

Syllabus

# IS 340: Operating Systems

# School of Technology & Computing

5 Credits, Undergraduate Course

Summer 2021

*Access to the Internet is required.*

*All written assignments must be in Microsoft-Word-compatible formats.*

*See the library’s APA Style Guide tutorial for a list of resources that can help you use APA style.*

# **Faculty Information**

Professional experience information for instructors is found under *Faculty Information* in the online course menu.

# **Contact Information**

Contact information for instructors is found under *Faculty Information* in the online course menu.

**Contact Information**

Three important contacts: Instructor, Teacher’s Assistant and Blackboard support.

Instructor: Shawn Hannon / shannon-1@cityu.edu

Teacher’s Assistant: Guangwei Huang (“Cedric”) cedrichuang@cityuniversity.edu

Blackboard support: https://my.cityu.edu/student-help-center/

Course Description

An operating system defines an abstraction of hardware and manages resource sharing among computer users. The topics in this area explain the basic knowledge of operating systems in the sense of interfacing an operating system to networks, teaching the difference between the kernel and user modes, and developing key approaches to operating system design and implementation.

# **Course Resources**

Required and recommended resources to complete coursework and assignments are found on the course [Reading List](https://cityu.alma.exlibrisgroup.com/leganto/login?auth=SAML). Note: resources listed under "Required - Must Purchase" should be purchased from a vendor of the student’s own choosing; resources listed under "Available from the Library" are available at no cost to students.

# **Course Outcomes**

At the end of this course, students will be able to:

* Understand how an operating system functions and how it manages the operation of a computing device.
* Apply system administration principles to activities associated with the system administration.
* Analyze complex system administration problems
* Evaluate professional responsibilities and informed judgments in system administration practices based on system security and ethical principles.
* Create a system administration solution to meet a given set of Linux system administration requirements.

Additional Information

Topics include:

1. Operating System Introduction
   * [What is the Operating System?](https://docs.aws.amazon.com/whitepapers/latest/aws-overview/what-is-cloud-computing.html)
   * How does an operating system function?
   * What does an operating system manage?
   * How to create a Linux operating system instance in AWS
2. Linux Installation on Amazon Cloud
   * [What is Cloud Computing?](https://docs.aws.amazon.com/whitepapers/latest/aws-overview/what-is-cloud-computing.html)
   * [Six Advantages of Cloud Computing](https://docs.aws.amazon.com/whitepapers/latest/aws-overview/six-advantages-of-cloud-computing.html)
   * [Types of Cloud Computing](https://docs.aws.amazon.com/whitepapers/latest/aws-overview/types-of-cloud-computing.html)
   * [Amazon Web Services Cloud Platform](https://docs.aws.amazon.com/whitepapers/latest/aws-overview/amazon-web-services-cloud-platform.html) - Compute Services - [Amazon EC2](https://docs.aws.amazon.com/whitepapers/latest/aws-overview/compute-services.html#amazon-ec2)
3. Introducing Linux
   * Linux Distributions
   * Picking Hardware
   * Supported Hardware
   * Getting the Software
   * Getting Support
4. Installing Linux
   * Live CDs, Virtual Machines, and Clouds
   * CentOS Server Installation
   * Ubuntu Installation
   * Troubleshooting
5. Linux Basics
   * Getting Started
   * Linux vs. Microsoft Windows
   * Remote Access
   * Getting Help
   * Users and Groups
   * Services and Processes
   * Packages
   * Files and File Systems
   * Working with Files
6. Users and Groups
   * What Happens When You Log In?
   * Working with Users and Groups
   * Controlling Access to Your Host
   * More about sudo
7. Startup and Services
   * What Happens When Your Host Starts?
   * Understanding the GRUB2 Boot Loader
   * What Happens After You Boot?
   * Managing Services
   * Shutting Down and Rebooting Your Linux Host
   * Scheduling Services and Commands
8. Networking and Firewalls
   * Introduction to Networks and Networking
   * General Network Troubleshooting
   * TCP Wrappers
   * Setting Up a PPP Connection
9. Package Management
   * Introduction to Package Management
   * Package Management on CentOS
   * Package Management on Ubuntu
10. Storage Management and Disaster Recovery
    * Storage Basics
    * Partitions
    * File Systems
    * The Btrfs File System
    * Using Your File System
    * RAID
    * Logical Volume Management

# **Grading Scale**

The grades earned for the course will be calculated using City University of Seattle’s decimal grading system, found in the current University Catalog (<https://www.cityu.edu/catalog/>).

Grading rubrics with details on how each assignment will be graded are located under *Assignments* and/or in *My Grades* in the online course menu. Students should review the rubric for each assignment prior to completing their work in order to understand how it will be assessed.

|  |  |  |
| --- | --- | --- |
| **OVERVIEW OF REQUIRED ASSIGNMENTS** | **% OF FINAL GRADE** | **POINTS** |
| The Muddiest Point (MP) | 5% | 50 = 5 points \* 10 modules |
| Concept Test (CT) | 5% | 50 = 5 points \* 10 modules |
| Discussion Board (DB) | 10% | 100 = 10 points \* 10 modules |
| Hands-On Practice (HOP) | 20% | 200= 20 points \* 10 modules |
| Virtual Lab (VL) | 30% | 300= 30 points  \* 10 modules |
| Knowledge Check (KC) | 10% | 100= 10 points  \* 10 modules |
| Team Project (TP) | 20% | Proposal:  30 points  Progress:  70 points  Final Report:  70 points  Final PPT:  30 points  Subtotal: 200 points |
| **TOTAL** | **100%** | **1,000 points** |

Course Assignments and Grading

The instructor will provide grading rubrics that will provide more detail as to how this assignment will be graded.

**The Muddiest Point (MP)**

Before class, students are required to submit the Muddiest Point (MP) activity. The purpose of this activity is to stimulate student engagement. The instructor uses the MP to assess how students understood the required readings. The instructor also uses the MP to customize the lecture scope to implement Just-in-Time Teaching (JiTT). The MP consists of writing a brief reflective essay (<= 50 words) identifying the most confusing part (i.e., the MP) of the content covered in the upcoming module. If a student understood all concepts, the student needs to explain the most exciting aspect.  There is one multiple-choice question from the required reading to demonstrate that the student understood the required readings.

|  |  |
| --- | --- |
| ***Criteria*** | ***% of Grade*** |
| Participation | 40% |
| Writing | 40% |
| Correctness | 20% |
| **TOTAL** | **100%** |

**Concept Test (CT)**

The instructor poses a problem based on key concepts of a lecture. After reflecting on the problem, students submit their response and the instructor review them without providing a correct answer. Students discuss their thought process and solution with a peer.  Students then commit to an answer and re-submits their responses. Instructor reviews responses and thought processes with the correct answer.

|  |  |
| --- | --- |
| ***Criteria*** | ***% of Grade*** |
| Engagement | 100% |
| **TOTAL** | **100%** |

**Discussion Board (DB)**

All classes are required to use the Discussion Board. Participation through DB is an integral part of this course. It is defined as active engagement in a discussion or other activity. Instructors will determine the type of activities and their due dates; moreover, different DB activities will have different substance and length guidelines. The instructor will provide specific instructions to students.

A student posts an answer to a weekly discussion topic in Discussion Board. The student also posts a response to two other students' posts by the end of each module. Comments and questions should be clear and thoughtful, with correct grammar, spelling, and punctuation. The instructor will grade the quality of your discussion postings on both content and response.

Questions or comments specifically for the instructor should be emailed directly to the instructor or posted in the Question and Answer Forum. Students who want to talk with other students about issues unrelated to the discussion forums should use the Coffee Talk Forum.

Although the tone of your DB postings can be informal, your instructor will expect the content to be on a professional level. Your comments and questions for discussion should be clear and thoughtful, with correct grammar, spelling, and punctuation. As with written assignments, the quality of your discussion postings will be graded on both content and presentation.

|  |  |
| --- | --- |
| ***Criteria*** | ***% of Grade*** |
| Participation | 50% |
| Writing | 50% |
| **TOTAL** | **100%** |

**Hands-on Practice (HOP)**

The instructor will assign Hands-on Practice exercises to a pair of students in class or individually online. Students pair up and practice exercises to learn specific programming languages, application programming interfaces (APIs), or tools related to the programming assignments or virtual labs.

|  |  |
| --- | --- |
| ***Criteria*** | ***% of Grade*** |
| Practice Exercise | 80% |
| Engagement | 20% |
| **TOTAL** | **100%** |

**Virtual Lab (VL)**

Students complete cloud-based labs that support the concepts taught within the course. VLs involve viewing instructional documents and following systematic instructions. Activities are embedded within each lab. The activities present a challenge to complete. Each lab is graded on accuracy and writing. A student has unlimited attempts at each lab to increase their accuracy and learn the required skills. Reports submitted include a write up on their understandings and findings in their lab reports.

|  |  |
| --- | --- |
| ***Criteria*** | ***% of Grade*** |
| Accuracy | 80% |
| Writing | 20% |
| ***TOTAL*** | ***100%*** |

**Knowledge Check (KC)**

Weekly quizzes measure knowledge concepts acquired. Focus on the underlying principles and concepts rather than memorization to solve the quizzes.

|  |  |
| --- | --- |
| ***Criteria*** | ***% of Grade*** |
| Correctness | 100% |
| **TOTAL** | **100%** |

**Team Project (TP)**

A team will be selected consisting of three or four.  A group of fewer than three students requires the instructor’s approval. Each team will use an instructor-approved topic relevant to the course.

The paper must be no less than 6-7 pages. We required you to use the paper template from [EDSIG/CONISAR](http://www.aitp-edsig.org/), the international conference standard. *The instructor may recommend* *the best papers in this course to conferences with your team’s approval. If necessary, the instructor may require more revisions after the course is over. However, the paper submission is optional and has nothing to do with your course grade*.

We will provide you three report templates and one presentation template. The file name consists of team project number, team number, and the list of your team members. For example, “*TP01 T03 Sam John Mark*.”

* TP01 for the proposal - “*TP01 T0X Author1 Author2 Author3.docx*”
* TP02 for the progress report - “*TP02 T0X Author1 Author2 Author3.docx*”
* TP03 for the final report - “*TP03 T0X Author1 Author2 Author3.docx*”
* TP04 for the final presentation slide - “*TP04 T0X Author1 Author2 Author3.pptx*”

As in any scholarly writing, students should not merely copy information from another author. Students should use evidence to support the contentions they have drawn from their findings and critically analyze related literature. In essence, each paper needs to be an analytical paper, not a summary of readings.

In addition, a team presentation slide is required.

* The presentation consists of 15+4 slides: 15 slides for content and 4 slides for cover, agenda, key reference, and Q&A.
* The PPT template is provided. Your team can change design and color for your team’s purpose.
* If necessary, a presentation video (15 minutes) may be requested.
* If necessary, a demo video (a maximum of 1-2 minutes) may be requested. But the demo time should be included in the total presentation time (15 minutes).

Four submissions are required according to the following schedule:

* Proposal (1 page; 30 points) - Starting (Module 1) & Ending (Module 3)
* Progress Report (3-4 pages; 70 points; graded after the proposal has been submitted) - Starting (Module 4) & Ending (Module 7)
* Final Report (6-7 pages; 70 points; graded after the progress has been submitted) - Starting (Module 8) & Ending (Module 10)
* Final PPT (15+4slides, 30 points; graded after the final report has been submitted) - Starting (Module 8) & Ending (Module 10)

Students are expected to use the assigned readings, videos, and other materials throughout the quarter. Students will need to utilize additional sources that were not assigned by the professor. While stylized after an industry report, nonetheless, students are expected to employ APA formatting of citations, footnotes, and bibliography. Students must cite the sources of all ideas, facts, and information used that are not their own, even if they have put the information into their own words. Failure to do so is plagiarism, although the oversight is unintentional. To avoid plagiarism, check <https://library.cityu.edu/howto/apa-writing/avoid-plagiarism/>.

**Project Description: An Analysis of Shell Programming Practices**

Each team is required to have a report explaining what you learned from each Hands-on Practice.

**TP Report**

***EACH*** student will provide a report formatted based on a template provided by the instructor. Students are required to improve the writing iteratively and incrementally every week. The revision will always happen during a quarter. Students will add new required sections to the existing paper every week.

The final report is the culmination of applied research and activities conducted throughout the quarter. The final report/paper provides a detailed problem and its solution likely to be encountered by a company or organization described in a case study supplied by the student.

*TP01 & TP02*

|  |  |
| --- | --- |
| ***Components*** | ***% of Grade*** |
| Structure | 20% |
| Content | 30% |
| Writing | 30% |
| Reference | 10% |
| Collaboration | 10% |
| **TOTAL** | 100% |

*TP03*

|  |  |  |  |
| --- | --- | --- | --- |
|  | ***Criteria*** | ***Outcome*** | ***% of Grade*** |
| General Computing Knowledge (20%) | | | |
| 1 | Operating Systems | Integrate components and functions of contemporary operating systems. | 20% |
| Critical Thinking (60%) | | | |
| 2 | Issue | Issue is stated and described thoroughly so that it is understood fully. | 20% |
| 3 | Evidence | Information is taken from source(s) appropriate to the scope with enough interpretation and evaluation to develop a comprehensive analysis or synthesis, and expert opinions are thoroughly scrutinized. | 10% |
| 4 | Context and Awareness | Thoroughly analyzes assumptions and biases, carefully evaluating contextual relevance when presenting a position. | 20% |
| 5 | Conclusions | Conclusions are logical and reflect an informed evaluation of evidence and perspectives in priority order. | 10% |
| Collaboration (20%) | | | |
| 6 | Teamwork | Works effectively on diverse, global and/or distributed teams. | 10% |
| 7 | Knowledge of Cultural Frameworks | Demonstrates sophisticated understanding of the complexity of elements important to members of another culture in relation to its history, values, politics, communication styles, economy, or beliefs and practices. | 5% |
| 8 | Openness to Cultural Differences | Demonstrates sophisticated understanding of the complexity of elements important to members of another culture in relation to its history, values, politics, communication styles, economy, or beliefs and practices. | 5% |
|  | **TOTAL** |  | 100% |

**TP Presentation**

The student will report on the research outcomes, development, or other project efforts to an academically appropriate committee in a public forum. The nature of the presentation content will determine the specific makeup of the audience. The student will choose the format of the presentation, in consultation with the advisor. The layout and design must be appropriate and adequate to represent the outcomes of the effort. While students must make some form of a visual presentation, the presentation of the results may include publishing in a refereed publication, publication in a trade or popular magazine or journal, broadcast in an appropriate medium, or, in exceptional cases, limited dissemination within a closed community.

Each presenter will have 15 minutes for presentation and 5 minutes for questions and answers.  Each presenter must keep the total presentation time limit strictly.

|  |  |
| --- | --- |
| ***Criteria*** | ***% of Grade*** |
| Structure | 20% |
| Visual Presentation | 30% |
| Verbal Quality & Engagement | 30% |
| Collaboration | 20% |
| **TOTAL** | 100% |

# **Course Policies**

Course policies on topics such as Late Assignments, Participation, and Professional Writing are found under Course Information in the online course menu. Students are responsible for reviewing and applying these policies while enrolled in this course.

# **University Policies**

Students are responsible for understanding and adhering to all of City University of Seattle’s academic policies. The most current versions of these policies can be found in the [University Catalog](http://www.cityu.edu/catalog/) that is linked from the CityU Web site.

**Title IX Statement**

**Non-Discrimination & Prohibition of Sexual Misconduct**

City University of Seattle adheres to all federal, state, and local civil rights laws prohibiting discrimination in employment and education. The University is committed to ensuring that the education environment is bounded by standards of mutual respect and safety and is free from discriminatory practices.

In the U.S., the University is required by Title IX of the Education Amendments of 1972 to ensure that all of its education programs and activities do not discriminate on the basis of sex/gender. Sex include sex, sex stereotypes, gender identity, gender expression, sexual orientation, and pregnancy or parenting status. Sexual harassment, sexual assault, dating and domestic violence, and stalking are forms of sex discrimination, which are prohibited under Title IX and by City University of Seattle policy. City University of Seattle also prohibits retaliation against any person opposing discrimination or participating in any discrimination investigation or complaint process internal or external to the institution. Questions regarding Title IX, including its application and/or concerns about noncompliance, should be directed to the Title IX Coordinator. For a complete copy of the policy or for more information, visit [https://my.cityu.edu/titleix](https://nam11.safelinks.protection.outlook.com/?url=https%3A%2F%2Fmy.cityu.edu%2Ftitleix&data=04|01|dvorakradana@cityu.edu|6bcb525e2e924fa7701608d8e50c2dcd|b3fa96d9f5154662add763d854e39e63|1|0|637511187754483625|Unknown|TWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%3D|1000&sdata=yZr9i8f97XxpbDMuUjCFfDQCYARHtoQrP%2FSPIPRTYss%3D&reserved=0) or contact the Title IX Coordinator.

In Canada, in compliance with the British Columbia Human Rights Code, the Alberta Human Rights Act, WorksafeBC, and the Workers’ Compensation Board of Alberta, the University believes that its environment should at all times be supportive and respectful of the dignity and self-esteem of individuals. Discrimination, harassment and bullying conduct, whether through person-to-person behavior or via electronic communications such as email or social media is not acceptable and will not be tolerated. As an educational institution, it is our responsibility to cultivate an environment of excellence, equity, mutual respect and to recognize the value and potential of every individual. The University will take all necessary steps to meet or exceed the requirements of the law to prevent discrimination, harassment and bullying. The Respectful Workplace Policy for the prevention of discrimination, harassment and bullying policy and procedure can be found at [https://www.cityu.edu/discovercityu/about-cityu/](https://nam11.safelinks.protection.outlook.com/?url=https%3A%2F%2Fwww.cityu.edu%2Fdiscovercityu%2Fabout-cityu%2F&data=04|01|dvorakradana@cityu.edu|6bcb525e2e924fa7701608d8e50c2dcd|b3fa96d9f5154662add763d854e39e63|1|0|637511187754483625|Unknown|TWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%3D|1000&sdata=UROGgidLhV0DnLVpoKnPKxDCIUQdcI73LxfXc9mMbko%3D&reserved=0) under the Policies section or at [https://www.cityuniversity.ca/about/](https://nam11.safelinks.protection.outlook.com/?url=https%3A%2F%2Fwww.cityuniversity.ca%2Fabout%2F&data=04|01|dvorakradana@cityu.edu|6bcb525e2e924fa7701608d8e50c2dcd|b3fa96d9f5154662add763d854e39e63|1|0|637511187754493622|Unknown|TWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%3D|1000&sdata=Ysq%2FYYNQy5hboluAckY0blZmsgHabLYnjF%2FiP4XHJnc%3D&reserved=0).

**Religious Accommodations**

City University of Seattle has a policy for accommodation of student absences or significant hardship due to reasons of faith or conscience, or for organized religious activities. The University’s policy, including more information about how to request an accommodation, is available in the University Catalog and on the [my.cityu.edu](http://my.cityu.edu/) student portal. Accommodations must be requested by the 20% mark of this course (e.g., day 14 of a ten-week course, day 7 of a 5-week course) using the Religious Accommodations Request Form found on the student dashboard in the [my.cityu.edu](http://my.cityu.edu/) student portal.

**Academic Integrity**

Academic integrity in students requires the pursuit of scholarly activity that is free from fraud, deception and unauthorized collaboration with other individuals. Students are responsible for understanding CityU’s policy on academic integrity and adhering to its standards in meeting all course requirements. A complete copy of this policy can be found in the [University Catalog](http://www.cityu.edu/catalog/) under *Student Rights and Responsibilities* on the page titled *Academic Integrity Policy.*

**Attendance**

Students taking courses in any format at the University are expected to be diligent in their studies and to attend class regularly.

Regular class attendance is important in achieving learning outcomes in the course and may be a valid consideration in determining the final grade. For classes where a physical presence is required, a student has attended if they are present at any time during the class session.  For online classes, a student has attended if they have posted or submitted an assignment. A complete copy of this policy can be in the [University Catalog](http://www.cityu.edu/catalog/) under *Student Rights and Responsibilities* on the page titled *Attendance.*

# **Support Services**

### **Disability Services Accommodations Statement**

Students with a documented disability who wish to request academic accommodations are encouraged to contact Disability Support Services to discuss accommodation requests and eligibility requirements. Please contact Disability Support Services at [*disability@cityu.edu*](mailto:disability@cityu.edu) or 206.239.4752 or visit the [Disability Support Services](https://my.cityu.edu/department/disability-support-services/) page in the my.cityu.edu portal. Confidentiality will be observed in all inquiries. Once approved, information about academic accommodations will be shared with course instructors.

### **Library Services**

CityU librarians are available to help students find the resources and information they need to succeed in this course. Contact a CityU librarian through the [Ask a Librarian](http://library.cityu.edu/ask-a-librarian/)service, or access [library resources and services online](http://library.cityu.edu/), 24 hours a day, seven days a week.

### **Smarthinking Tutoring**

CityU students have access to free online tutoring offered through Smarthinking, including writing support, from certified tutors 24 hours a day, seven days a week. Contact CityU’s Student Support Center at [help@cityu.ed](mailto:help@cityu.ed)