# Syllabus in fall 2018 for CS 471/571 Operating SystemsGeneral Information

## Contact Your Instructor

 **Name:** *Jeff Kinne*

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**Phone:** *812-237-2136*

**Office:** Root Hall, *A-140D*

## Lecture, Exam, Office Hours

 **Lecture:** *MWF 3-3:50pm in Root Hall A-017*

**Exam:** *Wednesday Dec 12 3pm*. Also check the [Office of the Registrar’s exam schedule](https://www.indstate.edu/registrar/faculty-staff-resources/final-exam-schedule)

**Instructor Office Hours:** *10:30-noon TWR, and normally in roughly 9-4 with about half of any given day taken up with meetings*

**GA Tutoring**: See <http://cs.indstate.edu/info/labs.html>

**Website**: [*https://docs.google.com/document/d/1w2bGyWU5YWTlb4hvEJlIa5cAlKsbaOcKoACBGC8F-Is/edit?usp=sharing*](https://docs.google.com/document/d/1w2bGyWU5YWTlb4hvEJlIa5cAlKsbaOcKoACBGC8F-Is/edit?usp=sharing)

## Prerequisites

A grade of C or better in CS 202 or consent of instructor.

**Note** - A 500 level course cannot be taken as part of the MS program if you have completed the same 400 level course at ISU. For example, if you completed CS 451 as an undergrad, you **cannot** take CS 551 as an MS student and count it towards the degree.

## Recommended and/or Required Text

There is no required textbook. Readings will be assigned from online sources, including the following.

* [The Unix Timesharing System](http://cs.indstate.edu/CS471/unix.pdf) - the original unix paper. Everything still is pretty much as it describes.
* [Operating Systems: Three Easy Pieces](http://pages.cs.wisc.edu/~remzi/OSTEP/)- very nice textbook-style free book written by some experts in systems who are great teachers as well.
* [The Little Book of Semaphores](http://greenteapress.com/wp/semaphores/)
* [The ext2 File System](http://www.nongnu.org/ext2-doc/ext2.html)

## Course Announcements

Announcements regarding the course will be made both during class and via email to your @sycamores.indstate.edu email address. You should regularly check this email account or have it forwarded to an account that you check regularly.

## Classroom conduct

You may not use cell phones, iPods/music players, etc. during class. You should be civil and respectful to both the instructor and your classmates, and you should arrive to class a few minutes before the scheduled lecture so you are ready for lecture to begin on time. You may use your computer during class if you are using it to follow along with the examples that are being discussed. You may not check email, facebook, work on other courses, etc. during class.

# Course Description

The official description of this course from the catalog is

“Major topics include system structure, memory management, and process management. Hands-on experience using the department’s minicomputer facilities are an important part of the course.”

An Operating System is a complex computer program that mediates access to three essential resources: CPU, memory, and devices. The main goal of this class is gain an understanding of how these three objectives are met. A secondary goal is to understand how some of the ideas which originated as solutions to operating systems problems have contributed to solutions to other problems.

# Course Outline

* Review - functions every citizen should know, basic data structures in C (1-2 weeks)
* Device Management, typically focusing on storage devices and filesystems (3 weeks)
	+ ext2 file system in detail
	+ Other filesystems at a high level
* Process/Thread Management (3 weeks)
	+ Single CPU execution - time slicing, scheduling
	+ Multi-core execution
	+ Shared data - semaphores, other mechanisms, synchronization issues, race conditions
* Memory Management (3 weeks)
	+ Memory organization, virtual memory, pages, page faults, CPU cache
* Other Topics, as time allows

We are likely to have one “project” for each of - device management, process/thread management, memory management - where you will complete code that we start in class to write a major part of the operating system.

# Learning Outcomes

1. Source code for unix system calls - can trace through and explain the code, can make modifications.
2. Unix system calls - can write programs that use the calls to mimic unix utility commands.
3. Synchronization primitives - can explain proper use and write correct code that uses primitives to avoid race conditions or logical errors.
4. Common scheduling algorithms - can explain common algorithms and tradeoffs.
5. Process accounting - can explain in detail at least one process accounting system.
6. File systems - can explain in detail the layout of at least one modern file system, can explain basic properties and tradeoffs of a number of others.
7. Virtual memory - can explain fundamental concepts and their impact on performance, can explain in detail the mechanism of at least one modern memory management system.
8. Modern computer and operating system - can explain the basic architecture of modern computers and operating systems, including how an operating system ensures proper sharing of the following between different programs and users - CPU, disk, memory, other devices.

# Expected Amount of Work

If you take this class seriously and get what you should out of it, some weeks you will likely be spending around **10 hours/week** or more on the class. The students who get A’s in their CS courses and have an easy time finding jobs do spend this much time on this course. Not everyone would need to spend this much time and not all weeks will be the same, but you should plan on putting in whatever time it takes.

**Note - your classes should be more important than your part-time job.**

# Grading and Assignments

The students of this course have the following responsibilities: read assigned readings before lecture, attend lecture, complete homework assignments, take in-class quizzes, take exams, and complete projects.

Your grade in each of the following categories will be calculated. Your “total” grade will be the minimum of these.

1. **Exams** - we will have three exams, which will all be cumulative. The total exams grade will be max(exam3, .6\*exam3 + .4\*exam2, .5\*exam3 + .3\*exam2 + .2\*exam1).
2. **Projects** - three of the homework assignments will be labeled as projects. The projects grade will be the simple average of the three project grades (each of the three projects is ⅓ of the project grade). Each project will receive a score for style, correctness, inclusion of required features, and inclusion of advanced features.
3. **HW** - each HW is given a number of points, and the total HW grade comes from just adding up all of the HW’s (so HW’s worth more points are worth more in the total HW grade)
4. **Quiz** - same as with HW’s, but for in class quizzes.
5. **Attendance** - each lecture you should login to the machine. I have a script that runs to check who has logged in, and your total attendance will be the % of the time you were present and logged in within the first 5 minutes of the start of class.

**Note that if you miss more than 20% of the lectures, you will receive an F for the course**. This course has 45 lectures, so if you miss 9 lectures you fail. I will not give you a warning about this - if you are likely to miss more than a few lectures during the semester you should keep track for yourself how many you have missed.

## CS Course Policies

Note that this course follows all standard CS course policies. In particular check the CS course policies related to - cheating/plagiarism, attendance, missing exams. See <http://cs.indstate.edu/info/policies.html> for details.

## Late Homeworks

When an assignment is given, the assignment will state if late work will be accepted. For some assignments, a “full credit” date and “late credit” date will be given. By default, “late credit” is at most ½ of the points. If no “late credit” date is given for an assignment, then no late credit is given for the assignment.

Some key assignments will be labeled as “**checkpoint assignments**”. For these assignments, if you do not complete the assignment correctly by the due date, **you fail the course**. These assignments are labeled as “checkpoint assignments” to make it clear to you that you cannot pass the course if you do not complete them on time.

## Start Homeworks Early

We suggest attempting a homework assignment the day it is given, or the day after, so that if you have a problem you can ask early. If you continue to have problems in trying to complete the assignment, you will have time to ask again. Many of the homework assignments require thought and problem solving, which takes “time on the calendar” not just “time on the clock”. By that we mean that spending two hours on 3 consecutive days may be more productive than trying to spend 6 hours at once on the assignment.

## Grade Cutoffs

We try to design homework assignments and exams so that a standard cutoff for grades will be close to what you deserve. After the first exam a grade will be created in Blackboard called “Letter Grade” that is what your letter grade would be if the semester ended today. Initially, I will likely assign the following grades: 93-100 A, 90-93 A-, 87-90 B+, 83-87 B, 80-83 B-, 77-80 C+, 73-77 C, 70-73 C-, 67-70 D+, 63-67 D, 60-63 D-, 0-60 F

Our goal is that the different grades have the following rough meaning.

**A+/A**
You can do *all* the assignments *on your own*.

**B+/A-**You understand nearly everything, and should be all set to use this knowledge in other courses or in a job.

**B-/B**

Most things you understand very well and a few you might not (more towards the former for a B and more towards the latter for a C).

**C/C+**
Learned enough and have the minimum skills to move on in the subject.

**D+/C-**
You did put some effort in, and understand many things at a high level, but you haven’t mastered the details well enough to be able to use this knowledge in the future.

**D-**

Students will normally *not* get an F if - you attend 80% of the lectures, complete some of the assignments up through the end of the course, and get nearly half of the problems on the final exam correct.

**F**
Normally, students that get an F simply stopped doing the required work at some point.

# Blackboard

The course has a blackboard site. Click [here](http://blackboard.indstate.edu) to go to blackboard. You should see this course listed under your courses for the current term. The blackboard site is only used for giving you your grades (go to the course in blackboard, then click “My Tools”, and then “My Grades”). All course content, schedule, etc. is kept in this google doc (which you are currently viewing).

*For online courses - if any parts of blackboard are used for the course, mention it here if appropriate.*

# Academic Integrity

Follow the standard CS course policies in terms of what is and is not allowed on assignments: <http://cs.indstate.edu/info/policies.html>

Please ask the instructor if you have doubts about what is considered cheating in this course.

# Special Needs / Student Disabilities

*Standard language included in the syllabi for ISU courses.*

Indiana State University recognizes that students with disabilities may have special needs that must be met to give them equal access to college programs and facilities. If you need course adaptations or accommodations because of a disability, please contact us as soon as possible in a confidential setting either after class or in my office. All conversations regarding your disability will be kept in strict confidence. Indiana State University's Student Support Services (SSS) office coordinates services for students with disabilities: documentation of a disability needs to be on file in that office before any accommodations can be provided. Student Support Services is located on the lower level of Normal Hall in the [Center for Student Success](http://www.indstate.edu/services/student-success/cfss) and can be contacted at 812-237-2700, or you can visit the ISU website under A-Z, [Disability Student Services](https://www.indstate.edu/services/student-success/cfss/student-support-services/disability-student-services) and submit a Contact Form. Appointments to discuss accommodations with SSS staff members are encouraged.

Once a faculty member is notified by Student Support Services that a student is qualified to receive academic accommodations, a faculty member is obligated to provide or allow a reasonable classroom accommodation under ADA.

# **Disclosures Regarding Sexual Misconduct**

*Standard language included in the syllabi for ISU courses.*

Indiana State University fosters a campus free of sexual misconduct including sexual harassment, sexual violence, intimate partner violence, and stalking and/or any form of sex or gender discrimination. If you disclose a potential violation of the sexual misconduct policy I will need to notify the Title IX Coordinator. Students who have experienced sexual misconduct are encouraged to contact confidential resources listed below. To make a report or the Title IX Coordinator, visit the Equal Opportunity and Title IX website:<http://www.indstate.edu/equalopportunity-titleix/titleix>.

The ISU Student Counseling Center – HMSU 7th Floor | 812-237-3939 | [www.indstate.edu/cns](http://www.indstate.edu/cns)

The ISU Victim Advocate – Trista Gibbons, trista.gibbons@indstate.edu

HMSU 7th Floor | 812-237-3939 (office) | 812-230-3803 (cell)

Campus Ministries - United Campus Ministries | 812-232-0186

 <http://www2.indstate.edu/sao/campusinistries.htm>

[www.unitedcampusministries.org](http://www.unitedcampusministries.org/) | ucmminister2@gmail.com

321 N 7th St., Terre Haute, IN 47807

For more information on your rights and available resources<http://www.indstate.edu/equalopportunity-titleix/titleix>