

 <b>FLORIDA ATLANTIC UNIVERSITY</b>	<b>COURSE CHANGE REQUEST</b> <b>Graduate Programs</b>		UGPC Approval _____ UFS Approval _____ SCNS Submittal _____ Confirmed _____ Banner _____ Catalog _____
	<b>Department</b> EECS  <b>College</b> Engineering and Computer Science		
<b>Current Course Prefix and Number</b> CAP 5768		<b>Current Course Title</b> Introduction to Data Science	
Syllabus must be attached for <b>ANY</b> changes to current course details. See <a href="#">Guidelines</a> . Please consult and list departments that may be affected by the changes; attach documentation. Department of Mathematical Sciences, ITOM, College of Arts& Letters			
<b>Change title to:</b>  <b>Change prefix</b> From: _____ To: _____ <b>Change course number</b> From: _____ To: _____ <b>Change credits*</b> From: _____ To: _____ <b>Change grading</b> From: _____ To: _____ <b>Academic Service Learning (ASL) **</b> Add <input type="checkbox"/> Remove <input type="checkbox"/>		<b>Change description to:</b>  <b>Change prerequisites/minimum grades to:</b>  <b>Change corequisites to:</b>  <b>Change registration controls to:</b> Senior undergraduate students and graduate students  Please list existing and new pre/corequisites, specify AND or OR and include minimum passing grade.	
<b>Effective Term/Year for Changes:</b> Summer 2022		<b>Terminate course? Effective Term/Year for Termination:</b>	
<b>Faculty Contact/Email/Phone</b> Hanqi Zhuang, zhunag@fau.edu, 561.297.3413			
<b>Approved by</b> Department Chair _____ College Curriculum Chair _____ College Dean _____ UGPC Chair _____ UGC Chair _____ Graduate College Dean _____ UFS President _____ Provost _____		<b>Date</b> 2/7/2022 2/7/2022 2/8/2022 _____ _____ _____ _____ _____	

Email this form and syllabus to [UGPC@fau.edu](mailto:UGPC@fau.edu) 10 days before the UGPC meeting.

# CAP 5768 Introduction to Data Science

3 credits

Semester: TBD

Instructor: TBD



TA name: TBD  
Office: TBD  
Office hours: TBD  
Phone: TBD  
Email: TBD

## Course Description

This course surveys foundational topics in data science and reinforces practical programming skills in the context of data analytics. Students learn fundamentals of computational data analysis using statistics and machine learning and gain experience working with data sets from a variety of domains.

## Instructional Method

In person.

## Prerequisites/Corequisites

*Prerequisites: Programming competency at the level of an online short course (e.g., Code Academy)*

## Course Objectives/Student Learning Outcomes

In this course, students will:

1. Gain proficiency using the Python programming language and its associated libraries to perform a wide variety of data analysis techniques.
2. Learn to effectively use data visualization to explore data and report results.
3. Understand what it is to develop statistical models, when and why models are needed, the limitations of models, and how models can be used to support conclusions.
4. Understand commonalities and practical differences between various machine learning methods.

### *COVID-19 Statement*

*Due to the surge in COVID-19 cases and the omicron variant, all students regardless of vaccination status are expected to wear masks while indoors in any FAU facilities, including classrooms and laboratories. Students experiencing flu-like symptoms (fever, cough, shortness of breath) or students who have come in contact with confirmed positive cases of COVID-19 should immediately contact FAU Student Health Services (561-297-3512). Symptomatic students will be asked to leave the classroom to support the safety and protection of the university community. For additional information visit [www.fau.edu/coronavirus](http://www.fau.edu/coronavirus). In classes with face-to-face components, quarantined students should notify me immediately as you will not be able to attend class. I will not be able to offer an online version of the class but will make reasonable efforts to assist students in making up the work.*

5. Become resourceful and capable of navigating the web of online data analysis resources.
6. Become more discriminating in their assessment of published results.

## Course Evaluation Method

Hands-on assignments	60%
Tests (2 x 20%)	40%

There are 6 (six) hands-on assignments. They will consist of data manipulation, visualization, and analysis projects using simulated and real data sets. The tests will cover conceptual aspects of data science.

## Course Grading Scale

In keeping with University policy, students will be graded on a scale of A through F according to the following schedule:

Total points	100-93	92.9-90	89.9-87	86.9-83	82.9-80	79.9-77	76.9-73	72.9-70	69.9-67	66.9-63	62.9-60	<60
Grade	A	A-	B+	B	B-	C+	C	C-	D+	D	D-	F

## Policy on Makeup Tests, Late Work, and Incompletes

*Makeup tests* are given only if there is solid evidence of a medical or otherwise serious emergency that prevented the student of participating in the exam. Makeup exam should be administered and proctored by department personnel unless there are other pre-approved arrangements.

Assignments are usually due by 11:59 PM on the due date indicated in the course schedule.

**Late assignments will be graded with a penalty of 10% of the grade for each day after the assignment's due date, up to a maximum of 3 days late (i.e., 30% penalty), beyond which the assignment will receive a grade 0 (zero).**

*Incomplete grades* are given only if there is solid evidence of medical or otherwise serious emergency situation and the student is currently passing the class.

## Classroom Etiquette Policy

Disruptive behavior is defined in the FAU Student Code of Conduct as "... activities which interfere with the educational mission within classroom." Students who disrupt the educational experiences of other students and/or the instructor's course objectives in a face-to-face or online course are subject to disciplinary action. Such behavior impedes students' ability to learn or an instructor's ability to teach. Disruptive behavior may include but is not limited to non-approved use of electronic devices (including cellular telephones); cursing or shouting at others

in such a way as to be disruptive; or, other violations of an instructor's expectations for classroom conduct.

For more information, please see the [FAU Office of Student Conduct](#).

### **Netiquette**

Due to the casual communication common in the online environment, students are sometimes tempted to relax their grammar, spelling, and/or professionalism. Please remember that you are adult students and professionals—your communication should be appropriate. For more in-depth information, please see the [FAU statement on netiquette](#).

## **Policy on the Recording of Lectures**

Students enrolled in this course may record video or audio of class lectures for their own personal educational use. A class lecture is defined as a formal or methodical oral presentation as part of a university course intended to present information or teach students about a particular subject. Recording class activities other than class lectures, including but not limited to student presentations (whether individually or as part of a group), class discussion (except when incidental to and incorporated within a class lecture), labs, clinical presentations such as patient history, academic exercises involving student participation, test or examination administrations, field trips, and private conversations between students in the class or between a student and the lecturer, is prohibited. Recordings may not be used as a substitute for class participation or class attendance and may not be published or shared without the written consent of the faculty member. Failure to adhere to these requirements may constitute a violation of the University's Student Code of Conduct and/or the Code of Academic Integrity.

**By registering for this class, the students hereby consent to recording of the class and potential use of the class material for other purposes.**

## **Attendance Policy**

Students are expected to attend all of their scheduled University classes and to satisfy all academic objectives as outlined by the instructor. The effect of absences upon grades is determined by the instructor, and the University reserves the right to deal at any time with individual cases of non-attendance. Students are responsible for arranging to make up work missed because of legitimate class absence, such as illness, family emergencies, military obligation, court-imposed legal obligations or participation in University-approved activities. Examples of University-approved reasons for absences include participating on an athletic or scholastic team, musical and theatrical performances and debate activities. It is the student's responsibility to give the instructor notice prior to any anticipated absences and within a reasonable amount of time after an unanticipated absence, ordinarily by the next scheduled class meeting. Instructors must allow each student who is absent for a University-approved reason the opportunity to make up work missed without any reduction in the student's final course grade as a direct result of such absence.

## ONLINE ATTENDANCE POLICY

Since the course is mostly online, you should access the course **at least three times per week** to ensure you do not miss pertinent postings, messages, or announcements. It is imperative that you meet course deadlines and stay active in discussion boards, group projects, etc. If you are experiencing major illness, absences due to University duties, or other large-scale issues, contact the instructor immediately to formulate a resolution.

## Counseling and Psychological Services (CAPS) Center

Life as a university student can be challenging physically, mentally and emotionally. Students who find stress negatively affecting their ability to achieve academic or personal goals may wish to consider utilizing FAU's Counseling and Psychological Services (CAPS) Center. CAPS provides FAU students a range of services – individual counseling, support meetings, and psychiatric services, to name a few – offered to help improve and maintain emotional well-being. For more information, go to <http://www.fau.edu/counseling/>

## Disability Policy

In compliance with the Americans with Disabilities Act Amendments Act (ADAAA), students who require reasonable accommodations due to a disability to properly execute coursework must register with Student Accessibility Services (SAS) and follow all SAS procedures. SAS has offices across three of FAU's campuses – Boca Raton, Davie and Jupiter – however disability services are available for students on all campuses. For more information, please visit the SAS website at [www.fau.edu/sas/](http://www.fau.edu/sas/).

## Code of Academic Integrity

Students at Florida Atlantic University are expected to maintain the highest ethical standards. Academic dishonesty is considered a serious breach of these ethical standards, because it interferes with the university mission to provide a high-quality education in which no student enjoys an unfair advantage over any other. Academic dishonesty is also destructive of the university community, which is grounded in a system of mutual trust and places high value on personal integrity and individual responsibility. Harsh penalties are associated with academic dishonesty. For more information, see [University Regulation 4.001](#).

## Required Texts/Readings

Python Data Science Handbook: Essential Tools for Working with Data, 1<sup>st</sup> Edition  
Author: Jake VanderPlas; ISBN-13: 978-1491912058

**The web-based version of the book is freely available online via FAU Libraries. See Canvas for details.**

## Supplementary/Recommended Readings

Additional reading materials will be provided during the course.

## Course Topical Outline

Week 1: Introduction: What is Data Science?

Week2: Tools: Python, IPython, and Jupyter notebooks

Week 3: Tools: NumPy, Matplotlib, and Pandas

Week 4: Visualization techniques and exploratory data analysis (EDA)

Week 5: Using data to answer questions

Week 6: Selected topics in statistics and probability

Week 7: Statistical hypothesis testing, p-values, p-hacking, and Bayesian inference

Week 8: Introduction to Machine Learning

Week 9: Unsupervised machine learning: Clustering

Week 10: Unsupervised machine learning: Dimensionality reduction and manifold learning

Week 11: Supervised machine learning: Naive Bayes, k-nearest neighbors

Week 12: Supervised machine learning: linear regression, multiple regression, logistic regression

Week 13: Supervised machine learning: Decision trees and neural networks

Week 14: Introduction to Deep Learning

Week 15: Data Science beyond the code: ethical and legal considerations

The instructor reserves the right to adjust this syllabus as necessary.

**From:** Hanqi Zhuang <zhuang@fau.edu>  
**Sent:** Thursday, January 27, 2022 8:45 AM  
**To:** Stephen Locke <lockes@fau.edu>  
**Cc:** Mihaela Cardei <mcardei@fau.edu>  
**Subject:** CAP 5768

Hi Steve,

Happy New Year!

CAP 5768 does not have a pre-requisite that controls student registrations. One freshman took and failed the course. To prevent this from happening again, we proposed to add "**Senior and Graduate students**" in the Registration Control. See attached.

Let me know if you approve.

Thanks,  
Hanqi

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**From:** Stephen Locke <lockes@fau.edu>  
**Date:** Thursday, January 27, 2022 at 12:29 PM  
**To:** Hanqi Zhuang <zhuang@fau.edu>, Lun-Ching Chang <changl@fau.edu>  
**Cc:** Mihaela Cardei <mcardei@fau.edu>, William Kalies <WKALIES@fau.edu>, Vincent Naudot <vnaudot@fau.edu>  
**Subject:** Re: CAP 5768

Even with that restriction, you might get senior undergraduate students with no background trying the course.

But, I certainly approve of at least putting some restriction on students coming in.

Let me give Lun-Ching and Bill a chance to chime in.

Stephen

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**From:** William Kalies <WKALIES@fau.edu>  
**Sent:** Thursday, January 27, 2022 11:18 PM  
**To:** Stephen Locke <lockes@fau.edu>; Hanqi Zhuang <zhuang@fau.edu>; Lun-Ching Chang <changl@fau.edu>  
**Cc:** Mihaela Cardei <mcardei@fau.edu>; Vincent Naudot <vnaudot@fau.edu>  
**Subject:** Re: CAP 5768

Hello Hanqi and Stephen

The registrar brought this issue to our attention at the UGPC yesterday. I think a more global solution will be discussed over the course of the semester as there are no default registration controls on undergrads registering in 5000-level courses (those controls exist for 6000-level and above). I think in the meantime, this solution OK with me for this course, but I think for collegiality this should be sent to the entire MSDSA committee for comment/approval before going to UGPC.

I can send it to the committee tomorrow (I need to schedule a meeting of the committee as well).

Bill

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Bill Kalies  
Associate Dean for Graduate Studies  
Charles E. Schmidt College of Science  
Professor of Mathematical Sciences

Florida Atlantic University  
777 Glades Rd, SE-43, Room 242  
Boca Raton, FL 33431  
tel: 561-297-1107

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**From:** Mihaela Cardei <mcardei@fau.edu>  
**Sent:** Monday, January 31, 2022 12:20 PM  
**To:** William Trapani <wtrapan1@fau.edu>; Vincent Naudot <vnaudot@fau.edu>; Taghi Khoshgoftaar <khoshgof@fau.edu>; Karen Dye <kchinand@fau.edu>  
**Cc:** William Kalies <WKALIES@fau.edu>; Tamara Dinev <tdinev@fau.edu>; Hanqi Zhuang <zhuang@fau.edu>  
**Subject:** CAP 5768, revision of the Registration Control

Dear MS DSA Committee,

The core course "CAP 5768 Introduction to Data Science" does not have a pre-requisite that controls student registrations. In Fall 2021, one freshman enrolled in the class and failed the course, see the email below. To prevent this from happening again, we proposed to add "**Senior and Graduate students**" in the Registration Control. See attached.

Please let me know if you approve.

Thanks,  
Mihaela Cardei

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**From:** Karen Dye <kchinand@fau.edu>  
**Sent:** Monday, January 31, 2022 12:23 PM  
**To:** Mihaela Cardei <mcardei@fau.edu>  
**Subject:** Re: CAP 5768, revision of the Registration Control

Yes, I approve of this pre-requisite.

I'll be in touch hopefully by end of the day with the other request regarding the electives. Thanks for the reminder!

Karen

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**From:** Taghi Khoshgoftaar <khoshgof@fau.edu>  
**Sent:** Monday, January 31, 2022 12:30 PM  
**To:** Mihaela Cardei <mcardei@fau.edu>; William Trapani <wtrapan1@fau.edu>; Vincent Naudot <vnaudot@fau.edu>; Karen Dye <kchinand@fau.edu>  
**Cc:** William Kalies <WKALIES@fau.edu>; Tamara Dinev <tdinev@fau.edu>; Hanqi Zhuang <zhuang@fau.edu>  
**Subject:** Re: CAP 5768, revision of the Registration Control

Hi Mihaela,

One minor change:

**"Senior and Graduate students" to "Senior Undergraduate students and Graduate students".**

Thanks.

Taghi

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**From:** Mihaela Cardei <mcardei@fau.edu>

**Sent:** Monday, January 31, 2022 12:35 PM

**To:** Taghi Khoshgoftaar <khoshgof@fau.edu>; William Trapani <wtrapan1@fau.edu>; Vincent Naudot <vnaudot@fau.edu>; Karen Dye <kchinand@fau.edu>

**Cc:** William Kalies <WKALIES@fau.edu>; Tamara Dinev <tdinev@fau.edu>; Hanqi Zhuang <zhuang@fau.edu>

**Subject:** Re: CAP 5768, revision of the Registration Control

Thank you, Taghi, for the correction. The revised document is attached.

thanks,

Mihaela

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**From:** Vincent Naudot <vnaudot@fau.edu>

**Sent:** Monday, January 31, 2022 12:55 PM

**To:** Mihaela Cardei <mcardei@fau.edu>

**Subject:** Re: CAP 5768, revision of the Registration Control

**I am fine with the changes!**

Vct

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