THE UNIVERSITY OF WINNIPEG

Applied Computer Science

Course Number: **ACS-2906-051**
Course Name: **Computer Architecture and System Software**
Course Webpage: http://courses.acs.uwinnipeg.ca/2906-051

Instructor Information

Instructor: Dr. Christopher Henry   **Email:** ch.henry@uwinnipeg.ca
Class Room No: 3D04   **Class Meeting Time:** Tue 6:00 – 9:00 pm
Lab Room No: 3D03 (Th) or 3C13 (F)   **Lab Meeting Time:** 4:00-5:15 pm
Office Hours: Tue 4:45-5:45 pm

Important Dates

First Class:	January 7th, 2020
First Lab:	January 17th, 2020
Winter Reading Week[1]:	February 16th – 22nd, 2020 **(No classes)**
Midterm Test:	February 11th, 2020 (6:00 – 9:00 pm)
Withdrawal date w/o academic penalty[2]:	March 13th, 2020
Video lecture (due to conference):	March 24th, 2020
Last Scheduled Class:	March 31st, 2020
Final Examination (Comprehensive):	April 7th, 2020 (6:00 – 9:00 pm)

The University is closed on the following dates (No Classes):
February 17th, 2020
April 10th, 2020

[1]I will likely be in Norway for reading week and will not be available for meetings or office hours.
[2]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.

Additional Course Related Information

When it is necessary to cancel a class due to exceptional circumstances, instructors will make every effort to inform students via uwinnipeg email, as well as the Departmental Assistant and Chair/Dean so that class cancellation forms can be posted outside classrooms.

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 their course instructors.

Please note that withdrawing before the VW date does not necessarily result in a fee refund.

Course Objectives/Learning Outcomes

The course begins with discussions of the architecture of computer hardware and progresses to an examination of system software, including its relationship to the hardware, its structure and design, and its impact on application software, system developers, and end-users. Operating system concepts such as memory management, process management, and I/O subsystems will be covered. Students will also gain hands on experience in assembly programming language during laboratories and on assignments. Other topics include language processors, system utilities, security issues, performance management, program optimization, and GPU programming.

Evaluation Criteria

Assignments (18%)
There are 3 assignments, each worth 6% of your total grade. Submission instructions will be provided with each assignment. The late penalty is 15% per day (for a maximum of 3 days). Multiple submissions are not permitted. All submissions must be typed, and all source code must be commented and compile, or no credit will be given.

Laboratories (10%)
There will be 10 laboratories; each consisting of 1% of your final grade. Submission instructions will be given with each assignment. Multiple submissions are not permitted. All work submitted for evaluation must be typed, and all source code must be commented and compile, or no credit will be given. Late submissions will not be accepted.

Midterm Examination (20%)
There will be **one** midterm test.

Final Examination (52%)
The final examination is comprehensive.

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

Exam Requirements
- Photo ID is required
- You are expected to write the test/exam on the specified date.
- Unless a medical certificate is provided, no accommodation is made for missed deadlines or examinations
- No equipment (*e.g.* cell/smart phone, laptop, calculators, dictionaries, handheld devices, etc.) is authorized for use in tests/exams.
- Midterm and final examinations are closed-book.

Student Services and Information

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 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.

All students, faculty and staff have the right to participate, learn, and work in an environment that is free of harassment and discrimination. The UW Respectful Working and Learning Environment Policy may be found online at www.uwinnipeg.ca/respect

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 2019-20 Undergraduate Academic Calendar online at http://uwinnipeg.ca/academics/calendar/docs/important-notes.pdf

Required Textbooks

Main texts:

- Computer Systems: A Programmer's Perspective; 3rd Edition; Randel E. Bryant, David R. O'Hallaron; Prentice Hall 2010, ISBN: 978-0134092669.

Besides the information contained in the main texts and course notes, I may also distribute papers, and discuss appropriate material and examples from other sources. Students are responsible for all material covered in the class.

Prerequisite Information (This information can be found in the UW General Calendar)

Requisite courses: ACS-1904 or ACS-1905 with a minimum grade of C.
ACS-2906L (lab) must be taken concurrently.

Misuse of Computer Facilities, Plagiarism, and Cheating

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

Avoiding Academic Misconduct and Non-academic Misconduct. 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). Please note, in particular, the subsection of Student Discipline pertaining to plagiarism and other forms of cheating.

Detailed information can be found at the following:

- Academic Misconduct Policy and Procedures: https://www.uwinnipeg.ca/institutional-analysis/docs/policies/academic-misconduct-policy.pdf and https://www.uwinnipeg.ca/institutional-analysis/docs/policies/academic-misconduct-procedures.pdf
- Non-Academic Misconduct Policy and Procedures: https://www.uwinnipeg.ca/institutional-analysis/docs/student-non-academic-misconduct-policy.pdf and https://www.uwinnipeg.ca/institutional-analysis/docs/student-non-academic-misconduct-procedures.pdf

Misuse of Filesharing Sites. 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.

Avoiding Copyright Violation. Course materials are owned by the instructor who developed them. Examples of such materials are course outlines, assignment descriptions, lecture notes, test questions, and presentation slides. 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 photographing or recording slides, presentations, lectures, and notes on the board.

Course Topics

- Representing and Manipulating Info
- Integer Arithmetic
- Floating Point Arithmetic
- Assembly Language programming
- Memory Hierarchy
- Virtual Memory
- GPUs

Note: not all the above topics may be covered.

Course Readings

Relevant textbook chapters and sections will be given during lectures.

Recommended Study Habits

Students who do well in this class attend lectures, take notes, submit all deliverables, regularly ask questions, and tend to spend an extra 3-5 hours per week doing the following:

- Read course notes and handouts
- Read the textbook before coming to class
- Attempt the problems and exercises at the end of the chapters
- Form study groups to study for the midterm and exam

Advice: Students who fall behind find it very hard to catch up.