

COURSE OVERVIEW

Full Course Title: CYBER SECURITY ANALYTICS USING AI

Instructional Hours (Contact Hours): 45

Course Description:

The primary objective of the Cybersecurity analytics course is to cover fundamentals of cybersecurity concepts, and applications of data science/machine learning in cyber security theoretically and practically. Cybersecurity is the set of techniques used to alleviate the destruction of computer networks, applications, devices, and data. It aims to detect attacks, intrusions, and misuse, rapidly and builds quick, accurate, reliable decisions about the nature of a breach, what instigated it, and what decisions need to be taken to prevent data losses and avoid further intrusion.

Learning Outcomes:

- Understand the fundamentals of data science and machine learning.
- Understand about the various problems & challenges in the space of cyber security & how Machine Learning is shaping cyber security analytics.
- Understand the basics of Python programming constructs
- Understand the data science and machine learning libraries
- Implement Data science and ML applications using python
- Understand the applications of data science & predictive modeling in cyber security
- Apply machine learning algorithms for intruder detection
- Create a machine learning Intrusion Detection System (IDS).
- Create a machine-learning model for detecting SMS spam.

Learning Activities:

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|---|---|
| <input checked="" type="checkbox"/> Class Discussions/Discussion Boards | <input checked="" type="checkbox"/> Student Projects |
| <input checked="" type="checkbox"/> Peer-to-Peer Work (pairs, small groups) | <input checked="" type="checkbox"/> Readings |
| <input checked="" type="checkbox"/> Written Assignments (reports, essays) | <input checked="" type="checkbox"/> Textbook/Workbook Exercises |
| <input checked="" type="checkbox"/> Case Study Analysis | <input checked="" type="checkbox"/> Other: Click to enter |

Methods of Assessment/Grading Criteria:

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|---|---|
| <input checked="" type="checkbox"/> Class/Discussion Boards Participation | <input checked="" type="checkbox"/> Individual Projects/Presentations |
| <input checked="" type="checkbox"/> Written Assignments (reports, essays) | <input checked="" type="checkbox"/> Group Projects/Presentations |
| <input checked="" type="checkbox"/> Exams/Quizzes | <input checked="" type="checkbox"/> Other: Click to enter |

Course Topics:

- Introduction to Data Science and Machine Learning
 - Introduction to Data Science
 - Data Science Life Cycle
 - Exploratory Data Analysis
 - Basics of Machine Learning Algorithms
- Python Libraries for Data Science and Machine Learning
 - Introduction to Python
 - Introduction to Numpy, Pandas, sci-kit-learn
- Applications of Data Science and Machine Learning in Cyber Security
 - Spam Detection
 - Fraud Detection Intrusion Detection
 - Anomaly Detection
 - Software Vulnerabilities

COURSE OVERVIEW

- Machine Learning for Credit Card Fraudulent Detection
 - Data Understanding
 - Exploratory Data Analysis
 - Machine Learning for fraud detection GAnglia
- Machine Learning for Intrusion Detection
 - Data Understanding
 - Exploratory Data Analysis
 - Machine Learning for intruder detection
- Machine Learning for SMS Spam Detection
 - Data Understanding
 - Exploratory Data Analysis
 - Machine Learning for SMS Spam Detection Data Understanding

Prerequisites:

A strong foundation in computer science, including programming skills (especially Python), a good understanding of cybersecurity concepts, data analysis techniques, statistics, and familiarity with machine learning algorithms, with a focus on supervised and unsupervised learning methods.

OBJECT AUTOMATION