Syllabus

Department: Computer Science & Information Systems
Course Title: CSC 405 Computer Architecture
Credit Hours: 4

Instructor's Name: R. A. Pilgrim
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Catalog Description: Applications of digital logic circuits, register transfer logic and assembly language to the design and operation reviewed. Course covers the functional components of the ALU, control unit, memory unit, and I/O communications. Course includes an overview of microcontrollers and single-board computers as applied to embedded systems. A study of parallel and distributed architectures, as well as alternative processor architectures are reviewed. Three hours lecture, two hours of digital logic and embedded systems lab per week.

Purpose: To introduce computer functional organizations and hardware architectures, to explain the basic combinatorial and sequential circuits comprising a digital computer and to review advanced computer architectures used in parallel and distributed processing systems.

Student Learning Objectives: upon completion of this course the student should,

- have an understanding of the von Neumann architecture including the memory unit, control unit, data and control bus structures and I/O techniques.
- be able to design and implement combinatorial and sequential circuits.
- be familiar desktop microprocessor.
- understand how the control and execution of machine language is implemented in hardware.
- recognize advanced architectures including multiprocessors, RISC microprocessors and microcontrollers
- be able to design and implement circuits involving embedded processing elements

Course Outline:
- Boolean Algebra
- Basic Combinatorial Logic
- Combinational Circuit Design
- Sequential Circuit Design
- Finite State Machines
- Computer Arithmetic
- Instruction Set Architectures
- Assembly Language Instructions
- Register Transfer Language
- Design of a Very Simple CPU
• Cache & Virtual Memory
• Input/Output Organization
• Parallel Processing
• Multiprocessor HW/SW Organization
• Parallel Algorithms
• Alternative Parallel Architectures

**Instructional Activities** - Lectures, instructor-directed digital electronics laboratory exercises, homework, and 3 quizzes. In addition, lecture outlines, answers to selected homework problems, sample programs and other course related information will be available on the instructor's academic Web page.

**Resources** - Web Page, online lectures, project/homework/reading assignments, laboratory with digital logic and embedded systems hardware and supporting components

**Grading Procedures** - Course grades will be based on the content and quality of submitted laboratory exercises, homework, projects, test scores and class participation. Letter grades are assigned on a 10-point scale. Tests will be a combination of take-home and in-class elements. Final exam is optional and can count up to 50% of your grade if needed.

- Homework ........................................ 20%
- Laboratory Exercises ..................... 20%
- Class Participation ......................... 10%
- Tests/Quizzes ............................... 50%
- Final Exam ................................. 0-50%

**Attendance Policy** - The class role will be taken periodically. Students are expected to attend class regularly. Frequent absences could affect your homework/class participation grade. Late homework will not be graded for credit. Missed tests will be made up during the final exam.

**Text**: *Computing Machinery: digital logic, computer architecture & microcontrollers*

**Prerequisites**: CSC 301.

**ACADEMIC HONESTY POLICY**:

Murray State University takes seriously its moral and educational obligation to maintain high standards of academic honesty and ethical behavior. Instructors are expected to evaluate students’ academic achievements accurately, as well as ascertain that work submitted by students is authentic and the result of their own efforts, and consistent with established academic standards. Students are obligated to respect and abide by the basic standards of personal and professional integrity. Violations of Academic Honesty include:

- Cheating - Intentionally using or attempting to use unauthorized information such as books, notes, study aids, or other electronic, online, or digital devices in any academic
exercise; as well as unauthorized communication of information by any means to or from others during any academic exercise.

Fabrication and Falsification - Intentional alteration or invention of any information or citation in an academic exercise. Falsification involves changing information whereas fabrication involves inventing or counterfeiting information.

Multiple Submissions - The submission of substantial portions of the same academic work, including oral reports, for credit more than once without authorization from the instructor.

Plagiarism - Intentionally or knowingly representing the words, ideas, creative work, or data of someone else as one’s own in any academic exercise, without due and proper acknowledgement. Disciplinary action may include, but is not limited to the following:

  Requiring the student(s) to repeat the exercise or do additional related exercise(s).
  Lowering the grade or failing the student(s) on the particular exercise(s) involved.
  Lowering the grade or failing the student(s) in the course.

If the disciplinary action results in the awarding of a grade of E in the course, the student(s) may not drop the course.

Faculty reserve the right to invalidate any exercise or other evaluative measures if substantial evidence exists that the integrity of the exercise has been compromised. Faculty also reserve the right to document in the course syllabi further academic honesty policy elements related to the individual disciplines.

A student may appeal the decision of the faculty member with the department chair in writing within five working days. Note: If, at any point in this process, the student alleges that actions have taken place that may be in violation of the Murray State University Non-Discrimination Statement, this process must be suspended and the matter be directed to the Office of Equal Opportunity. Any appeal will be forwarded to the appropriate university committee as determined by the Provost.

NON-DISCRIMINATION POLICY STATEMENT:

Murray State University endorses the intent of all federal and state laws created to prohibit discrimination. Murray State University does not discriminate on the basis of race, color, national origin, gender, sexual orientation, religion, age, veteran status, or disability in employment, admissions, or the provision of services and provides, upon request, reasonable accommodation including auxiliary aids and services necessary to afford individuals with disabilities equal access to participate in all programs and activities. For more information, contact the Director of Equal Opportunity, 103 Wells Hall. 270-809-3155 (voice), 270-809-3361 (TDD).