

OSI

MASTER'S DEGREE



ARTIFICIAL INTELLIGENCE



www.osifoundation.com
www.occidentalworld.com

ARTIFICIAL INTELLIGENCE



INTRO

Online

120 ECTS

9 months

Perhaps we should all stop for a moment and focus not only on making our AI better and more successful, but also on the benefit of humanity, ...

Stephen Hawking
at Web Summit in Lisbon, November 2017

Artificial Intelligence is so popular that it's no more just an option for businesses. Businesses have already started making the technology an essential part of their strategies.

This Master's program is designed to teach the underlying concepts of Artificial Intelligence (AI) and machine learning and how they can be used to solve real-world problems.

Students will gain a deep knowledge of the math of machine learning, including relevant tools and languages and popular algorithms and their applications. They'll also gain a better understanding of the principles and practices of artificial intelligence (AI) and how to put them to work, from the basics Machine Learning, Natural language processing and Robotics.

Going beyond the theory, our approach invites participants to deep dive into the real scenarios, where learning is enriched by specialists in the fields of artificial intelligence.

We expect learners would be required to put in 12-16 hours per week.

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Module 1: Occidental Identity

Occidental Identity
Ancient and Classic Heritage
Relations between State and Religion

Module 2. Subject 1

1. INTRODUCTION TO ARTIFICIAL INTELLIGENCE

What is Artificial Intelligence?
The foundation & History of AI
Machine Learning
Natural Language Processing
Robotics

2. AGENTS & ENVIRONMENTS

What is an agent?
Rationality
Structure of Intelligent Agents

3. SEARCH ALGORITHMS

What is Searching in AI?
Search Terminology
Types of Search

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4. FUZZY LOGIC SYSTEMS

What is Fuzzy Logic?
Why Fuzzy Logic?
Sample Applications

5. ETHICAL AI

Module 2. Subject 2

PYTHON TO MACHINE LEARNING - INTRODUCTION

1. RAW DATA PROCESSING

Creating Arrays
Data Processing
Data Cleansing
Data Operations

2. INFERENCE STATISTICS

Normal
Distribution
Poisson
Distribution
z-score
p-value

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3. DATA MINING

Presenting an analysis
Example code

4. ADVANCED VISUALIZATION

Different types of Plots
Box Plots
Heatmaps
Scatter plots etc.

Module 2. Subject 3

1. APPLICATIONS OF AI

2. FORMS OF LEARNING

Forms of Learning
Supervised Learning
Reinforcement learning

3. SUPERVISED & UNSUPERVISED LEARNING

3.1 Linear Models – Regression & Classification

Maximum Likelihood

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Least Squares
Regularization

3.2 Bayesian Methods

Bayes Rule
MAP Inference
Active Learning

3.3 Foundational Classification Algorithms

Nearest Neighbors
Perceptron
Logistic Regression

3.4 Intermediate Classification Algorithms

SVM
Decision Trees
Random Forests and
Gradient (XG) Boosting

4. PRACTICAL ON SUPERVISED LEARNING

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Module 2. Subject 4

1. MACHINE LEARNING WITH PYTHON

- Decision Trees
- Linear Regression
- Logistic Regression

2. K-MEANS CLUSTERING

3. ESTIMATING LIKELIHOOD OF AN EVENT

- Data Preparation
- Create Training and Test Datasets
- Build a model
- Evaluate a model
- Build and Evaluate using Scikit

4. UNSTRUCTURED DATA ANALYSIS WITH TEXT MINING

- Data Preprocessing
- Creating a word cloud
- Stemming and Lemmatization

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Module 3. Subject 5

1. UNSUPERVISED LEARNING

1.1 Clustering Methods

K-Means

Clustering

E-M

Gaussian Mixtures

1.2 Recommendation

Systems

Collaborative

Filtering

Topic

Modeling

PCA

2. NATURAL LANGUAGE PROCESSING

Language Models

Text Classification

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3. IMAGE PROCESSING

Language Models
Text Classification

4. REINFORCEMENT LEARNING

4.1 Reinforcement Learning

Reinforcement Learning Introduction
Examples
Elements of Reinforcement Learning
Limitations and Scope

4.2 Tabular Solution Methods

Multi-arm Bandits
Gradient Bandits
Associative Search (Contextual Bandits)

4.3 Finite Markov Decision Process (MDP)

The Agent-Environment Interface
Goals and Rewards
Returns
The Markov Property
Markov Decision Processes

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Value Functions
Optimal Value Functions
Optimality and Approximation

4.4 Monte Carlo Methods

Monte Carlo Prediction
Monte Carlo Estimation of Action Values
Monte Carlo Control
Monte Carlo Control without Exploring Starts

Module 4

SAMPLE ASSIGNMENTS (will change in future)

ARTIFICIAL INTELLIGENCE IN EDUCATION

ASSIGNMENT 1:

Classification model:

Student marks classification from a given dataset.

ASSIGNMENT 2:

Scoring:

Model to Predict Student Scores.

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ASSIGNMENT 3:

Clustering:

Clustering of students based on their attendance per class and marks achieved.

ARTIFICIAL INTELLIGENCE IN MARKETING

ASSIGNMENT 4:

PRODUCT RECOMMENDATION ENGINE:

You will build a product recommendation engine by applying collaborative filtering and topic modelling techniques. You use a dataset which contains millions of product purchases from thousands of products.

ASSIGNMENT 5:

CUSTOMER CHURN PREDICTION SCORE:

You will build a customer churn model using Random Forests. You use a dataset which contains millions of customer interactions and the historical churn data.