DO NOT TYPE IN THIS BOX

Bulletin #: 1

Academic Year: 2022-23

FLORIDA INTERNATIONAL UNIVERSITY
UNIVERSITY CURRICULUM COMMITTEE
Proposal for a Course Change

PART I. FILL OUT THIS SECTION COMPLETELY

1. **School/College** Engineering and Computing

   Div./Dept. in Which Taught Electrical and Computer Engineering

2. | CNT | 4 | 149 | | 3 |
   |---|---|---|---|---|
   | Alpha Prefix | 1st Digit | Last 3 Digits | "C"-lec-lab "L"-Lab | Cr. Hrs. |

3. **Present Course Title** Sensor & IoT Data Analysis with Deep learning

PART II. FILL OUT CHANGE INFORMATION ONLY

Change Effective 1 / 1 / 2023

4a. **New Course Title** Deep Learning in ECE

b. **New Abbreviated course Title** *(for computer class schedules, transcripts)* Deep Learning in ECE

LIMITED TO 25 Characters *(including spaces)*

5a.

New Alpha Prefix	New 1st Digit	New Last 3 Digits	Change "C"-lec-lab "L"-Lab

5b. Change Credit Hours: From _____ **To** _____

6. **New Catalog Description/Major Topics** *(not to exceed 200 characters including spaces)*
   College of Medicine and College of Law: Attach description not exceeding 1,000 characters including spaces.

   This course will focus on the application of deep learning techniques and algorithms on structured and unstructured data. Deep learning frameworks are applied to create models from large datasets.

7. **New Prerequisite(s):**

8. **New Corequisite(s):**

9. **Explain Reclassification Request:**

   The course title and catalog description modifications will no longer be restricted to IoT or sensors, but its application to various areas within ECE.

10. **Does this proposed change impact the assessment process of a program or certificate? If yes, then send notification to assessment@fiu.edu.**

PROPOSAL REQUESTED BY:

Faculty Contact Dr. Alexander Perez-Pons (Type name) (Signature) 6 / 27 / 2022

aperezpo@fiu.edu (Email address) 305-348-7253 (Phone number)

Chairperson (Dept./Div.) Dr. Deidra Hodges (Type name) (Signature) 7 / 8 / 2022

Chairperson (Curr. Comm.) Dr. Alexander Afanasyev (Type name) (Signature) ____ / ____ / 20____

College/School Dean Dr. John Volakis (Type name) (Signature) ____ / ____ / 20____

Submit one original form. Attach one copy of the Course Justification and Course Syllabus: Course Description, Objectives, Learning Outcomes, Major Topics and textbooks.

FIU | Engineering & Computing

FLORIDA INTERNATIONAL UNIVERSITY

To: Mary Cossio
Faculty Senate

From: Dean or Assoc. Dean and College Curriculum Cmte. Chair

Subject: Memo in Lieu of Curriculum Chair and Dean Signatures for Bulletin #1

Date: September 16, 2022

As instructed by the Faculty Senate, this memo will serve as approval of the attached proposals for Bulletin #1 by our Curriculum Committee Chair, Alexander Afanasyev, and the Dean for College of Engineering and Computing (John L. Volakis), in lieu of physical signatures. The proposals in this Bulletin were approved by our Curriculum Committee on September 13, 2022.

In addition to the above, memos in lieu of signatures have also been included by departments unable to obtain physical signatures for their faculty contact and/or department chair.

FIU Engineering & Computing
FLORIDA INTERNATIONAL UNIVERSITY

To: Mary Cossio
Faculty Senate

From: Faculty Contact and Department Chair

Subject: Memo in Lieu of Curriculum Chair and Dean Signatures for Bulletin #1

Date: September 16, 2022

As instructed by the Faculty Senate, this memo will serve as approval of the attached proposals from ECE Department for Bulletin #1 by faculty contacts (Alexander Perez-Pons) and ECE Department Chair (Deidra Hodges), in lieu of physical signatures. The proposals in this Bulletin were approved by our Curriculum Committee on September 13, 2022.

Course Change Justification

The Electrical and Computer Engineering (ECE) department is requesting a course name change removing IOT from the name and adding to the end of each course name "in ECE". This accomplishes two main objectives, 1) it makes the course more general and not specific to IOT as these courses are part of several programs, tracks, and concentrations, and 2) the name change will directly associate the courses to the ECE department avoiding any possible confusion with the academic unit the course is situated.

The goal is to broaden the opportunity for students within the ECE department to take courses and have them represented appropriately in their transcripts to manifest accurately the content from the course's name. The name change will serve ECE students and the academic unit in promoting the course to the ECE students.

Department of Electrical and Computer Engineering

CNT 4149 Deep Learning in ECE

Catalog Data: This course will focus on the application of deep learning techniques and algorithms on structured and unstructured data. Deep learning frameworks are applied to create models from large datasets.

Prerequisites: **EEL 2880 or COP 2210 or COP 2250 or equivalent or instructor permission**

Corequisites: **None**

Textbooks **Hands-On Machine Learning with Scikit-Learn by Aurelien Geron, O'Reilly Media Inc**

Type: Elective for All BS students

Course Objectives:

This course will teach students different data analysis using deep learning techniques and applications. Students will gain hands on experience on popular open source framework like Tensor Flow, Keras and CNTK. Students will learn about Deep Neural Network, Convolution Neural Network, Recurrent Neural Network and its application to large datasets. Students will learn about automatic feature extraction, build / validate models and perform prediction using large sensor datasets. Student will learn about parameter optimization to improve network performance. Case studies will be provided to assist students in establishing real-world scenarios for data analysis and visualization using deep learning.

Course Learning Outcomes:

At the end of this course, the students will be able to:

- Understand fundamentals of data analytics using Deep Learning
- Knowledge of deep learning architecture and network
- Identify and apply Deep Neural Network to categorize data
- Apply Convolutional Neural Network to classify image data
- Apply Recurrent Neural Network to forecast based on time series and sequential data
- Identify sensor data anomaly using deep learning algorithms
- Learn network parameter optimization to improve performance
- Learn to develop models, predict and visualize results
- Apply Tensor Flow, Keras libraries to develop/optimize network and visualize results using large datasets

Topics Covered:

- Introduction to large dataset
- Deep learning libraries - Tensor Flow/Keras

- Pre-processing techniques for large datasets
- Deep learning algorithms
- Data analysis using Deep Neural Network
- Convolution Neural Network for image classification
- Application of Recurrent Neural Network for sequential data
- Anomaly detection in sensor data using deep learning algorithms
- Python data structures and Tensor Flow API for Analytics
- Deep neural network development and deployment
- Parameter optimization to improve neural network performance
- Data visualization using deep learning

Grading Scheme

Grading Scale: NOTE: There are ***no makeup exams*** offered	
Quiz	20%
Midterm	30%
Final	30%
Final Project	20%

Tentative Grading Scale

A	**100-95**	**B+**	**86-89**	**C+**	**74-77**	**D**	**60-69**
A-	**90-94**	**B**	**82-85**	**C**	**70-73**	**F**	**0-59**
		B-	**78-81**				

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

Department Regulations Concerning Incomplete Grades
To qualify for an Incomplete, a student:
1. Must contact (e.g., phone, email, etc.) the instructor or secretary 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
http://academic.fiu.edu/
http://drc.fiu.edu

Policies:

- **Academic Misconduct:** For work submitted, it is expected that each student will submit their own original work. Any evidence of duplication, cheating or plagiarism will result at least a failing grade for the course.
- **Unexcused Absences:** Two unexcused absences are permitted during the term. More than two will result in the loss of points from your final grade. (**1 point** per absence above two**, 3 points** per absence above 5).
- **Excused Absences:** Only emergency medical situations or extenuating circumstances are excused with proper documentation. After reviewing documentation you are **required to email** a description of the excuse and absence dates as a written record to apons@fiu.edu.
- **On Time:** As in the workplace, on time arrival and preparation are required. Two "lates" are equivalent to one absence. (Leaving class early is counted the same as tardy.)
- **Deadlines:** Assignments are due at the beginning of the class period on the date specified. Assignments submitted late (within 1 week) will receive **half credit.**
- **DO NOT** send assignments by email.
- Instructor reserves right to change course materials or dates as necessary.

Last Update: Pons, 8/30/2022