

CNT-4149 RVC 1228– Sensor & IoT Analysis With Deep Learning  
Department of Electrical & Computer Engineering  
Florida International University  
Fall, 2022

General Information

Section:	RVC 1228
Class time:	Online Class
Prerequisite:	N/A
Textbook:	No textbook required
Reference:	Hands-On Machine Learning with Scikit-Learn and TensorFlow. Concepts, Tools, and Techniques to Build Intelligent Systems by Aurélien Géron . ISBN: 978-1491962299 Introduction to Machine Learning with Python: A Guide for Data Scientists 1st Edition by Andreas Müller and Sarah Guido. ISBN: 978-1449369415 An Introduction to Machine Learning 3rd ed. 2021 Edition by Miroslav Kubat. ISBN: 978-3030819347

Contact Information

Instructor:	Jayesh Soni
Office:	EC 2174
Office Hours:	TuTh 3:30 PM - 5:00 PM (By Appointment)
Phone:	(305) 348-4238
E-mail:	jsoni@fiu.edu

**Course Description**

CNT-4149 RVC 1228– Sensor & IoT Analysis With Deep Learning. Learn the advanced deep learning libraries and the fundamental of Neural Networks. Understand the use of

Convolution Neural networks and Recurrent Neural networks to analyze the large IoT Dataset. Optimize the hyper-parameters for optimal modeling.

## Course Objectives

After completing this course, students are expected to have learned the following:

1. Understand fundamentals of Sensor and IoT analytics using Deep Learning
2. Knowledge of IoT deep learning architecture and network
3. Identify and apply Deep Neural Network to categorize IoT and Sensors data
4. Apply Convolutional Neural Network to classify image data received from IoT devices
5. Apply Recurrent Neural Network to forecast based on time series and sequential data received from sensors and IoT devices
6. Identify sensor data anomaly using deep learning algorithms
7. Learn network parameter optimization to improve performance
8. Learn to develop models, predict and visualize results
9. Apply Tensor Flow , Keras libraries to develop/optimize network and visualize results using large sensor / IoT datasets

## Topics Covered

1. Introduction to Sensor & IoT large dataset
2. Deep learning libraries - Tensor Flow/Keras
3. Pre-processing techniques for large datasets
4. Deep learning algorithms for IoT /Sensor Dataset
5. IoT data analysis using Deep Neural Network
6. Convolution Neural Network for image classification
7. Application of Recurrent Neural Network for sequential sensor/IoT data
8. Anomaly detection in sensor data using deep learning algorithms
9. Python data structures and Tensor Flow API for IoT Analytics
10. Deep neural network development and deployment
11. Parameter optimization to improve neural network performance
12. IoT/Sensor data visualization using deep learning

## Grading Scheme:

Assignments: 10%  
Midterm 25%  
Quiz: 20%  
Final Project: 20%  
Final Exam: 25%

## ABET Relationship of course to program outcomes:

(Select corresponding boxes below to applicable program outcomes for the course.)

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.

- 2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
- 3. an ability to communicate effectively with a range of audiences.
- 4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
- 5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
- 6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
- 7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

**Tentative Grading Scale:**

A	95-100	B+	85-89.9	C+	70 - 74.9
A-	90-94.9	B	80-84.9	C	65- 69.9
		B-	75-79.9	D	60-64.9

**University’s Code of Academic Integrity**

Florida International University is a community dedicated to generating and imparting knowledge through excellent teaching and research, the rigorous and respectful exchange of ideas, and community service. All students should respect the right of others to have an equitable opportunity to learn and honestly to demonstrate the quality of their learning. Therefore, all students are expected to adhere to a standard of academic conduct, which demonstrates respect for themselves, their fellow students, and the educational Mission of the University. All students are deemed by the University to understand that if they are found responsible for academic misconduct, they will be subject to the Academic Misconduct procedures and sanctions, as outlined in the Student Handbook.

More information can be found at [http://academic.fiu.edu/academic\\_misconduct.html](http://academic.fiu.edu/academic_misconduct.html)

**Department Regulations Concerning Incomplete Grades**

To qualify for an Incomplete, a student:

1. Must contact (e.g., phone, email, etc.) the instructor before or during missed portion of class.
2. Must be passing the course prior to that part of the course that is not completed
3. Must make up the incomplete work through the instructor of the course
4. Must see the instructor. All missed work must be finished before last two weeks of the following term.

**University policies on sexual harassment, and religious holidays, and information on services for students with disabilities**

Please visit the following websites:

<http://academic.fiu.edu/>

<http://drc.fiu.edu>

**Course Policies:**

- All exams are close book unless specified otherwise. Make-up exam is given only under special extenuating circumstances and up to the discretion of the instructor.
- All assignments are due at the beginning of the class time on the due day unless specified otherwise.
- No late turn-in will be accepted.
- All assignments need to be bound well and arranged in the correct order before being turned in. Otherwise, 20 percent of total points will be marked off.
- All assignments should include your work, or else no credit will be given.
- No copying is allowed on any assignment. No credit will be given to both copier's and copier's work.
- All behaviors of academic dishonesty will be handled according to university policy.
- DO NOT send assignments by email.
- Instructor reserves right to change course materials or dates as necessary.