THE UNIVERSITY OF WINNIPEG

APPLIED COMPUTER SCIENCE

Course Number: ACS-3931-001
Course Name: Principles of Operating Systems
Course Webpage: https://nexus.uwinnipeg.ca/d2l/home/75033

Instructor Information

Instructor: Sergio G. Camorlinga, PhD
E-mail: s.camorlinga@uwinnipeg.ca

Office Hours:	Thursdays	4:00 - 5:00 pm	3D29
Class meeting time:	Tuesdays/Thursdays	11:30 am - 12:45 pm	3D04

Important Dates

1. First Class:		January 6, 2026
2. Reading Week (no classes):		February 15-21, 2026
3. Midterm Exam:		February 24, 2026
4. Final Withdrawal Date w/o academic penalty*:		March 13, 2026
5. Last Class:		April 2, 2026
6. Final Exam:		*TBD*
7. University closures:	Louis Riel Day	February 16, 2026
	Good Friday	April 3, 2026

*A minimum of 20% of the work on which the final grade is based will be evaluated and available to the student before the voluntary withdrawal date.

Course Objectives / Learning Outcomes

This course covers the principles and design of operating systems with a hands-on component focused on the Linux Operating System. An Operating System is system software that manages resources (hardware & software) and provide common services to computer programs. Students are introduced to principles in process management, memory management, I/O device management, file systems, and operating system security. After each principle topic, we discuss how the respective principle is applied into the Linux Operating System. Linux is a family of open-source Unix-like OS based on the Linux kernel. We will review simple code in 'C' language to get a good understanding of principles and design aspects.

Evaluation Criteria

- Assignment labs: 15%
  - All assignment labs are to be completed individually.
  - There are 3 assignment labs
    - Each can include theory, programming, testing and/or analysis exercises
  - Each assignment lab is worth 5%
  - Assignment lab work results are submitted via Nexus in one zip file
  - Due at 23:59:00 pm (Nexus clock) sharp on due dates, which are posted in Nexus
  - No late assignment will be accepted, or under special circumstances accepted with 20% off for each late day
  - Assignment lab reports are only submitted as PDF (Portable Document Format) files and code in the format requested in the assignment lab description. All together in one zip file is submitted
  - The details of submission procedure will be stated in each assignment lab
  - Multiple submissions are not permitted. Students may submit a partially completed assignment lab, and will receive credit for those attempted problems
  - Combination of functionality, quality of design, programming style and documentations are considered for programming parts of the assignment labs
  - Problem solving, and programming parts of the assignment labs are time consuming. Start early.
  - Students are responsible for maintaining backups and protecting their work
  - Students are responsible to review their assignments before submission to make sure the correct files are attached to the submission
- Midterm: 35%
  - The midterm is during class time.
- Final Exam: 50%
  - Cumulative, i.e. it includes all material discussed in the course including assignments.

Test / Exam Requirements

- Exams will be delivered in person.
- Photo ID is required for the final exam.
- The use of computers, calculators, phones, or other electronic devices is not permitted during exams.
- Midterm and final exams are closed-book.

Students should contact the instructor as soon as possible if extenuating circumstances require missing a lab, assignment, test or examination. A medical certificate from a practicing physician may be required before any adjustments are considered.

Students with documented disabilities, temporary or chronic medical conditions, requiring academic accommodations for tests/exams (e.g., private space) or during lectures/laboratories (e.g., note-takers) are encouraged to contact Accessibility Services (AS) at 204-786-9771 or accessibilityservices@uwinnipeg.ca to discuss appropriate options. All information about a student's disability or medical condition remains confidential.
https://www.uwinnipeg.ca/accessibility-services

Students may choose not to attend classes or write examinations on holy days of their religion, but they must notify their instructors at least two weeks in advance. Instructors will then provide opportunity for students to make up work examinations without penalty. A list of religious holidays can be found in the 2025-26 Undergraduate Academic Calendar online at http://uwinnipeg.ca/academics/calendar/docs/important-notes.pdf

Final Letter Grade Assignment

Historically, numerical percentages have been converted to letter grades using the following scale. However, instructors can deviate from these values based on pedagogical nuances of a particular class, and final grades are subject to approval by the Department Review Committee.

A+	90 – 100%	B+	75 – 79%	C	60 – 64%
A	85 – 89 %	B	70 – 74%	D	50 – 59%
A-	80 – 84%	C+	65 – 69%	F	below 50%

NOTE: Final grades require departmental/program approval and may be subject to change.

Required Text Book / Reading List

The following textbook is required for this class.

- Operating Systems, Internals and Design Principles
  Stallings, William
  Pearson, 9th Edition 2017
  ISBN 978-0-1346-7095-9

We will use the following book as recommended complementary books, supplemented with some readings.

- Linux with Operating Systems Concepts
  Fox, Richard
  CRC Press, Taylor & Francis Group, 2nd Edition 2022
  ISBN 978-1-0320-6345-4

- Class Notes will be available on Nexus

Prerequisite Information

(This information can be found in the UW Undergraduate Academic Calendar)

- Requisite courses: ACS-2906 and ACS-2947 with a minimum grade of C

Regulations, Policies, and Academic Integrity

Students are encouraged to familiarize themselves with the Academic Regulations and Policies found in the University Academic Calendar at:
https://uwinnipeg.ca/academics/calendar/docs/regulationsandpolicies.pdf
Particular attention should be given to subsections 8 (Student Discipline), 9 (Senate Appeals) and 10 (Grade Appeals).

Avoiding Academic Misconduct: Academic dishonesty is a very serious offense and will be dealt in accordance with the University's policies.

Detailed information can be found at the following:

- Academic Misconduct Policy and Procedures: https://www.uwinnipeg.ca/policies/docs/policies/academic-misconduct-policy.pdf and https://www.uwinnipeg.ca/policies/docs/procedures/academic-misconduct-procedures.pdf
- About Academic Integrity and Misconduct, Resources and FAQs: https://library.uwinnipeg.ca/use-the-library/help-with-research/academic-integrity.html

Uploading essays and other assignments to essay vendor or trader sites (filesharing sites that are known providers of essays for use by others who submit them to instructors as their own work) involves "aiding and abetting" plagiarism. Students who do this can be charged with Academic Misconduct.

Academic Integrity and AI Text-generating Tools: Students must follow principles of academic integrity (e.g., honesty, respect, fairness, and responsibility) in their use of material obtained through AI text-generating tools (e.g., ChatGPT, Bing, Notion AI). Suspected misuse of AI may result in a report to the Senate Academic Standards and Misconduct Committee. If AI tools are used, students must cite them. According to the MLA (https://style.mla.org/citing-generative-ai/), "you should

a. AI tools are permitted for study purposes, however, are prohibited for answering questions, i.e., copying and pasting answers directly from AI tools is prohibited. Students may be asked to review their work with the instructor to show their understanding on submitted work
b. cite a generative AI tool whenever you paraphrase, quote, or incorporate into your own work any content (whether text, image, data, or other) that was created by it
c. acknowledge all functional uses of the tool (like editing your prose or translating words) in a note, your text, or another suitable location
d. take care to vet the secondary sources it cites."

Non-academic misconduct: Students are expected to conduct themselves in a respectful manner on campus and in the learning environment, irrespective of the platform being used. Behaviour, communication, or acts that are inconsistent with a number of UW policies could be considered "non-academic" misconduct. More detailed information can be found here:

- Respectful Working and Learning Environment Policy: https://www.uwinnipeg.ca/respect/respect-policy.html,
- Acceptable Use of Information Technology Policy: https://www.uwinnipeg.ca/policies/docs/policies/acceptable-use-of-information-technology-policy.pdf
- Non-Academic Misconduct Policy and Procedures: https://www.uwinnipeg.ca/policies/docs/policies/student-non-academic-misconduct-policy.pdf and https://www.uwinnipeg.ca/policies/docs/procedures/student-non-academic-misconduct-procedures.pdf

Copyright and Intellectual Property: Course materials are the property of the instructor who developed them. Examples of such materials are course outlines, assignment descriptions, lecture notes, test questions, and presentation slides—irrespective of format. Students who upload these materials to filesharing sites, or in any other way share these materials with others outside the class without prior permission of the instructor/presenter, are in violation of copyright law and University policy. Students must also seek prior permission of the instructor/presenter before, for example, photographing, recording, or taking screenshots of slides, presentations, lectures, and notes on the board. Students found to be in violation of an instructor's intellectual property rights could face serious consequences pursuant to the Academic Misconduct or Non-Academic Misconduct Policy; such consequences could possibly involve legal sanction under the Copyright Policy:
https://www.uwinnipeg.ca/policies/docs/policies/copyright-policy.pdf

Privacy

Students have rights in relation to the collection of personal data by the University of Winnipeg.

- Student Privacy: https://www.uwinnipeg.ca/privacy/admissions-privacy-notice.html
- Zoom Privacy: https://www.uwinnipeg.ca/privacy/zoom-privacy-notice.html
- Exam and Proctoring: https://www.uwinnipeg.ca/privacy/zoom-test-and-exam-proctoring.html

Class Cancellation, Correspondence with Students, and Withdrawing from Course

When it is necessary to cancel a class due to exceptional circumstances, the course instructor will make every effort to inform students via UWinnipeg email and Nexus.

Students are reminded that they have a responsibility to regularly check their UWinnipeg e-mail addresses to ensure timely receipt of correspondence from the University and/or the course instructor.

Please let the course instructor know if you plan on withdrawing from the course. Note that withdrawing before the VW date does not necessarily result in a fee refund.

Student Wellness

The University of Winnipeg affirms the importance of student mental health and our commitment to providing accessible, culturally appropriate, and effective services for students. Students who are seeking mental health supports are encouraged to reach out to the Wellness Centre at studentwellness@uwinnipeg.ca or 204-258-3809. For community-based mental health resources and supports, students are encouraged to dial 2-1-1. This program of United Way is available 24/7 in 150 languages. Other resources and contact information can be found at the following link: https://www.uwinnipeg.ca/student-wellness/contact-us.html.

Sexual Violence and Human Rights Advisor (SVHRA)

Students who have experienced Sexual Violence can access support from the SVHRA. The SVHRA receives disclosures and can support students with on and off-campus reporting. In collaboration with the Sexual Violence Response Team (SVRT), the SVHRA also provides fast-track referrals to Student Wellness, academic accommodations, security support, and other on and off campus supports. The SVHRA and SVRT operate within a confidential, survivor-centered, and trauma-informed framework. https://www.uwinnipeg.ca/respect/sexual-violence/

Disclosures may be made in-person, email, by text, by phone, or Zoom/Teams.

5Ri55, 5th Floor (Rice Centre)
204.230.6660 – *call or text (confidential line)*
svrt@uwinnipeg.ca

Topics to be covered (tentative)

I. Introduction
   a. Hardware overview – self-study
   b. Operating systems overview

II. Processes
   a. Process description and control
   b. Threads
   c. Concurrency – mutual exclusion and synchronization
   d. Concurrency – deadlock and starvation

III. Memory
   a. Memory management
   b. Virtual memory

IV. Scheduling
   a. Uniprocessor scheduling
   b. Multiprocessor, multicore and real-time scheduling

V. Input / Output and Files
    a. I/O management and disk scheduling
    b. File management

VI. Advanced topics
    a. Operating systems security

Note that all topics listed may not be covered and may be offered in a slightly different time order.

Additional Course Related Information

1. A permitted or necessary change in mode of delivery may require adjustments to important aspects of course outlines, like class schedule and the number, nature, and weighting of assignments and/or exams.

2. In order to ensure a safe and comfortable learning environment for everyone, we kindly ask that all students refrain from wearing or using scented products while attending class.