

Syllabus for Master of Science in Information Technology

Credits: 3
MSIT 5226

Instructor Contact Information:

You can also always send your instructor a private message through the Moodle Messaging system. Once logged into your course, click your instructor's Moodle profile page to be provided with ways to communicate with them. Your instructor's email will also be listed in their profile.

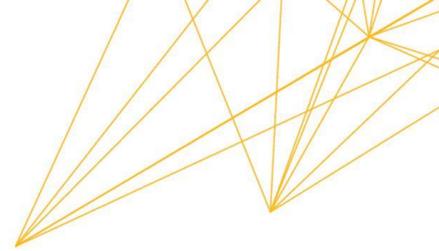
Course Description

This course provides a comprehensive introduction to the fundamental concepts, techniques, and applications of machine learning. Students will explore various types of learning, including supervised and unsupervised methods, and gain hands-on experience with Python libraries for data manipulation and analysis. Key topics include linear regression, artificial neural networks, ensemble learning, and an overview of deep learning. Through practical assignments, students will learn to implement algorithms and evaluate the model performance. The course aims to equip students with the necessary skills to tackle real-world machine learning problems and understand the underlying principles driving modern AI technologies.

Learning Objectives

Program Learning Outcomes (PLOs)

1. Students will be able to apply the principles of information technology, computer science, business administration and other disciplines to the analysis of complex computing problems.
2. Students will be able to design and evaluate solutions to complex computing problems using industry-recognized best practices and standards.
3. Students will be able to analyze user needs in the development and implementation of computing-based solutions.



4. Students will be able to assess the ethical considerations in the development, implementation, evaluation, and management of IT systems.
5. Students will be able to construct clear, well-organized arguments supported by credible research-based evidence.

Course Learning Objectives (CLOs):

Students will be able to:

CLO1. Describe the key concepts, types, and workflows of machine learning, as well as identify real-world applications across various domains.

CLO2. Implement supervised learning algorithms and unsupervised learning techniques using Python, along with appropriate model evaluation metrics.

CLO3. Implement supervised learning algorithms and unsupervised learning techniques using Python, along with appropriate model evaluation metrics.

CLO4. Apply ensemble learning techniques to enhance model performance.

CLO5. Describe the foundational principles of responsible AI and recognize the importance of explainability in AI systems.

Co/Prerequisites

None

Course Materials

UoPeople courses use open educational resources (OER) and other materials specifically donated to the University with free permissions for educational use. Therefore, students are not required to purchase any textbooks or sign up for any websites that have a cost associated with them. The main required textbook for this course is listed below and can be readily accessed using the provided links. There may be additional required/recommended readings, supplemental materials, or other resources and websites necessary for lessons; these will be provided for you in the course's General Information and Forums area, and throughout the term via the weekly course Unit areas and the Learning Guides.

Lee, W. (2019). *Python Machine Learning*. John Wiley & Sons, Inc.



Technology Requirements

To fully engage in this course and make the most of your experience, the course must be taken on a PC. You also must have regular access to the internet (high speed is preferred).

Additionally, there are software requirements and installation, and you can refer to the following details:

Python is a versatile and widely used language for machine learning, offering powerful libraries and tools for data analysis, visualization, and algorithm development.

The process of installing the necessary software and tools are as follows:

Step 1: Python Installation

Python is the core programming language for this course. Follow the steps below to install it:

- **Version Requirement:** Python 3.8 or later
- **Installation Steps:**
 1. Visit the official Python website at <https://www.python.org/downloads/>.
 2. Download the appropriate installer for your operating system (Windows, macOS, or Linux).
 3. During installation, ensure you check the box that says "**Add Python to PATH**".
 4. Verify the installation by typing following on terminal or command prompt:

```
python --version
```

Step 2: IDE/Code Editor



To write and execute Python code efficiently, you'll need an Integrated Development Environment (IDE) or code editor. Here are the recommended options:

1. **Spyder** (Preferred for Scientific Computing):

- Spyder is a Python IDE specifically designed for data science and machine learning, offering features like variable explorers, interactive consoles, and inline plotting.
- Spyder is included in the **Anaconda distribution**.
 - Download and install Anaconda from <https://www.anaconda.com/products/distribution>
 - After installation, launch Spyder directly from the Anaconda Navigator.
- Alternatively, you can install Spyder via pip if you already have Python installed by typing

```
pip install spyder
```

2. **Visual Studio Code (VS Code)**:

- A lightweight, highly customizable code editor with support for Python and extensions for debugging and version control.
- Download VS Code from <https://code.visualstudio.com/>.

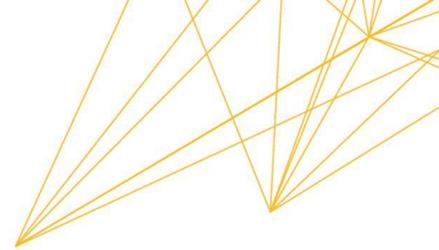
3. **Optional IDEs:**

• **Jupyter Notebook:**

- Jupyter Notebook provides an interactive environment where you can combine code, visualizations, and text.
- Install Jupyter by following the instructions at <https://jupyter.org/install>. Alternatively, install it as part of Anaconda (see below).

• **Anaconda Distribution:**

- Anaconda is a comprehensive package that includes Python, Jupyter Notebook, and many libraries required for this course.



- Download Anaconda from <https://www.anaconda.com/products/distribution>.

Know more from your textbook

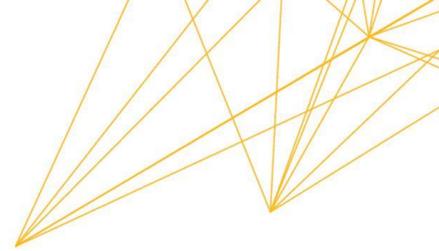
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- To read this book
 - Log into the UoPeople library and go to LIRN - [How to Access LIRN is now added to the library?](#)
 - Select Computer Science under the **Jump to the Specific Group** section.
 - Search using the entire name of the book.
 - View the online book.
 - Read Chapter 1: Introduction to Machine Learning
 - This chapter introduces the fundamentals of machine learning, including key problem types (classification, regression, clustering) and types of algorithms (supervised and unsupervised learning). It also provides a step-by-step guide on setting up essential tools, like Anaconda and Jupyter Notebook, for hands-on learning and managing notebooks.

Campus Tech Support Email for English programs: support@uopeople.edu

Regular and Substantive Interaction

Your Instructor will interact and engage with each of you on a regular basis throughout the term to support your learning. They will provide direct instruction related to the course's learning objectives, respond to your questions, grade and/or provide feedback on your submitted coursework, post regular announcements, and engage in the course discussion areas regarding academic course content when appropriate.



Course Expectations and Learning Activities

Discussion Forum

Some units in this course require that you complete a Discussion Assignment. You are required to develop and post a substantive response to the Discussion Assignment in the Discussion Forum. A substantive response is one that fully answers the question that has been posed by the instructor. In addition, you must extend the discussion by responding to at least two (2) of your peers' postings in the Discussion Forum. Grading rubrics are provided in the Discussion Forum for each week. Discussion Forums are only active for each current and relevant learning week, so it is not possible to contribute to the forum once the learning week has come to an end.

Assignments Activities

The assignment activities are graded by your instructor. The grading rubric is listed under the assignment instructions. The grading rubric is a document that outlines the criteria that your instructor will use to grade your work.

Course Forum

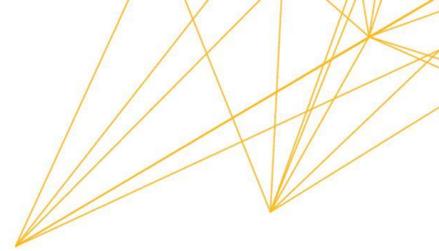
The Course Forum is the place to raise issues and questions relating to the course. It is regularly monitored by the instructors and is a good place to meet fellow students taking the same course. While it is not required to participate in the Course Forum, it is highly recommended.

Class Introductions

This section is your opportunity to introduce yourself to your classmates and create a vibrant learning community. By sharing your background, interests, and goals, you can create meaningful connections and discover commonalities with your peers.

Participation Expectations

1. Be involved and active in your courses.
2. Be highly motivated and disciplined.



3. Check the course homepage, calendar and assignment page, the course syllabus, your UoPeople email, and the Moodle course discussion forums several times a week.
4. Post the required comments and responses to the discussion forum for your course.
5. Keep up with your assignments.
6. Participate actively in class discussions.
7. Be polite and respectful.
8. Use proper grammar and correct spelling.
9. Be honest and original. Plagiarism will not be tolerated in any online course.

Non-participation is characterized by a lack of any assignment submissions, inadequate contributions to the Discussion Forums. Also, please note the following important points about course participation:

- Assignments must be submitted on or before the specified deadline. A course timeline is provided in the course schedule, and the instructor will specify deadlines for each assignment.
- Occasionally there may be a legitimate reason for submitting an assignment late. Most of the time, late assignments will not be accepted and there will be no make-up assignments.
- All students are obligated to inform their instructor in advance of any known absences which may result in their non-participation.

Feedback and Suggestions

We value your input and would encourage you to complete the end-of-course survey to provide us with course feedback and suggestions and report issues.



Evaluation and Grading Scale

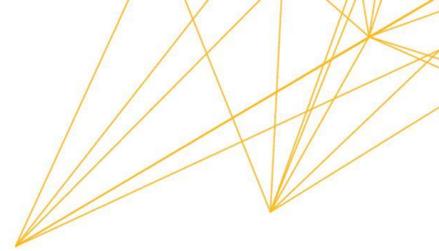
This course follows a pass/fail grading system. For each assignment, specific criteria will be provided, and students are expected to submit answers that fully meet the requirements of each criterion. To pass an assignment, students must provide accurate and comprehensive responses that meet all, or the majority, of each criterion's requirements.

Grading Weights:

Category	% Of Grade	Grade Items (Learning Activities)	Associated Learning Objectives/Outcomes
Discussions	40%	1. Unit 1 – Discussion Forum 2. Unit 3 – Discussion Forum 3. Unit 4 – Discussion Forum 4. Unit 5 – Discussion Forum 5. Unit 6 – Discussion Forum 6. Unit 8 – Discussion Forum	<ul style="list-style-type: none"> ● Unit 1 – CLO1 ● Unit 3 – CLO 2 ● Unit 4 – CLO2 ● Unit 5 – CLO3 ● Unit 6 – CLO4 ● Unit 8 – CLO5
Assignment	60%	1. Unit 2 – Assignment Activity 2. Unit 3 – Assignment Activity 3. Unit 4 – Assignment Activity 4. Unit 5 – Assignment Activity 5. Unit 7 – Assignment Activity	<ul style="list-style-type: none"> ● Unit 2 – CLO2 ● Unit 3 – CLO2 ● Unit 4 – CLO2 ● Unit 5 – CLO3 ● Unit 7 – CLO3
TOTAL	100%		

Grading Scale:

Letter Grade	% Grade	Grade Points
A	98%-100%	4.00
A	93-97%	4.00
A-	90%-92%	3.67



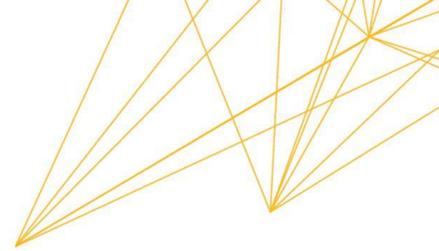
B+	88%-89%	3.33
B	83%-87%	3.00
B-	80%-82%	2.67
C+	78%-79%	2.33
C	73%-77%	2.00
C-	70%-72%	1.67
D+	68-69%	1.33
D	63%-67%	1.00
D-	60%-62%	0.67
F	<60	0.00
W	N/A	N/A

Students may also be granted Withdrawal (W), if they withdraw from the course, or an Incomplete (I) should their circumstances permit. A student who feels they were graded unfairly, or who seeks to dispute a grade, may initiate a grade appeal process. Refer to [Campus Policies](#) for more information on withdrawals and appeals.

Course Schedule

UNIT 1: Introduction to Machine Learning

- Watch/Read early enough in the unit to enable completion of the related assignments - suggest by 3rd-4th day of the unit.
- Discussion first response due by the 4th day of the week.
- Discussion replies due by the 7th day of the week.



UNIT 2: Linear Regression

- Watch/Read early enough in the unit to enable completion of the related assignments - suggest by 3rd-4th day of the unit.
- Assignment Activity submission due 7th day of the week.

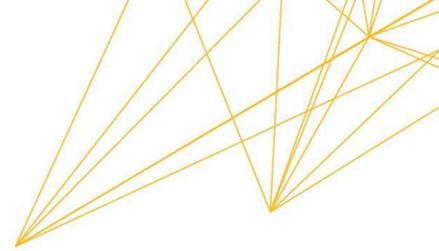
UNIT 3: Supervised Learning

- Watch/Read early enough in the unit to enable completion of the related assignments - suggest by 3rd-4th day of the unit.
- Discussion first response due by the 4th day of the week.
- Discussion replies due by the 7th day of the week.
- Assignment Activity submission due 7th day of the week.

UNIT 4: Unsupervised Learning

- Watch/Read early enough in the unit to enable completion of the related assignments - suggest by 3rd-4th day of the unit.
- Discussion first response due by the 4th day of the week.
- Discussion replies due by the 7th day of the week.
- Assignment Activity submission due 7th day of the week.

UNIT 5: Artificial Neural Networks



- Watch/Read early enough in the unit to enable completion of the related assignments - suggest by 3rd-4th day of the unit.
- Discussion first response due by the 4th day of the week.
- Discussion replies due by the 7th day of the week.
- Assignment Activity submission due 7th day of the week.

UNIT 6: Ensemble Learning

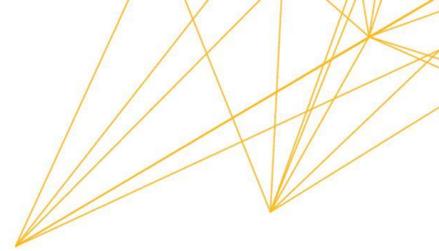
- Watch/Read early enough in the unit to enable completion of the related assignments - suggest by 3rd-4th day of the unit.
- Discussion first response due by the 4th day of the week.
- Discussion replies due by the 7th day of the week.

UNIT 7: Overview of Deep Learning and Gen AI

- Watch/Read early enough in the unit to enable completion of the related assignments - suggest by 3rd-4th day of the unit.
- Assignment Activity submission due 7th day of the week.

UNIT 8: Responsible and Explainable AI

- Watch/Read early enough in the unit to enable completion of the related assignments - suggest by 3rd-4th day of the unit.
- Discussion first response due by the 4th day of the week.
- Discussion replies due by the 7th day of the week.



Campus Policies & Processes

Late Work/Make-up Policy

Please review the [Late Work](#) policy in the University Catalog.

Code of Conduct

University of the People expects that students conduct themselves in a respectful, collaborative, and honest manner at all times. Harassment, threatening behavior, or deliberate embarrassment of others will not be permitted. Any conduct that interferes with the quality of the educational experience is not allowed and may result in disciplinary action, such as course failure, probation, suspension, or dismissal. For more information on this topic, please review the [General Code of Conduct](#) in the University Catalog.

Procedures for Resolving Academic Grievances/Appeals

If you believe that the final grade you received for a course is erroneous, unjust, or unfair, please contact your course instructor. This must be done within seven days of the posted final grade. For more information on this topic, please review the [Grievance Policy](#) and [Grade Appeals](#) Procedure in the University Catalog.

Withdrawal and Drop Date Policy

Please review the [Course Drops and Withdrawals](#) policy of the University Catalog.

Academic Integrity and Plagiarism

Please review the [Code of Academic Integrity](#) in the University catalog.

Intellectual Property

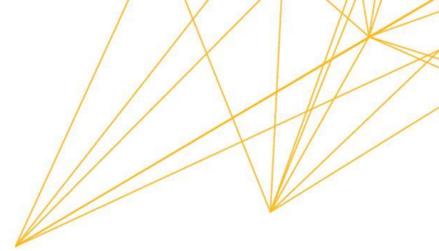
UoPeople respects the intellectual property rights of others who seek to create, preserve, and disseminate knowledge through teaching, collective learning, and continued research at the University at large. For more information on this topic, please review the [Intellectual Property](#) policy in the University catalog.

Reasonable Accommodations

Contact your Program Advisor to open a request for support.



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Student Support Services & Resources

English Programs

Academic Advising: advising@uopeople.edu

Financial Aid: financial.aid@uopeople.edu

Library Resources: library@uopeople.edu

Payment Processing: payments@uopeople.edu

Student Services: student.services@uopeople.edu

Technical Support: support@uopeople.edu