tree • Random Forest Ensemble technique • How it works: Bagging Theory • Modeling and Evaluation in Python	6 Hrs
7.	Naïve Bayes • Introduction to Naive Bayes • How it works: Bayes' Theorem • Naive Bayes For Text Classification • Modeling and Evaluation in Python	6 Hrs
8.	Gradient Boosting, Xgboost • Introduction to Boosting and XGBoost • How it works: weak learners' concept • Modeling and Evaluation of in Python	6 Hrs
9.	Support Vector Machine (SVM) • Introduction to SVM • How It Works: SVM Concept, Kernel Trick • Modeling and Evaluation of SVM in Python	6 Hrs

III	Advanced Ml Concepts &Feature Engineering	
1.	Advanced Ml Concepts • Adv Metrics (Roc_Auc, R2, Precision, Recall) • K-Fold Cross Validation • Grid And Randomized Search Cv In Sklearn • Imbalanced Data Set : Smote Technique • Feature Selection Techniques	9 Hrs
IV	Deployment	
	Deployment With Flask • Introduction to Flask • URL and App routing • Flask application – ML Model deployment	6 Hrs

Other Contents:

I. **Course Fees: Course** fee is Rs 4,050+ GST (* Nil for SC/ST Candidates)
II. **Registration Fee:** An amount of Rs.1000/- (including all taxes as applicable) (non-refundable) should be paid at the time of registering for the course.
III. **Course Fee Instalment Structure: -** Can be paid in two instalments
IV. **Eligibility:**
   • 2nd Year Polytechnic Diploma in Computer Science/ IT/ Electronics /Electrical/ Instrumentation/ or
   • Final year BCA/B.Sc.(Electronics/CS/IT) or
   • Pursuing MCA/MSC(CS/IT) /PGDCA or
   • Pursuing B.E/B.Tech in any domain or
   • NIELIT O Level(IT)
V. **Number of Seats :30**
VI. **Selection of candidates:** The candidates passed in the qualifying examination will be based on their marks obtained, subject to eligibility and availability of seats.
VII. **Important Dates:**

Starting Date for Registration	**01/07/2024**
Last date to submit application form:	**19/08/2024**
Counselling/Admission	**20/08/2024**
Last Date for Payment of Fee	**30/08/2024**
Commencement of class work:	**02/09/2024 (Tentative)**

VIII. **Course Timings:** 3:00 Hrs. in week days (Mon-Fri).

IX.   Lab Facilities: LIST OF EQUIPMENT (For a batch of 30 students)

Sr. NO.	Description	Qty
1	Classroom	2
2	Student Chair	30
3	Student Table	15
4	Smart Interactive Display	2
5	White Board	2
6	Desktop computer with Accessories: installed with: Jupyter notebook NumPy Pandas Matplotlib Seaborn Scikit-Learn	30