

# Cloud Computer Systems and Applications

EEL 6761

**Class Periods:** T | Period 2 - 3 (8:30 AM - 10:25 AM), R | Period 3 (9:35 AM - 10:25 AM)

**Location:** LAR 0239

**Academic Term:** Spring 2022

## **Instructor:**

Name: José Fortes

Email Address: fortes@ufl.edu

Office Phone Number: 352-392-9265

Office Hours: T 1 pm, W 11 am or by appointment.

## **Teaching Assistant/Peer Mentor/Supervised Teaching Student:**

Please contact through the Canvas website

- TBA

## **Course Description**

3 credits. A broad introduction to cloud and distributed computing, big data platforms and intelligent platforms. It covers system architecture, programming models, algorithmic design, and big data applications. Selected applications will be used as case studies.

## **Course Pre-Requisites / Co-Requisites**

EEL 5737 or EEL 5764. Instructor approval possible if student demonstrates familiarity with algorithms, data structure, computer systems, and programming (such as Java, Python, C/C++, Go, Scala). (To request a prerequisite waiver the student should email to [registration@ece.ufl.edu](mailto:registration@ece.ufl.edu) ).

## **Course Objectives**

Large-scale computer and software systems are increasingly complex, diverse and distributed to computational clouds and other large infrastructures. The use of these systems requires understanding of the interfaces provided by cloud systems and their unique advantages, such as scalability, reliability and on-demand usage. Learning objectives include (1) how to understand the fundamental aspects of distributed computing, (2) how to examine cloud computing software stacks, and (3) how to identify, construct, combine and evaluate cloud platforms for data analytics, high-performance computing, information processing, data communication and intelligent systems.

## **Materials and Supply Fees**

None.

## **Required Textbooks and Software**

- Cloud Computing for Science and Engineering
- Ian Foster and Dennis B. Gannon, The MIT Press
- 2017
- ISBN-13: 978-0262037242
- ISBN-10: 9780262037242

## **Recommended Materials**

- Distributed Systems
- Maarten van Steen and Andrew S. Tanenbaum
- Edition 3, Version 01 (February 2017)
- ISBN-13: 978-1543057386, ISBN-10: 1543057381

## **Course Schedule**

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- Week 1: Introduction to distributed and cloud computing
- Week 2: Computation and communication architectures. Homework 1 on self-configuration.
- Week 3: Naming and coordination of distributed systems
- Week 4: Consistency and replication. Homework 1 due. Homework 2 on coordination and synchronization.
- Week 5: Fault-tolerant systems
- Week 6: Data management on the cloud. Homework 2 due.
- Week 7: Scalable cloud computation
- Week 8: Midterm exam and assignment of project on distributed system evaluation
- Week 9: Data analytics in the cloud
- Week 10: Streaming data in the cloud
- Week 11: Machine learning in the cloud
- Week 12: Security and privacy in cloud computing
- Week 13: Cloud management and microservices
- Week 14: Advanced topics
- Week 15: Advanced topics. Project reports and presentations due.

**Attendance Policy, Class Expectations, and Make-Up Policy**

Excused absences must be in compliance with university policies in the Graduate Catalog (<http://gradcatalog.ufl.edu/content.php?catoid=10&navoid=2020#attendance>) and require appropriate documentation.

**Evaluation of Grades**

Grades are based on student performance on homework, in-class midterm exam, individual project contribution and an in-class presentation describing project objectives, approaches, evaluation, conclusions, and improvement suggestions.

Assignment	Total Points	Percentage of Final Grade
Homework Sets (2)	200	25%
Midterm Exam	200	25%
Final Presentation	200	25%
Project	200	25%
		100%

**Project Grading**

**Phase 1** – Conceptual understanding and design (70 points)

**Phase 2** – Implementation and evaluation (70 Points)

**Phase 3** – Report and presentation (60 points)

**Grading Policy**

Percent	Grade	Grade Points
85.0 - 100.0	A	4.00
82.0 - 84.9	A-	3.67
79.0 - 81.9	B+	3.33
76.0 – 78.9	B	3.00
73.0 - 75.9	B-	2.67
70.0 - 72.9	C+	2.33
67.0 – 69.9	C	2.00
64.0 - 66.9	C-	1.67
61.0 - 63.9	D+	1.33
58.0 – 60.9	D	1.00
55.0 – 57.9	D-	0.67
0 - 54.9	E	0.00

More information on UF grading policy may be found at:

<http://gradcatalog.ufl.edu/content.php?catoid=10&navoid=2020#grades>

**Students Requiring Accommodations**

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Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, <https://www.dso.ufl.edu/drc>) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.

### ***Course Evaluation***

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at <https://gatorevals.aa.ufl.edu/students/>. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via <https://ufl.bluera.com/ufl/>. Summaries of course evaluation results are available to students at <https://gatorevals.aa.ufl.edu/public-results/>.

### ***University Honesty Policy***

UF students are bound by The Honor Pledge which states, “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.” The Honor Code (<https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/>) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

### ***Commitment to a Safe and Inclusive Learning Environment***

The Herbert Wertheim College of Engineering values broad diversity within our community and is committed to individual and group empowerment, inclusion, and the elimination of discrimination. It is expected that every person in this class will treat one another with dignity and respect regardless of gender, sexuality, disability, age, socioeconomic status, ethnicity, race, and culture.

If you feel like your performance in class is being impacted by discrimination or harassment of any kind, please contact your instructor or any of the following:

- Your academic advisor or Graduate Program Coordinator
- Robin Bielling, Director of Human Resources, 352-392-0903, [rbielling@eng.ufl.edu](mailto:rbielling@eng.ufl.edu)
- Curtis Taylor, Associate Dean of Student Affairs, 352-392-2177, [taylor@eng.ufl.edu](mailto:taylor@eng.ufl.edu)
- Toshikazu Nishida, Associate Dean of Academic Affairs, 352-392-0943, [nishida@eng.ufl.edu](mailto:nishida@eng.ufl.edu)

### ***Software Use***

All faculty, staff, and students of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.

### ***Student Privacy***

There are federal laws protecting your privacy with regards to grades earned in courses and on individual assignments. For more information, please see: <https://registrar.ufl.edu/ferpa.html>

### ***Campus Resources:***

## Health and Wellness

### **U Matter, We Care:**

Your well-being is important to the University of Florida. The U Matter, We Care initiative is committed to creating a culture of care on our campus by encouraging members of our community to look out for one another and to reach out for help if a member of our community is in need. If you or a friend is in distress, please contact [umatter@ufl.edu](mailto:umatter@ufl.edu) so that the U Matter, We Care Team can reach out to the student in distress. A nighttime and weekend crisis counselor is available by phone at 352-392-1575. The U Matter, We Care Team can help connect students to the many other helping resources available including, but not limited to, Victim Advocates, Housing staff, and the Counseling and Wellness Center. Please remember that asking for help is a sign of strength. In case of emergency, call 9-1-1.

**Counseling and Wellness Center:** <http://www.counseling.ufl.edu/cwc>, and 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

### **Sexual Discrimination, Harassment, Assault, or Violence**

If you or a friend has been subjected to sexual discrimination, sexual harassment, sexual assault, or violence contact the [Office of Title IX Compliance](#), located at Yon Hall Room 427, 1908 Stadium Road, (352) 273-1094, [title-ix@ufl.edu](mailto:title-ix@ufl.edu)

### **Sexual Assault Recovery Services (SARS)**

Student Health Care Center, 392-1161.

**University Police Department** at 392-1111 (or 9-1-1 for emergencies), or <http://www.police.ufl.edu/>.

## Academic Resources

**E-learning technical support**, 352-392-4357 (select option 2) or e-mail to [Learning-support@ufl.edu](mailto:Learning-support@ufl.edu).  
<https://lss.at.ufl.edu/help.shtml>.

**Career Resource Center**, Reitz Union, 392-1601. Career assistance and counseling. <https://www.crc.ufl.edu/>.

**Library Support**, <http://cms.uflib.ufl.edu/ask>. Various ways to receive assistance with respect to using the libraries or finding resources.

**Teaching Center**, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring.  
<https://teachingcenter.ufl.edu/>.

**Writing Studio**, 302 Tigert Hall, 846-1138. Help brainstorming, formatting, and writing papers.  
<https://writing.ufl.edu/writing-studio/>.

**Student Complaints Campus:** [https://www.dso.ufl.edu/documents/UF\\_Complaints\\_policy.pdf](https://www.dso.ufl.edu/documents/UF_Complaints_policy.pdf).

**On-Line Students Complaints:** <http://www.distance.ufl.edu/student-complaint-process>.