CS 504 Principles of Software Engineering

School of Technology and computing

3 Credits, Graduate Course
Summer 2021

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.

Email: [first name] [last name]
Phone: [xxx-xxx-xxxx]
Office Hours and Response Time: [I am available through MS Teams Tuesday and Thursday nights between 7-8pm. I will respond within 24 hours. I will grade within 3 business days after the due date.]
Bio: (keep images under 300px wide)

Course Description

The Software Engineering discipline covers those activities used to produce and deliver quality code in a consistent manner. This course covers process models, methodologies and architectures for producing code, as well as the project and configuration management processes to guide the software lifecycle. The course also looks at the critical areas of requirements engineering, documentation and metrics. Students mastering this course will be prepared to participate in professional software engineering teams.

Course Resources

Required and recommended resources to complete coursework and assignments are found on the course Reading List. The reading list can be found under Course Information in Blackboard as well as from the library homepage.

Note: Required resources that must be purchased by the student are tagged "Purchase from a vendor of your choosing." Required resources with a direct link, "Available through CityU Library", are available at no cost to students.

Students in Canada will see required resources they need to purchase tagged "Purchase from the Canadian Bookstore." Students outside the U.S. and Canada should contact their advisor or textbook coordinator for additional information.

Course Outcomes

As a result of this course, students will know or be able to do the following:
- Understand key elements of common software development methodologies and process models.

- Apply the results of requirements engineering to design architectures.
- Apply Software Configuration Management (SCM) to the control of development, ease of maintenance, and clarity of communications for software projects.
- Analyze the types, uses, and expected content of common software documentation.
- Evaluate the application of software process improvement models and metrics to measure and estimate aspects of software engineering.
- Create the testing, quality assurance, and traceability requirements and measures for a software project.

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) - (Before Class)	5%	50	= 5 points	* 10 modules
Concept Test (CT) – (Attendance)	0%	0	= 0 points	* 10 modules
Discussion Board (DB)	5%	50	= 5 points	* 10 modules
Hands-On Practice (HOP)	5%	50	= 5 points	* 10 modules
Independent Project (IP) • IP1: Content Management System • IP2: Requirements & Architecture • IP3: Test Plan & Cases • IP4: Software Metrics • IP5: Software Documentation	60%	600	= 120 points * 5 times	
Knowledge Check (KC) – (After class)	5%	50	= 5 points	* 10 modules
Team Projects (TP)	20%	Proposal: 30 points Progress: 70 points Final Report: 70 points Final PPT: 30 points Subtotal: 200 points		
TOTAL	**100%**	**1,000 points**		

Specifics of Course Assignments

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	30%
Writing	40%
Citation	10%
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%

Independent Projects (IP)
An independent project requires each student to analyze an instructor-approved topic and its requirement, design a system or component based on the given subject, implement the designed system, and test the system. The paper must be no less than 3-4 pages, excluding the title and reference pages, using APA format, with at least five (5) recent, scholarly/non-scholarly, peer- or non-peer-reviewed references. As in any academic writing, students should not merely copy information from another author, but use evidence to support the contentions they have drawn from their findings and critically analyze related literature. Each paper needs to be an analytical paper, not a summary of readings.

Students must cite the sources of all ideas, facts, tables, images, figures, formulas, 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, even if the oversight is unintentional. Papers must comply with the University's academic integrity policy, as described in the university catalog.

Criteria	% of Grade
Structure	20%
Content	30%
Development	20%
Writing	20%
Reference	10%
TOTAL	100%

IP1: Configuration Management System
Each student will implement and demonstrate test cases in a Configuration Management System (CMS).

The instructor will provide specific guidance on the CMS, or choices of CMS's to be implemented. Specific instructions may be provided in addition to the documentation of the CMS selected.

Once the CMS has been implemented, the student will create at least two accounts in the system, including one with applicable administrative rights.

The student will create test cases to demonstrate how the following situations are handled in the CMS and related processes:
- Code check out
- Code check in
- Code snapshot (or release point)
- Code in development by two users, first one checks out code, second checks out code, makes changes and checks in, first makes changes and needs to check in.
- Code changes need to be rolled back to a previous level.
- One developer is working on a new version, one is fixing bugs in a previous release.

Each process must be documented.

IP2: Requirements and Architecture
Each student will conduct a requirements engineering process and map the resulting requirements into a systems architecture or high-level design. The student will trace the mapping of requirements to modules in the architecture.

The instructor will provide guidance to the student on the development effort and resources to be used in the requirements gathering.

The student will choose an architectural style based on the appropriateness of the style to the requirements. Based on the style the student will complete the architecture/high level design to the level where it is ready for implementation.

The student will create all design artifacts appropriate to the selected style.

IP3: Test Plan and Cases
Each student will create a test plan including test cases for the system they designed for the previous assignments.

The student will indicate and explain the process model to be used for the development of the system. The test plan will be developed to be consistent with the process model.

The plan must include an overview of the approach to testing including the project test philosophy.

The plan must include needed unit, systems, validation and verification, and acceptance testing. The plan should indicate regression-testing requirements. The plan must assign responsibilities for each test.

The student will develop example test cases for required tests. The test cases must be consistent with the test plan approach and requirements.

IP4: Software Metrics

Each student will develop metrics for the validation and acceptance testing of the system designed in previous assignments.

The student will describe how he or she collect and evaluate each metric.

The student will describe why each of the metrics has been selected and what the effect of the metric is on the overall project quality.

IP5: Software Documentation

Each student will produce samples or shells of the documentation for the development project from previous assignments. Each document should include a short explanation of how and why it is used. (Note: Documentation does not need to be paper, or word processor based).

The documentation must be consistent with the process model previously selected. Samples or shells must be complete enough to demonstrate that the student knows how to use the documents properly.

The documentation must include an "After Action Review" or "Lessons Learned" document. This document will apply specifically to lessons learned during the assignments in the course.

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)

Each student can select his or her team that consists of three to four students. 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 students to use the paper template from [EDSIG/CONISAR](), 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.*

The instructor will provide students three report templates and one presentation template. The file name consists of team project number, team number, and the list of the 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: Software Engineering Project
After each team member finishes his or her independent project, each team will compare and analyze the independent project of each team member. Each team will use the five independent projects for comparison and analysis.

- IP1: Content Management System
- IP2: Requirements & Architecture
- IP3: Test Plan & Cases
- IP4: Software Metrics
- IP5: Software Documentation

TP Report
The 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.

Criteria	% of Grade
Structure	20%
Content	30%
Writing	30%
Reference	10%
Collaboration	10%
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

You 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 that is linked from the CityU Web site.

Antidiscrimination

City University of Seattle and its staff and faculty are committed to supporting our students. We value equity, diversity, and inclusion as a way of life as well as the educational opportunities it provides. City U will not tolerate any form of discrimination based on race, color, ethnicity, sexual orientation, gender identification, socioeconomic status, or religious values. If you have experienced any discrimination based on any of the above, we encourage you to report this to the University. Please report this to your instructor. If you do not feel safe reporting this to your instructor, please report to Dr. Scott Carnz, Provost or to the Vice President of Student Affairs, Melissa Mecham.

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 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 behaviour 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/discover-cityu/about-cityu/ under the Policies section or at https://www.cityuniversity.ca/about/.

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 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 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 in the section titled *Academic Integrity Policy* under *Student Rights & Responsibilities*.

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 found in the University Catalog in the section titled Attendance under Student Rights & Responsibilities.

Final Assignments Due Date
Final assignments for each class at CityU must be due on or before the final date of the course as indicated in the university's course information system. Due dates that extend beyond the final date of the course may negatively impact tuition funding for students.

Support Services

Disability Services & Accommodations
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* or 206.239.4752 or visit the 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 service, or access library resources and services online, 24 hours a day, seven days a week.

Smarthinking Tutoring

CityU students have 24/7 access to free online tutoring offered through Smarthinking, including writing support, from certified tutors. Contact CityU's Student Support Center at mycityusupport@cityu.edu to request a username and password.