

VE482 — Introduction to Operating Systems

Syllabus

Manuel — UM-JI (Fall 2021)

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1 Presentation

The focus of this course will be the understanding of operating systems, that is learning how they work and how to implement their basic components.

In order to fully benefit from this course, students are expected to only conduct and submit their own, personal work.

2 Teaching team

Details related to the instructor and Teaching Assistants (TAs) are summarized in the following table.

Instructor and TA	Contact	Office hours	Location
Manuel	charlem@sjtu.edu.cn	Appointment	TBD
Yiding	colossuschang@sjtu.edu.cn	TBA	TBA
Yuchi	citrate@sjtu.edu.cn	TBA	TBA
Boming	bomingzh@sjtu.edu.cn	TBA	TBA

3 Schedule

The fall semester is 14 weeks long, including one week for the finals and the national holidays.

Lectures:

- Tuesday 10:00 – 11:40
- Thursday 10:00 – 11:40

Labs:

- Tuesday 18:20 – 20:55
- Friday 12:10 – 14:45

4 Course content and objectives

This course has been tailored with three main goals in mind:

- Understand how operating systems work
- Become familiar with the internal structure of the operating system
- Be able to perform basic operating system coding

Hence, at the end of this course, students should be provided with a solid basis for any further study of operating systems; In particular they should have developed the necessary skills to engage in more advanced development of operating systems at both theoretical and practical levels.

These goals are fulfilled through the following course outcomes:

- Understand the general organisation of an OS (chap. 1)
- Be familiar with the concept of process and threads (chap. 2)
- Be able to work with multithreading (chap. 3, project)
- Be able to implement the most common scheduling algorithms (chap. 4, project)
- Be familiar with the concept of deadlock (chap. 5)
- Understand the connection between hardware and software (chap. 7, labs)
- Know the basics on the memory management and filesystems (chap. 6, 8)
- Be proficient at using Unix systems, spot particular parts of the kernel code, and write clean and well shaped code (chap. 1, labs, projects)
- Understand basic security concepts in an OS (chap. 9)

The detailed organisation of this course is given as follows:

Weeks 1–7	Weeks 8–13
0. Course information	6. Memory management
1. Operating systems overview	7. Input/Output
2. Processes and threads	8. Filesystems
3. Interprocess communication	9. Security
4. Scheduling	10. Multiple processors systems
5. Deadlocks	
Midterm exam	Final exam

5 Grading policy

The final average will be composed of four sub-grades, apportioned as follows:

- Homework: 10%
- Labs: 10%
- Projects: 40%
- Final exam: 20%
- Midterm exam: 20%

Any late submission will result in a 10% deduction per day from the grade of the corresponding work. After three days no submission will be accepted.

For the final grade a curve will be applied such that the median is in the range B – B+.

6 Honor code

It is of a major importance for any submitted work to be the result of one own research and understanding. In particular it is not acceptable to reuse the work from another student, or downloaded from the internet. Students can however help each others in an up-building way by sharing ideas and understanding on the course.

If in any case code or details from a textbook or internet is reused, the source should be clearly stated such as not to induce any possible confusion.

According to JI Honor Code copying the work of others will result in **severe penalties**.

Exams

During the exam no document of any sort is allowed.

Any document, material, or mean of information and communication not explicitly listed above is strictly prohibited. In particular a **non-exhaustive** list of forbidden materials is as follows.

- Personal notes;
- Any electronic device;
- A copy of someone else's notes;
- An A4 paper sheet with original handwritten notes on both sides;
- Lecture slides, assignments, labs or projects;

Group works

Students are fully responsible for the work they submit. In particular in case of plagiarism the whole group will be sent to Honor Council, not only the student who did plagiarise.

7 General information

The following references and links can be used to find information relevant to the course.

- While this course is heavily based on the book *Modern Operating Systems* from A. Tanenbaum, the book *Operating System Concepts* from A. Silberschatz offers interesting insight; *Operating Systems: Three Easy Pieces* by Arpaci-Dusseau can also be referred to, for a different approach to the course;
- A website containing much information on OS development http://wiki.osdev.org/Main_Page;
- All the course related materials will be made available on Canvas;
- The assignments, labs, and projects will require Minix 3;
- Linux will be used for demonstration purpose and in the assignments;
- The use of meta-search engines and English is highly recommended when searching information online;

To improve communication between the students and the teaching team please observe the following guidelines.

- Any student facing a special situation likely to impact his studies, such as serious illness or full time work, is expected to contact the teaching team as early as possible in order to discuss it and see if any solution can be found;
- When sending an email related to this course include the tag [ve482] in the subject;
e.g. Subject: [ve482] grade issue
- When contacting a TA for a grade issue or any other major problem send a carbon copy (cc) to the instructor. Not doing so might result in omissions, not up-to-date grades etc....If such problem occurs and there is no record of the issue the request will be **automatically rejected**;
- Never attach a large file (> 2 MB) to an email, use SJTU jBox service instead and only include the corresponding link in the email;
- Keep in touch with the teaching team, feedbacks and suggestions will be much appreciated;