INTRODUCTION TO AI MACHINE LEARNING

PHY.C.23.2

ALL SAINTS' COLLEGE

THIRUVANANTHAPURAM

Certificate Course

on

INTRODUCTION TO AI & MACHINE LEARNING

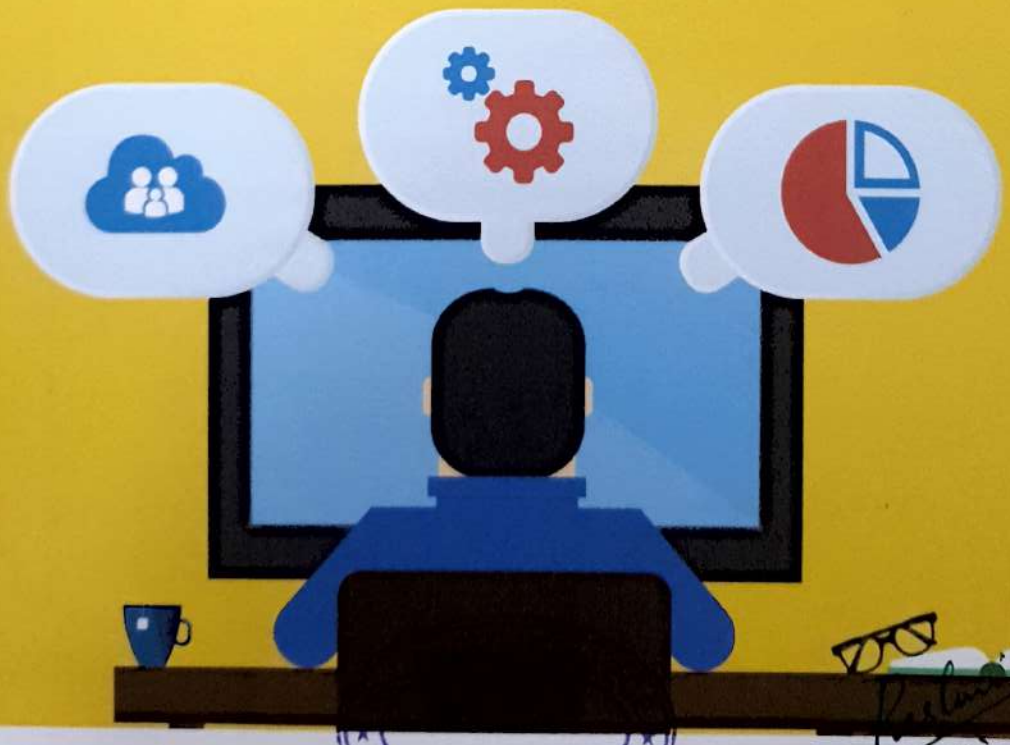
Conducted by

Department of Physics

2023-2024

Eligibility: UG/PG ongoing students

This beginner-friendly course provides a comprehensive overview of AI and machine learning fundamentals, covering key concepts, algorithms, and real-world applications.



TRIVANDRUM-7, S.INDIA

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Thiruvananthapuram

All Saints' College
Trivandrum

Department of Physics

Course Syllabus

Introduction to AI & Machine Learning (PHY.C.23.2)

Course Objectives

The main objective of the course included:

- Understanding AI Fundamentals: Provide a solid foundation in the basic concepts and principles of artificial intelligence.
- Machine Learning Basics: Introduce the key concepts, algorithms, and techniques used in machine learning.
- Practical Applications: Demonstrate the real-world applications of AI and machine learning in various domains.
- Ethical Considerations: Explore the ethical implications and societal impact of AI and machine learning.

Course Objectives

At the completion of course, students will be able to:

- Knowledge: Students will have a strong understanding of AI and machine learning concepts, algorithms, and applications.
- Skills: Students will be able to:

  Collect, clean, and prepare data for analysis.

  Select appropriate machine learning algorithms for given tasks.

  Build and train basic machine learning models.

  Evaluate the performance of machine learning models.

  Recognize and address ethical considerations in AI development.
- Competencies: Students will be able to apply their knowledge and skills to solve real-world problems using AI and machine learning techniques.
- Confidence: Students will gain confidence in their ability to learn and explore new AI and machine learning technologies.

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Syllabus (30hrs)

Unit 1: Introduction to Artificial Intelligence and Machine Learning (6 Hours)

Introduction to AI- Definition, history, and applications of AI, Types of AI (narrow, general, super),Ethical considerations in AI. Introduction to Machine Learning- Definition and applications of ML, Supervised vs. unsupervised learning, Reinforcement learning.

References:

- Russell, S. J., & Norvig, P. (2016). Artificial intelligence: A modern approach. Prentice Hall.
- Mitchell, T. M. (1997). Machine learning. McGraw-Hill.

Unit 2: Supervised Learning (8 Hours)

Regression -Linear regression, Polynomial regression, Multiple linear regression, Evaluation metrics (MSE, RMSE, MAE). Classification- Logistic regression, Support vector machines (SVM), Decision trees and random forests, Evaluation metrics (accuracy, precision, recall, F1-score).

References:

- Hastie, T., Tibshirani, R., & Friedman, J. (2009). The elements of statistical learning: data mining, inference, and prediction. Springer.
- James, G., Witten, D., Hastie, T., & Tibshirani, R. (2013). An introduction to statistical learning: with applications in R. Springer.

Unit 3: Unsupervised Learning (6 Hours)

Clustering- K-means clustering, Hierarchical clustering, Density-based clustering (DBSCAN). Dimensionality Reduction: Principal component analysis (PCA), t-SNE. Anomaly Detection: Statistical methods, Isolation Forest.

References:

- Aggarwal, C. C. (2014). Data mining: the teenage years. Springer.
- Xu, R., & Wunsch, D. (2005). Clustering algorithms: a comparative study. IEEE Transactions on Neural Networks, 15(1), 68-78.

Unit 4: Neural Networks and Deep Learning (6 Hours)

Introduction to Neural Networks: Perceptron, Multilayer perceptron (MLP). Deep Learning: Convolutional neural networks (CNNs), Recurrent neural networks (RNNs) , Applications (image recognition, natural language processing)

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References:

- Goodfellow, I., Bengio, Y., & Courville, A. (2016). Deep learning. MIT Press.
- LeCun, Y., Bengio, Y., & Hinton, G. (2015). Deep learning. Nature, 521(7553), 436-444.

Unit 5: Machine Learning Applications and Tools (4 Hours)

Real-world applications: Healthcare, Finance, Marketing, Recommendation systems. Popular machine learning tools: ,Python libraries (Scikit-learn, TensorFlow, PyTorch) R packages, Cloud-based platforms (Google Cloud AI, AWS SageMaker, Azure Machine Learning)

References:

- Géron, A. (2019). Hands-on machine learning with Scikit-Learn, Keras, and TensorFlow: concepts, tools, and techniques to build intelligent systems. O'Reilly Media.
- Chollet, F. (2018). Deep learning with Python. Manning Publications.

Evaluation : Exam Based evaluation

Theory: 40 Marks

Practical : 30 Marks

Project: 30 Marks

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List of students attended the certificate course
on
Introduction to AI & Machine Learning (PHY.C.23.2)
2023-2024

Sl.NO.	Name	Class
1	ABINA ANTONY	MSc II Year
2	AISWARYA K S	MSc II Year
3	AMRUTHA C A	MSc II Year
4	ANAMIKA A	MSc II Year
5	ANJANA A B	MSc II Year
6	BEJI TERENSE	MSc II Year
7	GADHA S GOPAN	MSc II Year
8	MEKHA J	MSc II Year
9	PARVATHY V H	MSc II Year
10	PRINCY P L	MSc II Year
11	SANGEETHA E	MSc II Year
12	SREELAKSHMI K V	MSc II Year
13	SREELEKSHMI S	MSc II Year
14	ABHI. J	BSc II Year
15	ARATHY ASOKAN .G.A	BSc II Year
16	BISMI.S	BSc II Year
17	DEVI DINESH	BSc II Year
18	FATHIMA BEEVI.S	BSc II Year
19	GAYATHRI.S.K	BSc II Year
20	ROULLAHMOL.N.S	BSc II Year
21	SREELEKHA.A.L	BSc II Year
22	AJEESHA.S.S	BSc II Year
23	AMRITHA.SAJU	BSc II Year
24	AMRITHA.V.A	BSc II Year

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25	ANAKHA JOY	BSc II Year
26	JENNIFER THADEUS	BSc II Year
27	MEENU KRISHNA	BSc II Year
28	MEENU KUTTY S S	BSc II Year
29	ROSHNI. A	BSc II Year
30	SHANI SHAJI	BSc II Year
31	SRUTHI.S	BSc II Year
32	ALFA.N.A	BSc II Year
33	JEEVITHA ANNA GEORGY	BSc II Year
34	JENIFAR.P	BSc II Year
35	AMINA N USEF	BSc I Year
36	ANASWARA S	BSc I Year
37	ROSHINI A N	BSc I Year
38	ABHIRAMI SM	BSc I Year
39	AISWARYA A S	BSc I Year
40	AMRUTHA J L	BSc I Year
41	KAAVYA S	BSc I Year
42	KHADEEJA BEEVI R	BSc I Year
43	MEHRIN HARIS	BSc I Year
44	NIVEJITHA S	BSc I Year
45	SARANGI JAYAN	BSc I Year
46	VIDHYAMOL B S	BSc I Year
47	ANAGHA VIJAY S	BSc I Year
48	NEENA ANN SAJI	BSc I Year
49	RACHEL MARY S	BSc I Year

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Department of Physics

Course Summary

Introduction to AI & Machine Learning (PHY.C.23.2)

A certificate course on "Introduction to AI & Machine Learning " was conducted fr the final year Physics PG students and Second and first year Physics UG students of All Saints' College during the academic year 2023-2024. The course was conducted during 03.02.24 - 10.05.24. A trainer was assigned to students .The course was delivered through a combination of theoretical lectures and hands-on practical sessions. The trainer provided clear explanations of concepts, guided students through coding exercises, and encouraged active participation and discussion. This course was designed to introduce students to the fundamental concepts of artificial intelligence (AI) and machine learning (ML). The course aimed to equip students with the necessary knowledge and skills to understand and apply AI and ML techniques to solve real-world problems. The "Introduction to AI & Machine Learning" course successfully achieved its objectives, providing students with a valuable introduction to the field. It empowered them with the necessary skills to contribute to the growing field of AI and ML. The course will continue to be refined based on feedback and emerging trends in the field.

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Course Report

Advanced Python with Django Programming (PHY.C.23.1)

A certificate course on "Introduction to AI & Machine Learning " was conducted fr the final year Physics PG students and Second and first year Physics UG students of All Saints' College during the academic year 2023-2024. The course was conducted during 03.02.24 - 10.05.24. They have adhered to a special, methodical, marketable skill development approach that is step-by-step and systematic. Thirty hours of training were done as part of this. Students were paired with a trainer, and they received instruction on the newest methods and technologies. Assessment was also undertaken to track the progress of pupils and participation certificate was awarded to all participants depending on their attendance and assessment. The course was delivered through a combination of theoretical lectures and practical hands-on sessions. Experienced trainers guided students through the intricacies of AI and ML, providing clear explanations and real-world examples. The emphasis was on active learning, with students encouraged to experiment, solve problems, and collaborate with their peers. The "Introduction to AI & Machine Learning" course successfully achieved its objectives, providing students with a valuable introduction to the field. It empowered them with the necessary skills to contribute to the growing field of AI and ML. By successfully completing the course, students were well-equipped to embark on their journey into the exciting world of AI and ML. The knowledge and skills gained will undoubtedly benefit them in their academic and professional pursuits.

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Certificate Course on Introduction to AI & Machine Learning PHY C.23.2.4   2023-2024

for

Staff Attendance Register

Sl. No.	Designation	NAME	Days / Date	1 (3/2/24)	2 (17/2/24)	3 (2/3/24)	4 (16/3/24)	5 (19/4/24)	6 (20/4/24)	7 (10/5/24)	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Casual Leave: 1st of the Month	Previous	Total	Remarks
1.		Abira Antony	M	a	x	x	x	x	x	x																												
2.		Anusree K.S	E	x	x	x	a	x	x	x																												
3.		Amrutha C.A	M	x	x	x	x	x	x	x																												
4.		Anamika A	E	x	x	x	x	x	x	x																												
5.		Aysema A.B	M	x	x	a	x	x	x	x																												
6.		Beji Terence	E	x	x	x	x	x	x	x																												
7.		Gadha S Gopan	M	x	x	x	x	x	x	x																												
8.		Mekha J	E	x	x	x	x	a	x	x																												
9.		Parvathy V.H	M	x	x	x	x	x	x	x																												
10.		Bincy B.L	E	x	x	x	x	x	x	x																												
11.		Sangeetha E	M	x	x	x	x	x	x	x																												
12.		Sreelakshmi K.Y	E	a	x	x	x	x	x	x																												
13.		Sreelekshmi S	M	x	x	x	x	x	x	x																												
14.		Ebin J	E	x	x	x	x	x	a	x																												
15.		Prathy Asokan G.A	M	x	x	x	x	x	x	x																												
16.		Bismi S	E	x	x	x	x	x	x	x																												
17.		Devi Dinesh	M	x	a	x	x	x	x	x																												
18.		Fathima Beevi S	E	x	x	x	x	x	x	x																												
19.		Gayathri S.K	M	x	x	x	x	x	x	x																												
20.		Preethamol N.S	E	x	x	x	x	a	x	x																												
21.		Sreelekha A.L	M	x	x	x	x	x	x	x																												
22.		Aleesha S.S	E	x	x	x	x	x	x	x																												
23.		Amrutha Saju	M	a	x	x	x	x	x	x																												
24.		Amritha V.A	E	x	x	x	x	x	x	x																												
25.		Anakha Joy	M	x	x	x	x	x	x	x																												
26.		Jennifer Thadews	E	x	x	x	x	x	x	x																												
27.		Meenu Krishna	M	x	a	x	x	x	x	x																												
28.		Meenu Kutty S.L	E	x	x	x	x	x	x	x																												
29.		Roshni A.	M	x	x	x	x	a	x	x																												
30.		Shani Shaji	E	x	x	x	x	x	x	x																												
31.		Sruthi S.	M	x	a	x	x	x	x	x																												
32.		Alfa N.A.	E	x	x	x	x	x	x	a																												
33.		Jeevitha Anna Georgy	M	x	x	x	x	x	x	x																												
34.		Jenifer P.	E	x	x	a	x	x	x	x																												

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Reshmi
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Staff Attendance Register

for

Sl.No.	Designation	NAME	Days / Date	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
31		[illegible] V [illegible]	M	✓	✓	✓	✓	✓	✓	✓																						
32.		Anaswara S	E	✓	✓	✓	✓	✓	✓	✓																						
33		[illegible] AN	M	✓	✓	✓	✓	✓	✓	✓																						
[illegible]		[illegible] MC.	E																													
[illegible]		Abhirami SM	M	a	✓	✓	✓	✓	✓	✓																						
39		Aiswarya AS	E	✓	✓	✓	✓	✓	✓	✓																						
40		Amrutha JL	M	✓	✓	✓	a	✓	✓	✓																						
[illegible]		Anakha M	E																													
[illegible]'		Kavya S	M	✓	✓	✓	✓	✓	✓	✓																						
42.		Khadeeja Beevi R	E	a	✓	✓	✓	✓	✓	✓																						
43		Mehrin Haris	M	✓	✓	✓	✓	✓	✓	✓																						
44		Nivajitha S	E	✓	✓	✓	✓	✓	✓	✓																						
45.		Sarangi Jayan	M	✓	✓	✓	a	✓	✓	✓																						
46		Vidhyamol BS	E	✓	✓	✓	✓	✓	✓	✓																						
47.		Anagha Vijay S	M	✓	✓	✓	a	✓	✓	✓																						
48		Neena Ann Saji	E	✓	✓	✓	✓	✓	✓	✓																						
49.		Rachel Mary S	M	✓	✓	a	✓	✓	✓	✓																						

Ms. Dhanya Jose
Course co-ordinator

Dr. Anjana. P S
Head, Dept of Physics

Prof. Dr. Reshmi R Prasad
Principal

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POSTGRADUATE DEPARMENT OF PHYSICS

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(Affiliated to University of Kerala)

CERTIFICATE

This is to certify that Ms. ***Abina Antony, MSc. Physics (Specialization in Space Physics) II Year Student*** has successfully competed the 30 hour certificate course on "Introduction to AI & Machine Learning" Programming organized by the Postgraduate Department of Physics, All Saints' College, Thiruvananthapuram during 03.02.24 - 10.05.24.

Anj – PS

Dr. Anjana P.S.
HOD, Department of Physics

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Reshmi

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CERTIFICATE

This is to certify that Ms. ***Bismi S, BSc. Physics II Year Student*** has successfully competed the 30 hour certificate course on "Introduction to AI & Machine Learning" Programming organized by the Postgraduate Department of Physics, All Saints' College, Thiruvananthapuram during 03.02.24 - 10.05.24.

Dr. Anjana P.S.
HOD, Department of Physics

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CERTIFICATE

This is to certify that Ms. ***Sreelekha A L, BSc. Physics II Year Student*** has successfully competed the 30 hour certificate course on "Introduction to AI & Machine Learning" Programming organized by the Postgraduate Department of Physics, All Saints' College, Thiruvananthapuram during 03.02.24 - 10.05.24.

Dr. Anjana P.S.
HOD, Department of Physics

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CERTIFICATE

This is to certify that Ms. *Devi Dinesh, BSc. Physics II Year Student* has successfully competed the 30 hour certificate course on "Introduction to AI & Machine Learning" Programming organized by the Postgraduate Department of Physics, All Saints' College, Thiruvananthapuram during 03.02.24 - 10.05.24.

Dr. Anjana P.S.
HOD, Department of Physics

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CERTIFICATE

This is to certify that Ms. ***Sarangi Jayan BSc. Physics I Year Student*** has successfully competed the 30 hour certificate course on "Introduction to AI & Machine Learning" Programming organized by the Postgraduate Department of Physics, All Saints' College, Thiruvananthapuram during 03.02.24 - 10.05.24.

Dr. Anjana P.S.
HOD, Department of Physics

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