



**Bow Valley
College**

Course Outline

CLCM3506

Secure Cloud DevOps
Winter 2024 - Current

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CLCM3506 Secure Cloud DevOps**COURSE DESCRIPTION**

This course will enable learners to design and implement secure applications that run in a continuous integration and continuous deployment (CI/CD) environment in the Cloud. Learners will document security processes and procedures for data and code security based on a design architecture document. They will document and explain security protocols for data services, for code services and functional elements, and for CI/CD. Learners will also be able to explain the security policies and procedures and validate them with stakeholders.

REQUISITES	None
EQUIVALENTS	Complete the following courses: • CLCM3503 - Secure Cloud DevOps (3)
CREDITS	3
HOURS	45
ELIGIBLE FOR PLAR	No
ZERO TEXTBOOK COST	Yes

COURSE COMPETENCY**COMPETENCY TITLE**

Cloud Application Implementation – Novice Security

COMPETENCY STATEMENT

Design and create a secure environment for development, deployment, operation, and services to ensure high availability, safety, and security.

COMPETENCY DESCRIPTION

Cloud applications are dynamic and use innovative and adaptive technology. Cloud computing is driving IT solutions with flexibility, variable storage, accessibility, and productivity. Businesses that develop Cloud technology create strategic advantages in business processes, growth, and security. With shared resources, cloud applications resolve key challenges of identity management, access control, and privacy.

To manage the shift to cloud applications, many organizations have adopted a formal document development process. The documentation process helps to mitigate communication barriers, and provide the security standards, policies, and procedures required to quickly implement a complete cloud application solution.

COURSE LEARNING OUTCOMES

Bow Valley College is committed to ensuring our graduates can demonstrate their abilities in key areas that will make them effective citizens and encourage their development as lifelong learners. In addition to the discipline-specific skills that learners acquire in their programs, the College has identified ten learning outcomes.

College-Wide Outcomes:

1. Communication
2. Thinking Skills
3. Numeracy and Financial Literacy
4. Working with Others
5. Digital Literacy
6. Positive Attitudes and Behaviours
7. Continuous Learning
8. Health and Wellness Awareness
9. Citizenship and Intercultural Competence
10. Environmental Sustainability

#	COURSE LEARNING OUTCOME(S)	COLLEGE WIDE OUTCOMES SUPPORTED
1	Design and Implement secure cloud development environment by exercising judgement and demonstrating attention to details.	1, 2, 4, 5
2	Design and deploy secure Continuous Integration/Continuous Deployment (CI/CD) pipelines, integrating security practices seamlessly into the development and deployment processes by exercising judgement and working as a team member.	1, 2, 4, 5, 6
3	Demonstrate proficiency in configuring and utilizing automated tools for continuous vulnerability scanning within the development and operational environments by exercising judgement and working as a team member.	1, 2, 4, 5
4	Setting up and configuring robust security monitoring and logging solutions within DevOps environments by exercising judgement and working as a team member.	1, 2, 4, 5
5	Validate cloud CI/CD processes by demonstrating accurate written and verbal communication skills.	1, 2, 4, 5, 6

LEARNING PATHWAY

**The time it takes learners to demonstrate competencies will vary. An example of a suggested schedule for learning and development is shown below. Learners will need to plan out their assessment attempts within their course. For additional information, please consult the Course Offering Information in Brightspace.*

WEEK/HOURS LEARNING AND DEVELOPMENT PLAN

Week 1	Complete the Performance Demonstrations and Competency Assessment; Review your personalized learning plan
Week 2	Document the secure deployment for CI/CD pipeline by exercising judgement and working as a team member
Week 3	Document the secure deployment for CI/CD pipeline by exercising judgement and working as a team member
Week 4	Document the secure deployment for CI/CD pipeline by exercising judgement and working as a team member
Week 5	Deploy secure CI/CD pipeline by exercising judgement and working as a team member
Week 6	Deploy secure CI/CD pipeline by exercising judgement and working as a team member
Week 7	Deploy secure CI/CD pipeline by exercising judgement and working as a team member
Week 8	Deploy secure CI/CD pipeline by exercising judgement and working as a team member
Week 9	Reading Week (modifications to this week will occur to adjust to the academic calendar)
Week 10	Deploy secure CI/CD pipeline by exercising judgement and working as a team member
Week 11	Deploy secure CI/CD pipeline by exercising judgement and working as a team member
Week 12	Deploy secure CI/CD pipeline by exercising judgement and working as a team member
Week 13	Validate the CI/CD process by demonstrating verbal communication skills with tact and diplomacy
Week 14	Validate the CI/CD process by demonstrating verbal communication skills with tact and diplomacy
Week 15	Validate the CI/CD process by demonstrating verbal communication skills with tact and diplomacy

COURSE MODULES AND SCHEDULE

**Course schedule subject to change, depending on delivery mode and term of study. For exact dates, please consult the Course Offering Information in Brightspace.*

WEEK/HOURS MODULES

1	Introduction to secure DevOps lifecycle
2	Introduction to dockerization
3	Containerization with Elastic Container Registry (ECR) and Elastic Container Service (ECS)
4	Continuous Integration (CI) and Deployment (CD) with Jenkins
5	Secured DevOps culture, collaboration tools and services (1)
6	Secured DevOps culture, collaboration tools and services (2)
7	Cloud security and Identity Access Management (IAM)
8	Security monitoring and logging in DevOps environments
9	Reading week
10	Automated vulnerability scanning and remediation
11	Governance in secure cloud DevOps
12	Documentation excellence in security cloud DevOps
13	Course revision and student support
14	Final project and presentations
15	Final project and presentations

ASSESSMENT

This course follows an assessment-first approach, in which learners will be assessed, and receive structured feedback, and a personalized learning plan. Learners will also receive differentiated support from an instructor based on their individual needs.

Learners will have a variety of ways to demonstrate they have met the required competency through the demonstration of learning outcomes and criteria as laid out in the rubric. Learners will have multiple (but not unlimited) attempts to prove competency. It is suggested that learners plan out their assessment attempts within their course.

Learners will have flexibility in how they satisfy course learning outcomes while still adhering to the criteria found in the rubric and the Course Offering information. Please refer to the Course Offering Information and the rubric in Brightspace for additional information.

COURSE
LEARNING ASSESSMENT
OUTCOMES

3	Performance Demonstration
4	Performance Demonstration
5	Performance Demonstration
1, 2, 3, 4, 5	Competency Assessment

ASSESSMENT

COURSE
LEARNING ASSESSMENT
OUTCOME(S) WEIGHT

1, 2, 3, 4, 5	Labs (Minimum of 2)	60%
1, 2, 3, 4, 5	Participation	10%
1,2,3,4,5,6	Final Project	30%

Important: For details on each assignment and exam, please see the Course Offering Information.

PERFORMANCE STANDARDS

A minimum grade of D is required to pass this course. However, a program may require a higher grade in this course to progress in the program or to meet specific program completion requirements.

Please consult with the program area or contact the program chair for further details. A minimum Grade Point Average of 2.0 is required for graduation.

GRADING SCHEME

Grade	Percentage	Grade Point	Description
A+	95-100	4.0	Exceptional: superior knowledge of subject matter
A	90-94	4.0	Excellent: outstanding knowledge of subject matter
A-	85-89	3.67	

B+	80-84	3.33	
B	75-79	3.0	Very Good: knowledge of subject matter generally mastered
B-	70-74	2.67	
C+	67-69	2.33	
C	64-66	2.0	Satisfactory/Acceptable: knowledge of subject matter adequately mastered
C-	60-63	1.67	
D+	57-59	1.33	
D	50-56	1.0	Minimal Pass
F	Less than 50	0.0	Fail: an unsatisfactory performance

REQUIRED LEARNING RESOURCES

Learners will use a Cloud platform.

AWS (2020). Introduction to DevOps on AWS.

AWS Official Documentation Website.

Marc Hornbeek (2023). Engineering DevOps.

Additional learning resources may be found in the Course Offering Information or in Brightspace.

ADDITIONAL INFORMATION

Additional information may be found in the Course Offering Information or in Brightspace.

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ACADEMIC ACCOMMODATIONS

Learners with a disability (learning, physical, and/or mental health) may qualify for academic and exam

accommodations. For more information, or to apply for accommodations, learners should make an appointment with Accessibility Services in the Learner Success Services (LSS) Department. Accessibility Services can also assist learners who may be struggling with learning but do not have a formal diagnosis. To make an appointment visit LSS on the first floor of the south campus or call 403-410-1440. It is the learner's responsibility to contact Accessibility Services and request academic accommodations. For more information, please visit our website at <http://www.bowvalleycollege.ca/accessibility>.

INSTITUTIONAL POLICIES

Bow Valley College is committed to the highest standards of academic integrity and honesty. Learners are urged to become familiar with and uphold the following policies: Academic Integrity (500-1-7), Learner Code of Conduct, Procedures and Guidelines (500-1-1), Learner Appeals (500-1-12), Attendance (500-1-10), Grading (500-1-6), Academic Continuance and Graduation (500-1-5), and Electronic Communications (300-2-13). Audio or video recording of lectures, labs, seminars, or any other teaching and learning environment by learners is allowed only with consent of the instructor as part of an approved accommodation plan. Recorded material is to be used solely for personal study and is not being used or distributed without prior written consent from the instructor.

Turnitin:

Students may be required to submit their course work to Turnitin, a third-party service provider engaged by BVC. Turnitin identifies plagiarism by checking databases of electronic books and articles, archived webpages, and previously submitted student papers. Students acknowledge that any course work or essays submitted to Turnitin will be included as source documents in the Turnitin.com reference database, where it will be used solely to detect plagiarism. The terms that apply to a student's use of Turnitin are described on Turnitin.com.

Online Exam Proctoring:

Examinations for this course may require proctoring through an online proctoring service. Online proctoring enables online exam taking within a controlled and monitored environment, thereby enhancing academic integrity. Online proctoring may occur through a variety of methods, including but not limited to:

- a. live online proctoring where a remote invigilator authenticates identity and observes completion of an exam using specialized software and recordings;
- b. automated proctoring where the exam session is recorded and AI (artificial intelligence) analyzed;
- c. browser lockdown that limits access to other applications, websites, copying, printing, screen capture and other functions; or
- d. a combination of both live/automated proctoring and browser lockdown.

Course instructors will review recordings, analyses, and data obtained through online proctoring for academic integrity infractions. It is the student's responsibility to meet the technical, software, location, and identity verification requirements necessary to enable online proctoring.

Further details of these policies are available in the Academic Calendar and on the Bow Valley College website, bowvalleycollege.ca.

Learners are encouraged to keep a copy of this course outline for future reference.

Collection of Personal Information:

This course, including your image and voice, may be recorded and made available to you and other students taking the course section. By attending the class(es) online or in person, you consent to the collection of your personal information. If you do not wish to be recorded, please contact your instructor before starting the course/class to discuss alternative arrangements.

You may use the recordings only for educational purposes and you must not copy, share, or use the recordings for any other purpose without the instructor's express permission.

Your personal information is collected in accordance with section 33(c) of the Freedom of Information and Protection of Privacy Act (Alberta) to deliver academic programming, support learner flexibility, promote universal design for learning principles, and for purposes consistent with the course activities and outcomes. If you have any questions about the collection, disclosure, use, or protection of this information, please contact the College's Access and Privacy Officer at foip@bowvalleycollege.ca.