CSD-4464 Programming Java EE

Computer Studies

Course Number:	**Co-Requisites:**	**Pre-Requisites:**
CSD-4464	N/A	CSD-2103 and CSD-3464 and CSD-4203
Prepared by:	Aaron Sarson, Coordinator	
Approved by:	Chris Slade, Senior Dean	
Approval Date:	Friday, June 16, 2023	
Approved for Academic Year:	2023-2024	
Credit Weight:	4.00	

Course Description

As a continuation of Programming Java SE, students (1) manage databases using Java; (2) build two- and three-tier client-server applications; and (3) refine industry-standard coding practices. Students build a complete Web-based application that incorporates three-tier development including client-side, server-side, and database processing.

Course Learning Outcomes/Course Objectives

1. **Participate and communicate as a member of a team in the design, development and implementation of software applications.**
   - 1.1 Configure and use the JUnit and Mockito testing framework
   - 1.2 Build a range of Assertions
   - 1.3 Outline and implement functional and non-functional requirements in a software system
   - 1.4 Implement a source-control technique to manage collaborative coding
   - 1.5 Deploy applications to a Java Application Server
   - 1.6 Design and deploy a complex web service

2. **Use appropriate tools to develop, test, and maintain secure program code.**
   - 2.1 Utilize generics for creating generic solutions for software
   - 2.2 Utilize Optionals in place of *null*s
   - 2.3 Select and apply the appropriate Interfaces and Classes from the Java Collections Framework, including:
     - Set

- List
- Deque
- Map

2.4 Build and edit HashSets, ArrayLists, LinkedLists, HashMaps and TreeMaps

2.5 Manipulate collections using Java Streams API

2.6 Utilize the functional programming paradigm within the Java Programming Language

2.7 Create and Manipulate JSON using Jackson framework

3. **Use the Java programming language to develop code to design specifications using the Model-ViewController (MVC) architecture in a multi-tier environment.**

3.1 Build and manage a Spring web application

3.2 Work with the all the processing life-cycle phases of JSF

3.3 Manage AJAX requests for HTTP GET within the MVC architecture

3.4 Implement a variety of Spring MVC features

3.5 Connect resources to URLs using the JAX-RS standard

3.6 Bind the range of HTTP methods to customized tasks

3.7 Provide multiple Entity Providers to manage data in JSON, XML, or otherwise

3.8 Build client and server WebSocket endpoints using annotation methods

3.9 Implement Contexts and Dependency Injection for the discovery of EJBs

3.10 Perform Bean Validation to verify that data matches required constraints

4. **Manipulate databases using CRUD (create, read, update and delete) operations.**

4.1 Create a JDBC-compliant database connection

4.2 Utilize Spring CrudRepository and entity framework

4.3 Implement Java Entities based on database tables

4.4 Create, Read, Update and Delete entities from a database

4.5 Perform transactional operations and use database locking

Relationship to Essential Employability Skills

This course contributes to your program by helping you achieve the following Essential Employability Skills:

EES 2.3 Execute mathematical operations accurately. (T, A,)

EES 3.4 Apply a systematic approach to solve problems. (T, A,)

EES 3.5 Use a variety of thinking skills to anticipate and solve problems. (T, A,)

EES 5.8 Show respect for diverse opinions, values, belief systems and contributions of others. (T, A,)

EES 5.9 Interact with others in groups or teams in ways that contribute to effective working relationships and the achievement of goals. (T, A,)

EES 6.10 Manage the use of time and other resources to complete projects. (A,)

Relationship to Vocational Learning Outcomes

This course provides the opportunity for you to achieve the following Program Vocational Learning Outcomes (VLO's), which will be taught and evaluated at a taught (T), assessed (A) or culminating performance (CP) level:

CPCM - Computer Programmer

VLO 1	Identify, analyze, develop, implement, verify and document the requirements for a computing environment. (T, A)
VLO 3	Implement and maintain secure computing environments. (T, A)
VLO 4	Implement robust computing system solutions through validation testing that aligns with industry best practices. (T, A)
VLO 5	Communicate and collaborate with team members and stakeholders to ensure effective working relationships. (T, A)
VLO 6	Select and apply strategies for personal and professional development to enhance work performance. (T, A)
VLO 7	Apply project management principles and tools when working on projects within a computing environment. (T, A)
VLO 9	Support the analysis and definition of software system specifications based on functional and non-functional requirements. (T, A)
VLO 10	Contribute to the development, documentation, implementation, maintenance and testing of software systems by using industry standard software development methodologies based on defined specifications and existing technologies/frameworks. (T, A)
VLO 11	Apply one or more programming paradigms such as, object-oriented, structured or functional programming, and design principles, as well as documented requirements, to the software development process. (T, A)
VLO 12	Model, design, implement, and maintain basic data storage solutions. (T, A)
VLO 13	Contribute to the integration of network communications into software solutions by adhering to protocol standards. (T, A)

CPCT - Computer Programmer

VLO 1	Identify, analyze, develop, implement, verify and document the requirements for a computing environment. (T, A)
VLO 3	Implement and maintain secure computing environments. (T, A)
VLO 4	Implement robust computing system solutions through validation testing that aligns with industry best practices. (T, A)
VLO 5	Communicate and collaborate with team members and stakeholders to ensure effective working relationships (T, A)
VLO 6	Select and apply strategies for personal and professional development to enhance work performance. (T, A)
VLO 7	Apply project management principles and tools when working on projects within a computing environment. (T, A)
VLO 9	Support the analysis and definition of software system specifications based on functional and non-functional requirements. (T, A)
VLO 10	Contribute to the development, documentation, implementation, maintenance and testing of software systems by using industry standard software development methodologies based on defined specifications and existing technologies/frameworks. (T, A)

VLO 11	Apply one or more programming paradigms such as, object-oriented, structured or functional programming, and design principles, as well as documented requirements, to the software development process. (T, A)
VLO 12	Model, design, implement, and maintain basic data storage solutions. (T, A)
VLO 13	Contribute to the integration of network communications into software solutions by adhering to protocol standards. (T, A)

CPRO - Computer Programmer

VLO 1	Identify, analyze, develop, implement, verify and document the requirements for a computing environment. (T, A)
VLO 3	Implement and maintain secure computing environments. (T, A)
VLO 4	Implement robust computing system solutions through validation testing that aligns with industry best practices. (T, A)
VLO 5	Communicate and collaborate with team members and stakeholders to ensure effective working relationships. (T, A)
VLO 6	Select and apply strategies for personal and professional development to enhance work performance. (T, A)
VLO 7	Apply project management principles and tools when working on projects within a computing environment. (T, A)
VLO 9	Support the analysis and definition of software system specifications based on functional and non-functional requirements. (T, A)
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VLO 12	Model, design, implement, and maintain basic data storage solutions. (T, A)
VLO 13	Contribute to the integration of network communications into software solutions by adhering to protocol standards. (T, A)

CSAC - Computer Software and Database Development

VLO 1	Evaluate system requirements and implement multi-tiered (client, server, and database) web applications to meet client requirements. (T, A)
VLO 2	Design, model, implement, maintain and query databases using an enterprise-level relational database management system (DBMS) to meet end-user specifications. (T, A)
VLO 3	Deploy software applications for multiple devices and multiple operating systems. (T, A)
VLO 4	Evaluate and integrate security features into the client and database application tiers to secure against system threats. (T, A)
VLO 5	Integrate software applications for teams to collaborate and control the outcomes of a project. (T, A)

FSDM - Full Stack Software Development

VLO 1	Evaluate system requirements and implement full stack (client, server, and database) web applications to meet client requirements. (T, A)
VLO 2	Design, model, implement, maintain, and query databases using an enterprise-level relational database management system (DBMS) to satisfy end-user specifications. (T, A)
VLO 3	Implement program logic through the use of various programming paradigms (i.e. procedural, object-oriented, functional) that are supported by industry standard programming languages. (T, A)

VLO 4	Integrate software applications/tools for teams to collaborate and control the outcomes of a project. (T, A)
VLO 5	Select, apply, and implement software applications adhering to industry standard architectural patterns (i.e. MVC, Microservice, Client-Server) commonly used to develop full stack software applications. (T, A)

FSDO - Full Stack Software Development

VLO 1	Evaluate system requirements and implement full stack (client, server, and database) web applications to meet client requirements. (T, A)
VLO 2	Design, model, implement, maintain, and query databases using an enterprise-level relational database management system (DBMS) to satisfy end-user specifications. (T, A)
VLO 3	Implement program logic through the use of various programming paradigms (i.e. procedural, object-oriented, functional) that are supported by industry standard programming languages. (T, A)
VLO 4	Integrate software applications/tools for teams to collaborate and control the outcomes of a project. (T, A)
VLO 5	Select, apply, and implement software applications adhering to industry standard architectural patterns (i.e. MVC, Microservice, Client-Server) commonly used to develop full stack software applications. (T, A)

FSDS - Full Stack Software Development

VLO 1	Evaluate system requirements and implement full stack (client, server, and database) web applications to meet client requirements. (T, A)
VLO 2	Design, model, implement, maintain, and query databases using an enterprise-level relational database management system (DBMS) to satisfy end-user specifications. (T, A)
VLO 3	Implement program logic through the use of various programming paradigms (i.e. procedural, object-oriented, functional) that are supported by industry standard programming languages. (T, A)
VLO 4	Integrate software applications/tools for teams to collaborate and control the outcomes of a project. (T, A)
VLO 5	Select, apply, and implement software applications adhering to industry standard architectural patterns (i.e. MVC, Microservice, Client-Server) commonly used to develop full stack software applications. (T, A)

FSDT - Full Stack Software Development

VLO 1	Evaluate system requirements and implement full stack (client, server, and database) web applications to meet client requirements. (T, A)
VLO 2	Design, model, implement, maintain, and query databases using an enterprise-level relational database management system (DBMS) to satisfy end-user specifications. (T, A)
VLO 3	Implement program logic through the use of various programming paradigms (i.e. procedural, object-oriented, functional) that are supported by industry standard programming languages. (T, A)
VLO 4	Integrate software applications/tools for teams to collaborate and control the outcomes of a project. (T, A)
VLO 5	Select, apply, and implement software applications adhering to industry standard architectural patterns (i.e. MVC, Microservice, Client-Server) commonly used to develop full stack software applications. (T, A)

Learning Resources

Required

- Readings from various online and e-learning resources as assigned during the course of the term.

Supplemental

- J. Bloch (2017). *Effective Java (3rd ed.)*. Boston, MA: Addison-Wesley Professional. ISBN: 978-0-134-68609-7

Student Evaluation

Midterm Test - 25%
Final Exam - 25%
Assignments - 20% (5 Evenly Weighted)
Term Project - 30%

Grade Scheme

The round off mathematical principle will be used. Percentages are converted to letter grades and grade points as follows:

Mark (%)	Grade	Grade Point	Mark (%)	Grade	Grade Point
94-100	A+	4.0	67-69	C+	2.3
87-93	A	3.7	63-66	C	2.0
80-86	A-	3.5	60-62	C-	1.7
77-79	B+	3.2	50-59	D	1.0
73-76	B	3.0	0-49	F	0.0
70-72	B-	2.7			

Prior Learning Assessment and Recognition

Students who wish to apply for prior learning assessment and recognition (PLAR) need to demonstrate competency at a post-secondary level in all of the course learning requirements outlined above. Evidence of learning achievement for PLAR candidates includes:

- Other: Students interested in PLAR consideration are advised to discuss details with the program coordinator.

Course Related Information

Refer to Program Related Information

Program Related Information

CPRO - Computer Programmer

Program policies pertaining to CSD courses in the CPRO and CSAC programs are posted in D2L for all CSD courses. These policies explain the waiver option as well as policies related to evaluations and classroom conduct. Students are expected to be aware and abide by these policies.

CSAC - Computer Software and Database Development

Program policies pertaining to CSD courses in the CPRO and CSAC programs are posted in D2L for all CSD courses. These policies explain the waiver option as well as policies related to evaluations and classroom conduct. Students are expected to be aware and abide by these policies.

College Related Information

Note: It is the student's responsibility to retain course outlines for possible future use to support applications for transfer of credit to other educational institutions.

Academic Integrity

Lambton College is committed to high ethical standards in all academic activities within the College, including research, reporting and learning assessment (e.g. tests, lab reports, essays).
The cornerstone of academic integrity and professional reputation is principled conduct. All scholastic and academic activity must be free of all forms of academic dishonesty, including copying, plagiarism and cheating.

Lambton College will not tolerate any academic dishonesty, a position reflected in Lambton College policies. Students should be familiar with the Students Rights and Responsibilities Policy, located at lambtoncollege.ca. The policy states details concerning academic dishonesty and the penalties for dishonesty and unethical conduct.

Questions regarding this policy, or requests for additional clarification, should be directed to the Lambton College Student Success Department.

Students with Disabilities

If you are a student with a disability please identify your needs to the professor and/or the Accessibility Centre so that support services can be arranged for you. You can do this by making an appointment at the Accessibility Centre or by arranging a personal interview with the professor to discuss your needs.
Lambton College in Toronto at Cestar College Campus and Lambton College in Mississauga at Queen's College Campus, please identify your needs to the professor and/or student services.

Student Rights and Responsibility Policy

Acceptable behaviour in class is established by the instructor and is expected of all students. Any form of misbehaviour, harassment or violence will not be tolerated. Action will be taken as outlined in Lambton College policy.

Date of Withdrawal without Academic Penalty

Please consult the Academic Regulations and Registrar's published dates.

Waiver of Responsibility

Every attempt has been made to ensure the accuracy of this information as of the date of publication. The content may be modified, without notice, as deemed appropriate by the College.

Students should note policies may differ depending on the location of course offering. Please refer to your study location specific policies:

LAMBTON COLLEGE POLICIES - applicable to all Lambton College students:

- Student Rights & Responsibilities & Discipline policy (2000-5-1)
- Test & Exam Writing Protocol (2000-1-6)
- Evaluation of Students (2000-1-3)
- Policy Link - https://www.lambtoncollege.ca/custom/Pages/Policies/Policies.aspx

CESTAR COLLEGE:

- www.lambtoncollege.ca/policies-tor

QUEENS COLLEGE:

- www.lambtoncollege.ca/policies-miss