

Standardized Syllabus for the College of Engineering

EEL 6871 Software-defined Computing Systems

1. *Catalog Description (including credit hours):* Hardware and software models, systems software and software platforms, optimization techniques, predictive modeling, experiment design, adaptive and feedback-based computing, monitoring techniques and applications in networking, cluster systems, cloud computing, storage, data systems, systems management and datacenters. 3 credits.
2. *Pre-requisites and Co-requisites:* introduction to programming or data structures and algorithms (EEL4834 or equivalent) and principles of computer systems design (EEL5737 or equivalent) or instructor approval.
3. *Course objectives:* Large scale computer and software systems are increasingly complex, diverse and outsourced to computational clouds and other large infrastructures. The cooperative management of these systems by either their owners or their providers can only be done effectively and efficiently if programmatic interfaces are exposed for that purpose. This requires computer systems designers to understand a variety of fundamental modeling concepts and management techniques spanning multiple system layers, for both the systems to be designed and the components and services used to build these systems. This course introduces these models and techniques to students, by way of illustrative cases of software-defined systems deployed in industry and academia for a variety of computer, storage and networking applications.
4. *Contribution of course to meeting the professional component (ABET only):* 3 credits of Engineering design
5. *Relationship of course to program outcomes (ABET only):*
EE2 - knowledge of mathematics, basic and engineering sciences necessary to analyze and design complex systems
a - an ability to apply knowledge of mathematics, science, and engineering.
c - an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
e - an ability to identify, formulate, and solve engineering problems
k - an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
6. *Instructor:* Dr. Jose Fortes
 - a. *Office location:* 339 Larsen Hall
 - b. *Telephone:* 352-3929265
 - c. *E-mail address:* fortes@ufl.edu
 - d. *Web site:* <https://www.acis.ufl.edu/people/fortes>
 - e. *Office hours:* TBD
7. *Teaching Assistant:* TBD
 - a. *Office location:* TBD
 - b. *Telephone:* TBD
 - c. *E-mail address:* TBD

- d. *Office hours*: TBD
- 8. *Meeting Times*: TBD
- 9. *Class/laboratory schedule, i.e., number of sessions each week and duration of each session*: TBD
- 10. *Meeting Location*: TBD
- 11. *Material and Supply Fees*: None
- 12. *Textbooks and Software Required*

None. Instructor will provide papers and access to software and resources.

- 13. *Recommended Reading*:
 - a. Recent conference papers and online resources/documents provided by the instructor
- 14. Course Outline (provide topics covered by week or by class period):
 - Introduction
 - Software-definition versus virtualization and IT-as-a-Service
 - Consumer versus provider perspectives
 - Software-defined networking
 - Openflow and related concepts
 - Software-defined execution environments
 - Definition and scope
 - Examples
 - Abstractions and modeling techniques
 - Abstractions of resources, workloads and service-level agreements
 - Software and hardware development, structural and behavioral models
 - Predictive modeling (linear models, regression, least square, K-nearest neighbor, random forests, etc)
 - Project
 - Software-defined infrastructure
 - Software-defined datacenters
 - Software-defined storage
 - Management, monitoring and operational aspects of software-defined systems
 - Language, runtime and workload orchestration for software-defined systems
 - Other case studies: software-defined file systems, caching, topology, etc
- 15. *Attendance and Expectations (is attendance required, penalties for absence, tardiness, cell phone policy, etc.)*: Attendance is expected from students in order to properly follow class progress. There are no explicit penalties for absence. Cell phones must be off or on mute. Additional class policy guidelines are provided in a separate class policies document.
- 16. *Grading – methods of evaluation* (homework, reports, and projects 80%, exams 20%)
- 17. *Grading Scale*: Letter grades are assigned based on analysis of the curve of numeric grades of the entire class. The guideline is A (90), A- (85), B+ (80), B(75), B- (70), C+ (65), C(60), C- (55), D (50), F (<50).

18. *Make-up Exam Policy*: Make-up exams must be arranged with the instructor to be taken prior to the exam that is being made up for. Students are responsible for contacting the instructor as soon as a scheduling conflict with an exam is identified. Students who do not take an exam and do not make prior arrangements for rescheduling will be assigned a zero grade for the exam.
19. *Honesty Policy* – All students admitted to the University of Florida have signed a statement of academic honesty committing themselves to be honest in all academic work and understanding that failure to comply with this commitment will result in disciplinary action. This statement is a reminder to uphold your obligation as a UF student and to be honest in all work submitted and exams taken in this course and all others.
20. *Accommodation for Students with Disabilities* – Students Requesting classroom accommodation must first register with the Dean of Students Office. That office will provide the student with documentation that he/she must provide to the course instructor when requesting accommodation.
21. *UF Counseling Services* – Resources are available on-campus for students having personal problems or lacking clear career and academic goals. The resources include:
 - University Counseling Center, 301 Peabody Hall, 392-1575, Personal and Career Counseling.
 - SHCC mental Health, Student Health Care Center, 392-1171, Personal and Counseling.
 - Center for Sexual Assault/Abuse Recovery and Education (CARE), Student Health Care Center, 392-1161, sexual assault counseling.
 - Career Resource Center, Reitz Union, 392-1601, career development assistance and counseling.
22. *Software Use* – All faculty, staff and student 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.

Note: Statements in items 19-22, should be included as is.