Web Enterprise Applications

Information and Communications Technology

Course Number:	Co-Requisites:	Pre-Requisites:
CST8218	N/A	CST8221 and CST8238
Applicable Program(s):	**AAL:**	**Core/Elective:**
0006X01FWO - Computer Eng. Technology - Comp. Science	5	Core
0006X03FWO - Computer Eng. Technology - Comp. Science	5	Core
Prepared by:	Todd Kelley, Professor	
Approved by:	Andrew Pridham, Academic Chair, ICT	
Approval Date:	Friday, June 15, 2018	
Approved for Academic Year:	2018-2019	
Normative Hours:	75.00	

Course Description

Expand on HTML, Java, and database knowledge to develop skills in building scalable applications built using the Java Enterprise Edition framework. Students apply these skills in developing a web application project that supports mobile devices with a database layer, business logic, presentation logic and client-side components. Design topics involve project management of Web projects (Agile methods), business continuity and failover, using XML and AJAX, internationalization and locale-dependent data entry, web security and cryptography, privacy principles, open data, use of brokers and Model-View-Controller frameworks.

Relationship to Vocational Learning Outcomes

This course contributes to your program by helping you achieve the following Vocational Learning Outcomes:

0006X01FWO - Computer Eng. Technology - Comp. Science

VLO 1	Diagnose, solve, troubleshoot, and document technical problems involving computing devices using appropriate methodologies. (T, A,)
VLO 2	Integrate multiple software and hardware components using appropriate network architecture. (T, A,)
VLO 3	Participate in analyzing, planning, designing, and developing the architecture of computing devices and systems. (T, A, CP,)
VLO 4	Plan, install, configure, modify, test, and maintain a variety of computer systems to meet

	functional requirements. (T, A, CP,)
VLO 6	Analyze, build, test, implement, and maintain applications. (T, A, CP,)
VLO 7	Evaluate and document security issues associated with a variety of computing devices and propose alternatives to increase product reliability. (T, A,)
VLO 9	Contribute to the successful completion of the project applying the project management principles in use. (T, A,)
VLO 10	Identify and apply discipline-specific factors that enable their contribution to the local and global community through social responsibility, economic commitment and environmental stewardship. (T, A,)

0006X03FWO - Computer Eng. Technology - Comp. Science

VLO 1	Diagnose, solve, troubleshoot, and document technical problems involving computing devices using appropriate methodologies. (T, A,)
VLO 4	Plan, install, configure, modify, test, and maintain a variety of computer systems to meet functional requirements. (CP,)
VLO 6	Analyze, build, test, implement, and maintain applications. (T, A, CP,)
VLO 7	Evaluate and document security issues associated with a variety of computing devices and propose alternatives to increase product reliability. (T, A,)
VLO 10	Identify and apply discipline-specific practices that contribute to the local and global community through social responsibility, economic commitment and environmental stewardship. (T, A,)

Relationship to Essential Employability Skills

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

EES 1	Communicate clearly, concisely and correctly in the written, spoken and visual form that fulfills the purpose and meets the needs of the audience. (T, A,)
EES 2	Respond to written, spoken or visual messages in a manner that ensures effective communication. (A,)
EES 3	Execute mathematical operations accurately. (A,)
EES 4	Apply a systematic approach to solve problems. (T, A,)
EES 5	Use a variety of thinking skills to anticipate and solve problems. (A,)
EES 6	Locate, select, organize and document information using appropriate technology and information systems. (T, A,)
EES 7	Analyze, evaluate and apply relevant information from a variety of sources. (A,)
EES 8	Show respect for diverse opinions, values, belief systems and contributions of others. (T, A,)
EES 9	Interact with others in groups or teams in ways that contribute to effective working relationships and the achievement of goals. (T, A,)
EES 10	Manage the use of time and other resources to complete projects. (A,)
EES 11	Take responsibility for one's own actions, decisions and consequences. (A,)

Course Learning Requirements/Embedded Knowledge and Skills

When you have earned credit for this course, you will have demonstrated the ability to:

1.) Use knowledge of web application life cycle to package, deploy, test, list, update and un-deploy modules.

- Mange the web application life cycle
- Package a Web Module for deployment
- Deploy a WAR File to a Java EE Container
- Test Deployed Web Modules
- List Deployed Web Modules
- Update Deployed Web Modules
- Undeploy Web Modules
- Secure a web application.

2.) Analyze, design, implement and test Java EE web applications using server-side programs and container support.

- Create a web page generated using Java on the server.
- Create complex web pages by adding multiple input fields and/or by adding component tags.
- Bind components on a page to server-side data
- Wire component-generated events to server-side application code
- Save and restore application state beyond the life of server requests
- Build web pages that support internationalization and locale dependence for layout.

3.) Analyze, design, implement and test Java EE web applications.

- Create test harnesses for evaluating validity of inputs.
- Create test harnesses for evaluating validity of outputs.
- Create test harnesses for evaluating process flow irregularities.
- Test locking mechanisms for multi-user access to shared resources.

4.) Write validators, data converters, messages and labels in a web environment.

- Examine the User Interface Component Model
- Examine the Navigation Model
- Write Backing Beans
- Write Validators
- Write Converters
- Provide Localized Messages and Labels for Internationalization

5.) Use an additional component for JEE (such as JavaMail or JNDI) to design, implement and test Java EE web applications.

- Create web pages that support Ajax components
- Bind Ajax components on a page to server-side data
- Wire Ajax events to server-side application code

6.) Use web services in the development of a Java EE web application.

- Define the term: web service
- Identify different types of web services
- Make an informed decision on which type of web service to use

7.) Use Persistence in the Web Tier when accessing databases in a web application.

- Access a Database from a Web Application
- Define the Persistence Unit (PU)
- Create an Entity Class
- Get Access to an Entity Manager
- Access Data from the Database
- Update the Data in the Database

8.) Use of tools during the software develoment life cycle.

- Use an integrated development environment (IDE), such as Eclipse, to implment, deploy and test Java EE web Applications
- Use a version control system, such as CVS, Subversion or Git, to keep track of all the changes made in a Java EE web application project
- Configure a Java EE web container to log program messages at various facility levels
- Use a unit testing framework, such as JUnit, to conduct unit tests.

9.) Implement web applications with a high degree of quality.

- Effectively and efficiently apply time-management principles in the analysis, design, implementation and testing of a substantial web application
- Implement all of the requirements from a specification
- Implement a web application that is free from major defects

10.) Understand how web applications can be designed using the constructs within Java to accommodate internationalization.

Know how to use Java internationalization to accommodate different languages when developing a web application.

Learning Resources

Required:

This course is part of the Bring Your Own Device (laptop) program initiative at Algonquin College. Students are required to have a functioning laptop at all lecture and lab classes. The specifications for the required laptop and additional information about the BYOD program initiative can be found athttp://www.algonquincollege.com/onlineresources

Recommended References:

The Java EE 8 Tutorial available from http://docs.oracle.com/javaee/8/tutorial/doc/

JavaServer Faces 2.0: The Complete Reference, by Ed Burns and Chris Schalk with Neil Griffin, McGraw-Hill, ISBN: 978-0-07-162509-8

Additional Resources:

Additional resources such as class notes, web resources and Java APIs will be provided to students during the course.

Software Required:

Java EE Platform with Java 1.8: as found in Apache Tomcat (freely downloadable)
Eclipse or Netbeans JEE development environment with Java 1.8 (freely downloadable)
GIT (freely downloadable)
MariaDB or MySQL server and MySQL Workbench (freely downloadable)

Learning Activities

classroom lectures
software demonstrations
online lectures
online software demonstrations
laboratory work
hybrid activities
reading assignments
research of course-related material
assignments
exams

Hybrid delivery:

This course is consists of 2 hours of lecture in classroom and 2 hours of lab work per week, as well as one hour per

week of online material and activities available through Blackboard software.

Classroom Lectures:

Theoretical course material will be presented, aided by use of overhead projections, videos, demonstrations and brief lecture notes.

This course is hybrid. Approximately one hour per week outside of regular classroom lecture time will be required to review online materials and complete activities.

Some of the online theoretical material may consist of multi-media lectures and examples. This material will be accessible with free downloadable-from-Internet viewers (links provided) for use on student computers or with Access Centre/Resource Centre computers. Note: Students must bring in their own headsets to hear the audio component of material.

Students are expected to attend all lectures and review all posted materials.

Students will be expected to find and read applicable material in the textbook or online, and to be prepared to answer oral or written questions in lectures.

Students are encouraged to ask questions during lectures and to consult with the professors on topics that they do not clearly understand.

Students are also encouraged to ask/answer questions or initiate discussions using the Discussion Board forums in Blackboard.

Professors will inform students, at the beginning of the course, of suitable times for consultations.

Labs and Assignments:

Students will apply the lecture material to a series of assignments which are closely integrated with the current lecture materials. The assignments are organized to align with series of iterations on a group project to build a Web application that demonstrates the main features of JEE.

The students' ability to successfully complete the assigned exercises will directly correlate with their level of success on test(s) and the final exam.

Students should seek advice and help from the professor in the laboratory.

Lab exercises can be completed during the scheduled period, or in many cases be started in the lab period and continue as hybrid work outside of class.

Evaluation/Earning Credit

The following list provides evidence of this course's learning achievements and the outcomes they validate:

Final Exam (30%)

Validates Outcomes: CLR 1, CLR 2, CLR 3, CLR 4, CLR 6, CLR 7, CLR 10, EES 1, EES 2, EES 3

Midterm Exam(s) (15%)

Validates Outcomes: CLR 1, CLR 2, CLR 3, CLR 4, CLR 5, CLR 6, CLR 7, EES 1, EES 2, EES 3

Practical Assessment (s) (10%)

Validates Outcomes: CLR 1, CLR 2, CLR 3, CLR 4, CLR 5, CLR 6, CLR 7, CLR 8, CLR 9, CLR 10, EES 1, EES 2, EES 4, EES 5, EES 6, EES 7, EES 8, EES 9, EES 10, EES 11

Assignment(s) (35%)

Validates Outcomes: CLR 1, CLR 2, CLR 3, CLR 4, CLR 5, CLR 6, CLR 7, CLR 8, CLR 9, CLR 10, EES 1, EES 2, EES 3, EES 4, EES 5, EES 6, EES 7, EES 8, EES 9, EES 10, EES 11

Lab Activity(ies) (5%)

Validates Outcomes: CLR 3, CLR 4, CLR 5, CLR 6, CLR 7, CLR 8, CLR 10, EES 5, EES 6, EES 7, EES 11

Hybrid Assignment(s) (5%)

Validates Outcomes: CLR 1, CLR 2, CLR 3, CLR 10, EES 1, EES 2, EES 6, EES 7

Students are expected to meet evaluation and completion deadlines as stated in course outline and course section information documents. In circumstances where evaluation and/or completion deadlines are missed or student performance has been affected by a temporary or permanent disability (including mental health), interim or retroactive accommodations may be considered. In such instances, please consult your course faculty member. For other situations where deferral of evaluations may be warranted, please refer to college policy AA21.

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:

- Challenge Exam
- Project/Assignment

Grade Scheme

Final Grade	Mark Equivalent	Numeric Value	Final Grade	Mark Equivalent	Numeric Value
A+	90% - 100%	4.0	A	85% - 89%	3.8
A-	80% - 84%	3.6	B+	77% - 79%	3.3
B	73% - 76%	3.0	B-	70% - 72%	2.7
C+	67% - 69%	2.3	C	63% - 66%	2.0
C-	60% - 62%	1.7	D+	57% - 59%	1.4
D	53% - 56%	1.2	D-	50% - 52%	1.0
F	0% - 49%	0	FSP	0	0

Course Related Information

Assessment of student learning will be done by means of a mid-term exam, final exam, labs, hybrid activities and assignments.
Attendance at the laboratory sessions is strongly recommended but is not mandatory, although attendance will be recorded. Regular attendance is encouraged as there is a direct correlation between lab attendance and the course success rate. Students who are unable to attend a lab session must obtain their instructor's prior consent in order to keep their attendance record current.

This course is part of a series of courses on computer programming, and the concepts, techniques, problems and solutions in the domain of computer programming are the primary focus. The Java Programming Language is used as implementation language in this course; however, the details of the different versions of Java, or indeed of any specific programming language, are of secondary focus in this course compared to programming itself. Specifically, a number of features were introduced in Version 8 of the Java Language Specification; for example, lambda expressions, streams, and enhanced interfaces. These features can be considered advanced topics, and as such, they may not be appropriate for beginners and intermediate level courses. Depending on the level of course, the course professor will cover these topics only if it is relevant to the course learning outcomes.

All assignments must be successfully completed in order to obtain course credit. Late assignments will be penalized and receive a mark of zero, and need not be handed in, unless prior arrangements are made with your professor in writing. Any missed evaluation points will result in a grade of zero. In the case of a documented emergency the professor, in consultation with the Chair, will determine how the marks will be made up and/or final grade adjusted.

The Computer Studies Department requires that all course assignments (homework exercises, laboratory work, projects, etc) be submitted by students using a standard which could be specific to one or more courses. Professors will ensure, at the beginning of the term, that students are advised of the exact details of these course specific submission requirements. Professors will also post them online alongside the course outline. Student submissions that do not meet the course published submission standards may not be marked, and may incur a penalty of up to 100% of the submission mark.

In order to pass the course, the student must have a grade of at least 50% or "D-" on the mid-term exam, skills exam and final exam combined. Additionally, the student must have a grade of at least 50% or "D-" on all of the assignments.

Assignments will not be included in the final grade unless the student achieves at least a grade of 50% or "D-" on the mid-term exam and final exam. (Students who have a failing grade on the mid-term and the final exam will receive a grade of "F").

All students are required to write the final exam. There are no provisions for "making up" a missed final exam. If, as a result of being off-track in your program or some unforeseen circumstance, you note that there is a scheduling conflict in your final exam schedule, it is your responsibility to alert your course professor no later than one week

before final exams start, to allow for any special arrangements.

Department Related Information

STUDENT ACADEMIC RESPONSIBILITIES

Each student is responsible for:
• Knowing the due dates for marked out-of-class assignments.
• Attending all classes and knowing the dates of in-class marked assignments and exercises.
• Maintaining a folder of all work done in the course during the semester for validation claims in cases of disagreement with faculty.
• Keeping both paper and electronic copies of all assignments, marked and unmarked, in case papers are lost or go missing.
• Regularly checking both Blackboard announcements as well as one's Algonquin e-mail account for important messages from both professors and college administration.
• Participating in on-line and classroom exercises and activities as required.
• Retaining course outlines for possible future use to support applications for transfer of credit to other educational institutions.

Harassment/Discrimination/Violence will not be tolerated. Any form of harassment (sexual, racial, gender or disability-related), discrimination (direct or indirect), or violence, whether involving a professor and a student or amongst students, will not be tolerated on the college premises. Action taken will start with a formal warning and proceed to the full disciplinary actions as outlined in Algonquin College Policies - HR22 and SA07.
Harassment means one or a series of vexatious comment(s) (whether done verbally or through electronic means), or conduct related to one or more of the prohibited grounds that is known or ought reasonably to be known to be unwelcome/unwanted, offensive, intimidating, derogatory or hostile. This may include, but is not limited to: gestures, remarks, jokes, taunting, innuendo, display of offensive materials, offensive graffiti, threats, verbal or physical assault, stalking, slurs, shunning or exclusion related to the prohibited grounds.

For further information, a copy of the official policy statement can be obtained from the Student Association.

Violation of the Copyright Act
General – The Copyright Act makes it an offence to reproduce or distribute, in whatever format, any part of a publication without the prior written permission of the publisher. For complete details, see the Government of Canada website at http://laws.justice.gc.ca/en/C-42 . Make sure you give it due consideration, before deciding not to purchase a textbook or material required for your course.

Software Piracy - The Copyright Act has been updated to include software products. Be sure to carefully read the licensing agreement of any product you purchase or download, and understand the terms and conditions covering its use, installation and distribution (where applicable). Any infringement of licensing agreement makes you liable

under the law.

Disruptive Behaviour is any conduct, or threatened conduct, that is disruptive to the learning process or that interferes with the well being of other members of the College community. It will not be tolerated. Members of the College community, both students and staff, have the right to learn and work in a secure and productive environment. The College will make every effort to protect that right. Incidents of disruptive behaviour must be reported in writing to the departmental Chair as quickly as possible. The Chair will hold a hearing to review available information and determine any sanctions that will be imposed. Disciplinary hearings can result in penalties ranging from a written warning to expulsion.

For further details, consult the Algonquin College Policies AA32, SA07 and IT01 in your Instaguide.

College Related Information

Email

Algonquin College provides all full-time students with an e-mail account. This is the address that will be used when the College, your professors, or your fellow students communicate important information about your program or course events. It is your responsibility to ensure that you know how to send and receive e-mail using your Algonquin account and to check it regularly.

Students with Disabilities

If you are a student with a disability, you are strongly encouraged to make an appointment at the Centre for Accessible Learning to identify your needs. Ideally, this should be done within the first month of your program, so that a Letter of Accommodation (LOA) can be provided to your professors. If you are a returning student, please ensure that professors are given a copy of your LOA each semester.

Retroactive Accommodations

Students are expected to meet evaluation and completion deadlines as stated in course outline and course section information documents. In circumstances where evaluation and/or completion deadlines are missed or student performance has been affected by a temporary or permanent disability (including mental health), interim or retroactive accommodations may be considered. In such instances, please consult your course faculty member. For other situations where deferral of evaluations may be warranted, please refer to college policy AA21.

Academic Integrity & Plagiarism

Adherence to acceptable standards of academic honesty is an important aspect of the learning process at Algonquin College. Academic work submitted by a student is evaluated on the assumption that the work presented by the student is his or her own, unless designated otherwise. For further details consult Algonquin College Policies AA18: Academic Dishonesty and Discipline and AA20: Plagiarism

Student Course Feedback

It is Algonquin College’s policy to give students the opportunity to share their course experience by completing a

student course feedback survey for each course they take. For further details consult Algonquin College Policy AA25: Student Course Feedback

Use of Electronic Devices in Class

With the proliferation of small, personal electronic devices used for communications and data storage, Algonquin College believes there is a need to address their use during classes and examinations. During classes, the use of such devices is disruptive and disrespectful to others. During examinations, the use of such devices may facilitate cheating. For further details consult Algonquin College Policy AA32: Use of Electronic Devices in Class

Transfer of Credit

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.

Note: *It is the student's responsibility to refer to the Algonquin College Policies website for the most current information at http://www.algonquincollege.com/policies/*

Legend

Terms

•ALO: Aboriginal Learning Outcome
•Apprenticeship LO: Apprenticeship Learning Outcome
•CLR: Course Learning Requirement
•DPLO: Degree Program Learning Outcome
•EES: Essential Employability Skill
•EOP: Element of Performance
•GELO: General Education Learning Outcome
•LO: Learning Outcome
•PC: Program Competency
•PLA: Prior Learning Assessment
•PLAR: Prior Learning Assessment and Recognition
•VLO: Vocational Learning Outcome

Assessment Levels

•T: Taught
•A: Assessed
•CP: Culminating Performance