

# Systems Programming and Architecture - Course Syllabus

Course Number: CS 140

Course Title: Systems Programming and Architecture

Academic Semester:	Spring	Academic Year:	2015/ 2016
Semester Start Date:	Jan 24, 2016	Semester End Date:	May 19, 2016

Class Schedule: Monday/Thursday, 4-5:20

**Classroom Number:** 

Instructor(s) Name(s): Lubomir BIC Email: lubomirbic@gmail.com Office Location: Office Hours:

**Teaching Assistant name:** Email:

Building 1 - Office 3-123

# **COURSE DESCRIPTION FROM PROGRAM GUIDE**

This course provides a comprehensive and unified introduction to operating systems and concurrency control topics. It emphasizes both design issues and fundamental principles in contemporary systems and gives students a solid understanding of the key structures and mechanisms of operating systems. It also prepares the students to master concurrent and parallel programming by exposing the concepts of parallelism, synchronization and mutual exclusion. The course discusses design trade-offs and the practical decisions affecting design, performance and security. The course illustrates and reinforces design concepts and ties them to real-world design choices through the use of case studies.

# **COMPREHENSIVE COURSE DESCRIPTION**

Topics include:

Processes and their interactions (critical sections, cooperation), higher-level synchronization mechanisms, the OS kernel, process and thread scheduling, deadlocks (detection, prevention), physical memory management, virtual memory (paging, segmentation, page replacement algorithms, load control), linking and sharing, file systems, principles of input/output, protection and security (authentication, threats, cryptography, access control, information flow control).

# **GOALS AND OBJECTIVES**

- Give students a good understanding of the basic principles underlying general operating systems and the various design trade-offs.

- Students will be able to write pseudo code as well as actual code to solve some of the above problems.

- Students will be able to analyze and evaluate various trade-offs inherent to the design of systems software.

# **REQUIRED KNOWLEDGE**

Familiarity with programming in a high-level language, such as C, C++, or Java.

# **REFERENCE TEXTS**

- Required Textbook: L. Bic, A. Shaw, Operating Systems Principles, Prentice-Hall, 2003 (ISBN: 0130266116)

- This book is mandatory. It will be used for reading assignments and all homework problems and projects.

- For those who cannot get their own copy of the book, I will make all relevant chapters available as pdf files.

# METHOD OF EVALUATION

#### Graded content

Homework 10% Programming projects 30% Quizzes 30% Final examination 30%

# **COURSE REQUIREMENTS**

#### Assignments

All relevant information including due dates will be posted on the course webpage.

#### **Homework Assignments**

• There will be a set of homework problems for each week. They need to be turned in online by the due date.

• You are allowed to discuss your work with others but all problems must be completed individually, no team work.

• Solutions to homework problems will be presented and discussed in class after each due date.

• Please note: The points earned for homework make up only a relatively small percentage of the total grade and are intended only as an incentive for you to complete and turn in the work on time. However, the problems in the quizzes and the final exam will be very similar to those on the homework. Thus doing the homework is essential for doing well on the quizzes/exam.

#### **Projects:**

• There will be several programming projects to complete, each dealing with a different part of an operating system. These will be presented and discussed in class. They are due on the dates posted on the course website.

• All projects must be done individually, no team work.

# Exams:

- There will be 4 quizzes throughout the semester
- Each quiz will cover the material covered in class since the previous quiz.
- The quiz with the lowest grade will automatically be dropped
- There will one comprehensive final exam.
- · All exams are "closed book/closed notes"
- All exam problems will be similar to the homework problems.

#### Lectures:

- All lectures will be recorded and made available online.
- Copies of lecture notes in PowerPoint will be posted on the course webpage.

### **Course Policies**

#### Late work

• Late work (homework and projects) will be accepted, but a penalty of 10% per day will be imposed. No late homework will be accepted once the solutions have been presented.

# Plagiarism

• You are not allowed to reuse in your projects any portion of a design or code developed by another person or group (during this semester or any previous semesters). Any violation of this rule will result in a failing grade for this course.

• The same applies to all homework assignments.

# **Additional Information**

# NOTE

The instructor reserves the right to make changes to this syllabus as necessary.