EEL 5764  Computer Architecture

1. Catalog Description – (3 credits) Fundamentals in design and quantitative analysis of modern computer architecture and systems, including instruction set architecture, basic and advanced pipelining, superscalar and VLIW instruction-level parallelism, memory hierarchy, storage, and interconnects.

2. Pre-requisites and Co-requisites - EEL 4713C, 4744C, or equivalents

3. Course Objectives – An entry-level graduate course in computer architecture, compilers, operating systems, programming languages, VLSI designs, application and specific architectures.

4. Contribution of course to meeting the professional component (ABET only – undergraduate courses) -

5. Relationship of course to program outcomes: Skills student will develop in this course (ABET only undergraduate courses) -

6. Instructor – Dr. Tao Li
   a. Office location: 339D Larsen Hall
   b. Telephone: 352-392-9510
   c. E-mail address: taoli@ece.ufl.edu
   d. Class Web site: https://lss.at.ufl.edu/
   e. Office hours: Tues, Thurs, 3:00 p.m.-4:00 p.m.

7. Teaching Assistant – Shuo Jia
   a. Office location: 335 Benton
   b. Telephone: 352-278-6495
   c. E-mail address: shuojia@ufl.edu
   d. Office hours: Wed, Fri, 4:00-5:00 p.m.

    Teaching Assistant – Meng Wang
    a. Office location: 406 NEB
    b. Telephone: 352-327-0181
    c. E-mail address: wm8120@ufl.edu
    d. Office hours: Mon, Wed, 11:00 a.m.-Noon

8. Meeting Times – Tues 5th-6th period, Thurs 6th period

9. Class/laboratory schedule - 3 class periods consisting of 50 minutes each

10. Meeting Location – 201 NEB

11. Material and Supply Fees - None
12. Textbooks and Software Required -
   a. Title: Computer Architecture: A Quantitative Approach
   b. Author: John L. Hennessy, David Patterson
   c. Publication date and edition: 2012, Morgan Kaufman
   d. ISBN number: 978---0123838728

13. Recommended Reading -
   a. Title: Computer Organization and Design
   b. Author: David A. Patterson, John L. Hennessy
   c. Publication date and edition: 2004, Morgan Kaufmann
   d. ISBN number: 1558606041

   a. Title: Modern Processor Design: Fundamentals of Superscalar Processors
   b. Author: John Paul Shen, Mikko H. Lipasti
   d. ISBN number: 0-07-057064-7

14. Course Outline –
   Fundamentals of Computer Design
      Performance, Power, Reliability, etc
   Instruction Level Parallelism (ILP) and its Exploitation
      Pipelining
      Compiler Techniques for Exposing ILP
      Hardware-Based Speculation
      Out-of-order execution, Multiple Issue
      Dynamic Branch Prediction
   Memory Hierarchy Design
      Advanced Optimizations of Cache Performance
      Virtual Memory
   Data-Level Parallelism in Vector, SIMD, and GPU Architecture
   Multiprocessors and Thread-Level Parallellism
      Symmetric Shared-Memory Architecture (SMP)
      Distributed Shared Memory and Directory-Based Coherence (DSM)
      Synchronization
   The Warehouse-Scale Computer and Data Center
   Storage and Interconnect

15. Attendance and Expectations - Cell phones and other electronic devices are to be silenced. No text messaging during class or exams. No make-up exams will be given except for a medically documented incapability or family emergency. Homework is due by the end of class. Late homework will not be accepted. Re-grading requests must be submitted within 3 days after the graded materials are handed back. Attach a separate sheet to explain reasons for the request.
Requirements for class attendance and make-up exams, assignments, and other work are consistent with university policies that can be found at:

[https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx](https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx)

16. Grading – 50% - Homework; 25% - Exam 1; 25% - Exam 2

17. Grading Scale (e.g., 90-100 A, 85-89 B+, 80-84 B, etc.) If grades are to be curved, so state. Values should not overlap and the full grade to percentage/points map must be included.

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Undergraduate students, in order to graduate, must have an overall GPA and an upper-division GPA of 2.0 or better (C or better). Note: a C- average is equivalent to a GPA of 1.67, and therefore, it does not satisfy this graduation requirement.

Graduate students, in order to graduate, must have an overall GPA of 3.0 or better (B or better).” Note: a B- average is equivalent to a GPA of 2.67, and therefore, it does not satisfy this graduation requirement. For more information on grades and grading policies, please visit:

[https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx](https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx)

18. Make-Up Exam Policy - If you have a University-approved excuse and arrange for it in advance, or in case of documented emergency, a make-up exam will be allowed and arrangements can be made for making up missed work. University attendance policies can be found at:

[https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx](https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx)

Otherwise, make-up exams will be considered only in extraordinary cases, and must be taken before the scheduled exam. The student must submit a written petition to the instructor two weeks prior to the scheduled exam and the instructor must approve the petition.

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.

“...failure to comply with this commitment will result in disciplinary action compliant with the UF Student Honor Code Procedures ([http://www.dso.ufl.edu/sccr/procedures/honorcode.php](http://www.dso.ufl.edu/sccr/procedures/honorcode.php))

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:
   - UF Counseling & Wellness Center, 3190 Radio Rd, 392-1575, psychological and psychiatric services.
   - Career Resource Center, Reitz Union, 392-1601, career and job search services.

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.