**Course Syllabus**

**CS 551-03 – Systems Programming**

**Fall 2024**

**Course Information**

**Instructor:** Zerksis D. Umrigar

**Email:** umrigar+cs571@binghamton.edu

**Office:** EB N-26

**Office hours:** MWF 12:00 – 12:55p in EB N26, or by appointment.

**Zoom**: <https://binghamton.zoom.us/my/umrigar>

**Class Time**:MWF 10:50-11:50a

**Location**: EB 110

**TA**

**Name:**

**Email:**

**Office Hours:** in EB N00.

**Zoom**:

**Course Description**

A detailed study of the application program interface of a modern operating system. File operations, concurrency, processes, threads, inter-process communication, synchronization, client-server programming, multi-tier programming.

**Credit and Contact Hours**

**Credit Hours:** 3

**Contact Hours:** 3 for lecture

**Credit Hours Statement:** This course is a 3-credit course, which means that in addition to the scheduled meeting times, students are expected to do at least 6.5 hours of course-related work outside of class each week during the semester. This includes time spent completing assigned readings, studying for tests and examinations, preparing written assignments, and other course-related tasks.

**Learning Objectives**

* + - * To apply theoretical concepts from other courses in a practical setting.
      * To get a good understanding of programming to the API of a modern operating system.
      * To develop expert proficiency in low-level languages.
      * Largely an applied course; not particularly academic.

**Prerequisites and Corequisites**

Undergraduate Operating Systems

**Relationship to ABET N/A**

**Textbooks and Other Materials**

Recommended

* [TLPI] Michael Kerrisk, The Linux Programming Interface, No Starch Press, 2010.
* Jens Gustedt, Modern C.
* [K&R2] Brian Kernighan and Dennis Ritchie, The C Programming Language, 2nd Edition, 1988.
* Samuel P. Harbison, Guy L. Steele, C: A Reference Manual, 5th Edition, Prentice Hall, 2002.

**Topics/Class Schedule**

* Advanced C programming.
* Overview of the C standard libraries.
* Unix systems introduction.
* File I/O.
* Processes and threads.
* Consequences of computer architecture on performance.
* Inter-process communication.
* Network programming introduction.
* Signals.
* Concurrent programming

**Assignments**

Five Programming Projects:

1. A C program using the standard C library.
2. Using anonymous pipes.
3. A daemon using named pipes.
4. Shared memory.
5. A network client-server.

Four or five Homework Assignments: simple exercises which apply class material + more in-depth questions which may require looking up material not covered in class.

**Grading**

In-class Pop Quizzes (lowest dropped): 11%

Projects (lowest dropped) 24%

Homework (lowest dropped) 15%

Midterm: 25%

Final: 25%

Extra Credit: up to 3% for contributing to an open-source project relevant to the course.

Attendance: up to -16%

**Basis of Grade Determination**

Letter grades will be assigned strictly monotonically based on the numeric course grade.

No fixed cutoffs: letter grade assignment will largely be based on feedback from the TA. A letter grade of A will be given only for consistent superior work.

You will get an F only if you miss turning in a lot of work or submit consistently very poor quality work.

**Course Policies**

### Academic Honesty

* As per the course Academic Honesty Policy cheating of any type will be penalized heavily.
* Minimal penalty: zero on assignment and letter grade dropped by one slot: i.e. an A becomes an A-, a B- becomes a C+, etc. You will also need to sign a Watson college document which will be added to your file.
* Permissible to collaborate to understand course material, homework questions or project assignments. Not permissible to discuss solutions.
* If you feel you may have inadvertently crossed the line, then let us know; will not be considered cheating.
* If submitting an assignment late after the solution has been posted, you should obviously not be looking at the solution.
* All registered students must sign and complete an Academic Honesty Statement at http://zdu.binghamton.edu/cs551/misc/academic-honesty/academic-honesty-statement.pdf which acknowledges reading the CS academic honesty letter <https://zdu.binghamton.edu/cs551/misc/academic-honesty/cs-honesty-letter.pdf> and links to the Watson Academic Honesty policy at <https://www.binghamton.edu/watson/about/honesty-policy.pdf>.

Late Policy

You are allowed to submit assignments late by up to 3 days.

* + You may not use more than 7 late days over all assignments over the entire semester.
  + A day will count as 24 hours, irrespective of holidays or weekends.
  + Late submissions will not be accepted for some assignments, especially before an exam or towards the end of the semester.

**Managing Stress and Disabilities**

* If you are having problems, please see me ASAP; do not wait till the end of the semester.
* Flexible regarding deadlines under exceptional circumstances.
* If you are experiencing undue personal or academic stress at any time during the semester or need to talk with someone about a personal problem or situation, I encourage you to seek support as soon as possible. I am available to talk with you about stresses related to your work in my class.

**Campus Offices for Assistance:**

* Dean of Students Office: 607-777-2804
* Care Team : <https://www.binghamton.edu/services/care-team/index.html>.
* Decker Student Health Services Center: 607-777-2221
* University Police: Emergency: 911 (campus phones); 607-777-2222 (cell phones), Non-Emergency: 607-777-2393
* University Counseling Center: 607-777-2772
* Interpersonal Violence Prevention: 607-777-3062
* Harpur Advising: 607-777-6305
* Office of International Student & Scholar Services: 607-777-2510
* University Ombudsman: Main campus: 607-777-2388; University Downtown Center office 607-777-2388
* Services for Students with Disabilities: 607-777-2686 (Voice, TTY)