# FIGURESHUB

# MACHINE LEARNING & ROBOTICS SYLLABUS

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# Machine Learning Syllabus

## COURSE OVERVIEW

Welcome to the FiguresHub Machine Learning & Robotics Program! This comprehensive six-month course is designed to equip you with the skills and knowledge needed to thrive in the exciting fields of machine learning and robotics. The program combines theoretical foundations with extensive hands-on projects, ensuring a well-rounded and practical learning experience.

## REQUIREMENTS

- Newbie friendly
- A fully functional laptop that is able to access the internet.
- Minimal hardware requirements for laptop: [core i7, 256 SSD, and 16Gb of RAM]

## RESOURCES

Python, Anaconda Distribution, Visual Studio Code, Jupyter Notebooks, Git, GitHub, OpenAI Gym, Stable Baselines, Robot Operating System (ROS), Gazebo Simulation Environment, etc.

**COURSE CURRICULUM**

| WEEK | CONTENT |
| --- | --- |
| Week 1-2 | Introduction to Machine Learning |
| | • Overview of ML and its applications |
| | • Basic terminologies: features labels training and testing |
| Week 3-4 | Python Programming for ML |
| | • Basics of Python programming |
| | • Introduction to key libraries: NumPy, Pandas, Matplotlib |
| Week 5-6 | Data Processing |
| | • Data Cleaning and handling missing values |
| | • Feature scaling and normalization |
| | • Data encoding for categorical variables |
| Week 7-8 | Supervised Learning Algorithms |
| | • Linear Regression |
| | • Logistic Regression |
| | • Decision Trees and Random Forests |
| | • Model Evaluation and metrics |
| Week 9-10 | Unsupervised Learning Algorithm |
| | • K-Means Clustering |
| | • Hierarchical Clustering |
| | • Principal Component Analysis (PCA) |
| Week 11-12 | Neural Network Language and Deep Learning |
| | • Introduction to neural network |
| | • Building and training neural network |
| | • Deep learning architecture: CNNs and RNNs |

| Week 13-14 | Natural Language Processing |
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- Introduction to NLP
- Text processing and sentiment analysis
- Introduction to computer vision
- Image preprocessing and object detection

| Week 15-16 | Reinforcement Learning |
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- Basics of reinforcement learning
- Markov Decision Processes
- Q-learning and DeeQ Networks (DQN)
- Application of reinforcement learning

| Week 17-18 | Introduction To Robotics |
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- Basics of robotics and its applications
- Types of robots and their components
- Robotic sensors and actuators

| Week 19-20 | Robot Programming and Simulation |
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- Programming robots using python
- Simulation environments (e.g., ROS, Gazebo)

| Week 21-22 | Robot Perception and Control |
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- Sensor data processing for robots
- Path planning and navigation
- Robots control systems

| Week 23-24 | Final Project and Presentation |
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- Students works on a real world machine learning and
- Project presentation and demonstration
- Peer and instructor feedback

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## ADDITIONAL INFORMATION

Our Machine Learning and Robotics course not only provides a robust curriculum but also emphasizes mentorship and community collaboration. With dedicated instructors and a vibrant learner community, you'll benefit from personalized guidance and industry insights. Enjoy lifetime access to resources, exclusive webinars, and continuous support for a successful learning journey. Receive a completion certificate and join a dynamic machine learning community that values your success.