# GRADUATE SCHOOL OF

# ENGINEERING AND MANAGEMENT

**Department of Electrical and Computer Engineering**

**CSCE 692**

**Design Principles of Computer Architecture**

**Winter 2019 - Course Syllabus**

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| **Meeting Times** | 0800-0950, Tuesday and Thursday |
| **Location** | Building 640, Room 338 |
| **Instructor** | Dr. Scott Graham |
| **Office Location** | Bldg 640, Room 327 |
| **Office hours** | 1000 – 1100 Tuesdays, 1300-1400 Thursdays. Also available by appt. |
| **Contact Information** | scott.graham@afit.edu |

**Course Description:**

The objective of this course is for the student to understand and be able to apply fundamental principles of computer architecture design. An emphasis is placed upon the use of quantitative metrics to evaluate cost/performance tradeoffs and upon the use of actual performance data to evaluate design alternatives. Specific topics include construction set architecture design, pipelining, super scalar/VLIW processors, out-of-order execution, compiler optimization, memory system design, and input/output systems.

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| **Credits** | 4 |
| **Prerequisites** | CSCE 489 and CSCE 492 (or equivalents) |

**Student Learning Objectives:**

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| 1 | Apply foundational scientific concepts and sound computer science principles to efficiently and effectively advance Air Force and DoD technological capabilities. |
| 2 | Become well-educated, highly-valued, and successful engineers and scientists. |
| 3 | Significantly contribute to technical interdisciplinary team projects. |
| 4 | Professionally communicate technical solutions and results. |
| 5 | Continue to pursue lifelong multidisciplinary learning as professional engineers and scientists. |

**Required Books and Resource Materials:**

# John L. Hennessy and David L. Patterson, Computer Architecture: A Quantitative Approach, 6th Edition, Morgan Kaufmann, 2017.

**Recommended/Optional Books and Resource Materials:**

# David L. Patterson and John L. Hennessy, Computer Organization and Design: the Hardware/Software Interface, 5th Edition, Morgan Kaufmann, 2013.

**Grading Scheme/Policy:**

Homework - 25%, Midterm - 25%, Lab - 25%, Final Exam - 25%. Completion of all assignments, labs, and exams is required to pass the course. Final course grades will use the following grade scale:

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **A** | **A-** | **B+** | **B** | **B-** | **C+** | **C** | **C-** | **D+** | **D** | **D-** | **F** |
| **93+** | **90+** | **87+** | **83+** | **80+** | **77+** | **73+** | **70+** | **67+** | **63+** | **60+** | **<60** |

# Policies:

* 1. **Attendance:** Attendance at all class sessions and exams is mandatory for military and civilians assigned to AFIT as full-time students except for extenuating circumstances. Part-time students are expected to attend scheduled classes, and absences should be explained to the instructor. For additional information, see reference documents located at: <http://cs.eis.afit.edu/org/enstudents/en_senior_student_leaders/default.aspx>
     1. **Missing Class.** Students who need to miss class must follow the AFIT “Missing Class” procedures at outlined on page 36 of the AFIT Student Handbook (15AY Edition).
     2. **Inclement Weather.** Winter quarter classes are susceptible to cancellation as directed by 88th ABW policies with regard to base closing due to inclement weather. See current guidance on “Snow/Inclement Weather Delays” on page 45 of the Student Handbook (15AY Edition).
  2. **Academic Integrity:** Plagiarism and cheating will not be tolerated. “[A] piece of writing that has been copied from someone else and is presented as being your own work” is an example of plagiarism*.* Similarly “…taking someone's words or ideas as if they were your own” is also plagiarism [WordNet ® 1.6, © 1997 Princeton University]*.* Students are prohibited from engaging in plagiarism, cheating, misrepresentation, or any other act constituting a lack of academic integrity. Individuals who violate this policy are subject to adverse administrative action including disenrollment from school and disciplinary action. Individuals subject to the Uniform Code of Military Justice may be prosecuted under it. Violations by government civilian employees may result in administrative disciplinary action without regard to otherwise applicable criminal or civil sanctions for violations of related laws. (References: Student Handbook, ENOI 36 – 107, *Academic Integrity*).
  3. **Homework:** Homework will be assigned, collected, and graded. Late homework will not receive credit. For assignments and projects in this course, discussion and cooperative learning of a general nature is allowed and, in fact, encouraged as students work together to solve problems. However, using another person’s programs, specific algorithms, or other detailed solutions to assigned problems is an honor code violation. Solutions that are turned in for grading are expected to be the original work of the individual student.
  4. **Labs**: Lab 1 is a small cache simulation exercise worth 5% of course grade. Lab 2 is the first of a two-part design tradeoff project. Lab 2 is worth 5% and Phase 2 is worth 15% of the course grade.
  5. **Testing Policy:** Exams are to be worked solely by the individual. There will be no collaboration of any kind on exams. Exams will be take-home.
  6. **Academic Grievance:** AFIT and the Graduate School of Engineering and Management affirm the right of each student to resolve grievances with the Institution. Students are guaranteed the right of fair hearing and appeal in all matters of judgment of academic performance. Procedures are detailed in ENOI 36 – 138, *Student Academic Performance Appeals*.
  7. **Course Material, Announcements and Communication.** Electronic copies of course material to include the schedule, lecture slides, homework assignments, and project assignments will be made available on CANVAS.

*The course syllabus is a general plan for the course; deviations announced to the class by the instructor may be necessary.*