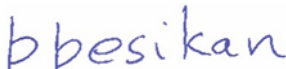# Course Outline

School:	Eng. Tech. & Applied Science
Department:	Information and Communication Engineering Technology (ICET)
Course Title:	Java EE Programming
Course Code:	COMP 303
Course Hours/Credits:	56
Prerequisites:	COMP 214, COMP 228
Co-requisites:	N/A
Eligible for Prior Learning, Assessment and Recognition:	Yes
Originated by:	ILIA NIKA
Creation Date:	Fall 2005
Revised by:	ILIA NIKA, Paula McMillan
Revision Date:	Summer 2017
Current Semester:	Winter 2018
Approved by:	*ppesikan c/o*

Chairperson/Dean

PLEASE NOTE THAT THE WINTER 2018 SEMESTER WILL BE 13 WEEKS IN DURATION. THIS MAY AFFECT COURSE HOURS. THIS DOES NOT APPLY TO COURSES IN THE AIRCRAFT MAINTENANCE AND AVIONICS MAINTENANCE PROGRAMS (COURSE CODES AIRC).

Students are expected to review and understand all areas of the course outline.

Retain this course outline for future transfer credit applications. A fee may be charged for additional copies.

This course outline is available in alternative formats upon request.

Acknowledgement of Traditional Lands

Centennial is proud to be a part of a rich history of education in this province and in this city. We acknowledge that we are on the treaty lands and territory of the Mississaugas of the Credit First Nation and pay tribute to their legacy and the legacy of all First Peoples of Canada, as we strengthen ties with the communities we serve and build the future through learning and through our graduates. Today the traditional meeting place of Toronto is still home to many Indigenous People from across Turtle Island and we are grateful to have the opportunity to work in the communities that have grown in the treaty lands of the Mississaugas. We acknowledge that we are all treaty people and accept our responsibility to honor all our relations.

Course Description

This course builds on Java Programming, COMP228, and covers Java EE APIs. Coursework emphasizes distributed objects, Java Web applications and Java enterprise applications for deployment to Java Application Servers. The course also covers using the Java Persistence API in Java SE and Java EE environments. Hands-on exercises use Eclipse and Wildfly 10.

Program Outcomes

Successful completion of this and other courses in the program culminates in the achievement of the Vocational Learning Outcomes (program outcomes) set by the Ministry of Advanced Education and Skills Development in the Program Standard. The VLOs express the learning a student must reliably demonstrate before graduation. To ensure a meaningful learning experience and to better understand how this course and program prepare graduates for success, students are encouraged to review the Program Standard by visiting http://www.tcu.gov.on.ca/pepg/audiences/colleges/progstan/. For apprenticeship-based programs, visit http://www.collegeoftrades.ca/training-standards.

Course Learning Outcomes

The student will reliably demonstrate the ability to:

1. Design,code and test RMI applications using Java Standard Edition
2. Design, code and test Java Web applications based on servlets and Java ServerPages (JSP).
3. Explain MVC and build web applications using MVC architecture.
4. Describe the Java EE n-tier architecture and explain how Java Application Servers support distributed applications
5. Explain the concept of Enterprise Java Beans (EJBs) and decide when EJBs are the appropriate model for application components.
6. Design, code, and test session EJBs and use them in distributed applications.
7. Use the Java Persistence Architecture for object-relational mapping and develop EJB applications using JPA.
8. Develop Java Web applications using Java Server Faces
9. Develop and package Java-based Web and enterprise applications using an enterprise edition IDE and test them using an Application Server.

Essential Employability Skills (EES)

The student will reliably demonstrate the ability to*:

1. Communicate clearly, concisely and correctly in the written, spoken, and visual form that fulfills the purpose and meets the needs of the audience.
4. Apply a systematic approach to solve problems.
5. Use a variety of thinking skills to anticipate and solve problems.
7. Analyze, evaluate, and apply relevant information from a variety of sources.
10. Manage the use of time and other resources to complete projects.

There are 11 Essential Employability Skills outcomes as per the Ministry Program Standard. Of these 11 outcomes, the following will be assessed in this course.

Global Citizenship and Equity (GC&E) Outcomes

N/A

Text and other Instructional/Learning Materials

Text Book(s):

Text:

Purchase not mandatory: Lecture notes and websites make up the main references for this course.

Dr. Danny Coward, Java EE 7: The Big Picture, Publisher: Oracle Press, Date: October 2014, ISBN: 9780071837330.

Recommended Additional references – for extra reading and background

Java EE 7 Essentials by Arun Gupta, Publisher: O'Reilly, Date: September 2013, ISBN: 978144930176.
Pro JPA 2 Second Edition, By: Mike Keith and Merrick Schincariol, Date: Apress, September 2013, ISBN: 1430249269.

Online Resource(s):

Java EE tutorial online: https://docs.oracle.com/javaee/7/tutorial/

Java SE Documentation: View online at http://docs.oracle.com/javase/8/docs/api/

Java SE Tutorials: View online at http://docs.oracle.com/javase/tutorial/

http://pdf.coreservlets.com/

Evaluation Scheme

⇨ Test 1: Hands-on test and MC questions covering Week 1-6.
⇨ Test 2: Short answer questions
⇨ Java SE Quiz 1: This quiz will be in week 3.
⇨ Lab Assignment 1: Use collections with supplied test driver
⇨ Lab Assignment 2: Build a distributed app using RMI
⇨ Lab Assignment 3: Complete the demo web app with MVC
⇨ Lab Assignment 4: Create a Web app web with data in collections
⇨ Lab Assignment 5: JPA for persistence in a layered Web app with MVC-P

⇨ Lab Assignment 6: Create a simple JSF interface

⇨ Lab Assignment 7: Intro to EJB

⇨ Lab Assignment 8: EJB as a façade to JPA

Evaluation Name	CLO(s)	EES Outcome(s)	GCE Outcome(s)	Weight/100
Test 1	1, 2, 3	1, 4, 5, 10		30
Test 2	4, 5, 6, 7, 8, 9	4, 7, 10		20
Java SE Quiz 1	1, 2, 3	1, 4, 5, 7, 10		10
Lab Assignment 1	1	1, 4, 5		4
Lab Assignment 2	1	4, 7, 10		4
Lab Assignment 3	2, 3	4, 5, 10		4
Lab Assignment 4	2, 3	1, 4, 5		4
Lab Assignment 5	3, 7	4, 5, 7, 10		7
Lab Assignment 6	8	4, 5, 7		5
Lab Assignment 7	4, 5, 7, 9	1, 4, 5, 10		5
Lab Assignment 8	4, 5, 7, 9	5, 7, 10		7
Total				100%

If students are unable to write a test they should immediately contact their professor or program Chair for advice. In exceptional and well documented circumstances (e.g. unforeseen family problems, serious illness, or death of a close family member), students may be able to write a make-up test.

All submitted work may be reviewed for authenticity and originality utilizing Turnitin®. Students who do not wish to have their work submitted to Turnitin® must, by the end of the second week of class, communicate this in writing to the instructor and make mutually agreeable alternate arrangements.

When writing tests, students must be able to produce official College photo identification or they may be refused the right to take the test or test results will be void.

Student Accommodation

Students with permanent or temporary accommodations who require academic accommodations are encouraged to register with the Centre for Students with Disabilities (CSD) located at Ashtonbee (L1-04), Progress (C1-03), Morningside (Rm 190), and Story Arts Campus (Rm 284). Documentation outlining the functional limitations of a disability is required; however, interim accommodations pending receipt of documentation may be possible. This service is free and confidential. For more information, please email csd@centennialcollege.ca.

Use of Dictionaries

• Any dictionary (hard copy or electronic) may be used in regular class work.

Program or School Policies

N/A

Course Policies

N/A

College Policies

Students should familiarize themselves with all College Policies that cover academic matters and student conduct.

All students and employees have the right to study and work in an environment that is free from discrimination and harassment and promotes respect and equity. Centennial policies ensure all incidents of harassment, discrimination, bullying and violence will be addressed and responded to accordingly.

Academic honesty is integral to the learning process and a necessary ingredient of academic integrity. Academic dishonesty includes cheating, plagiarism, and impersonation. All of these occur when the work of others is presented by a student as their own and/or without citing sources of information. Breaches of academic honesty may result in a failing grade on the assignment/course, suspension or expulsion from the college.

For more information on these and other policies, please visit www.centennialcollege.ca/about-centennial/college-overview/college-policies.

Students enrolled in a joint or collaborative program are subject to the partner institution's academic policies.

PLAR Process

This course is eligible for Prior Learning Assessment and Recognition (PLAR). PLAR is a process by which course credit may be granted for past learning acquired through work or other life experiences. The PLAR process involves completing an assessment (portfolio, test, assignment, etc.) that reliably demonstrates achievement of the course learning outcomes. Contact the academic school to obtain information on the PLAR process and the required assessment.

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Topical Outline (subject to change):

Week	Topics	Readings/Materials	Weekly Learning Outcome(s)	Instructional Strategies	Evaluation Name	Evaluation Date
1	Course overview Editions of Java platform - SDK and JRE Coding standards - Java Beans - Exceptions	Lecture slides Java SE docs and tutorial	Recall Java skills from previous courses. Discuss the differences between Java SE, EE and micro editions.	Lecture Demonstration of IDE In-class discussion	Hand out Asgn 1: SEReview: Use collections with supplied test driver	
2	Java SE API - java.util - java.net vs RMI - threads Design Patterns - Singleton - value obj /DTO	Lecture slides Java SE docs and tutorial	Use the Java SE API including collections Code a singleton to hold data Define terms state, synchronous/async	Lecture Workshop Asgn 1 Distribute software for students to install.	Converting a class to a Singleton.	
3	Distributed objects - CORBA , RMI Java EE intro - Java EE n-tier architecture	Lecture slides Test chapter 1	Define distributed objects. Describe the Java EE run time. Name tiers in a typical n-tier architecture.	Lecture In-class discussion Workshop for Asgn 2 Hand out Asgn 2: Build a distributed app using RMI	Quiz Lab Assignment 1	Week 3
4	Basic Web Apps - Servlets - JSP MVC Web app navigation	Lecture slides Text chapter 2	State the role servlets, JSPs and POJO in MVC. Code navigation among servlets and JSP. Use simple JSP EL and requestScope to pass data.	Lecture Review web technologies Demonstration In-class discussion Hand out Asgn 3: Complete the demo web app with MVC	Lab Assignment 2	Week 4
5	More syntax - Servlet API - JSP EL - JSTL Web app scopes Java EE packaging	Lecture notes Text chapter 3	Master enough syntax to build a simple servlet-JSP web app. Use scopes provided by server to store state. Deploy an EAR and WAR.	Lecture In-class discussion Workshop for Asgn 3 Hand out Asgn 4: Create a simple Web app web using scopes	Lab Assignment 3	Week 5
6	Web app summary	Lecture notes	Design and build robust basic	Lecture	Optional	Week 6

Week	Topics	Readings/Materials	Weekly Learning Outcome(s)	Instructional Strategies	Evaluation Name	Evaluation Date
	- Best practices Data sources JDBC review - Precompiled & dynamic SQL - Transactions	Text Chapter 11 Java SE docs	web apps. Add persistence with JDBC Explain the advantages of connection pooling.	In-class discussion Workshop for Asgn 4 Practice for midterm	bonus Asgn: Asgn 4 with data in collections	
7	Introduction to JPA - Entity beans - Persistence manager, context and unit - annotations	Lecture notes Text Chapter 12 Java EE tutorial Book: Pro JPA	Define entity beans. Manage life cycle and state of entity beans. Perform CRUD on entities using a persistence manager.	Lecture Demonstration In-class discussion	Test 1 Lab Assignment 4/ bonus	Week 7
8	JPA for DB tables in relationships - ORM - JPQL XA connections - 2-phase commit	Lecture notes Text Chapter 12 Java EE tutorial Book: Pro JPA	Add relational integrity to related entities in a web app. Use JPQL Explain how app server manages global connections.	Lecture In-class discussion Workshop for Asgn 5 Hand out Asgn 5: use JPA for persistence in a layered Web app with MVC-P		
9	Evolving web app technology - Struts - Spring - JSF Web design patterns	Lecture notes Text Chapter 4 Web resources	Discuss the issues deciding what technology to adopt for maintaining web apps. Explain how JSF and framework enable developers and support Web 2.0.	Lecture Demonstration In-class discussion		
10	Starting JSF - Faces servlet - Tag libraries - Managed beans - Listeners	Lecture notes Text Chapter 4 Java EE tutorial	Discuss the issues deciding what technology to adopt for maintaining web apps Explain how JSF and framework enable developers and support Web 2.0	Lecture Demonstration In-class discussion Hand out Asgn 6 JSF.	Lab Assignment 5	Week 10
11	JSF continued - Facelets - Configuring JSF - Converters & validators - Web app life cycle CDI	Lecture notes Text Chapter 4 Java EE tutorial	EBuild foundation for expanding ability to build web apps with JSF Discuss need and role of tools for developer productivity. Explain how dependency injection works and is used by JSF framework.	Lecture In-class discussion Workshop for Asgn 6	Hand out Asgn 7: Intro to EJB Lab Assignment 6	Week 11
12	Concepts of EJB 3 - Why and when to use EJB - Issues of state	Lecture notes Text Chapters 9 and 13 Java EE tutorial	Use stateless session beans as an envelope for the model tier List the types of EJBs and state purpose of each	Lecture Demonstration In-class discussion	Lab Assignment 7	Week 12

Week	Topics	Readings/Materials	Weekly Learning Outcome(s)	Instructional Strategies	Evaluation Name	Evaluation Date
	- Issues of state - EJB lite Container services Annotations & DD	Java EE tutorial	each Decide whether to use EJBs in a given situation	discussion Hand out Asgn 8: EJB façade for JPA		
13	EJB façade to JPA EJB client apps EJBs and exceptions Container services - Security - JNDI - Timers	Lecture notes Part of Text Chapters 14 and 15	Explain how adding an EJB layer can add robustness and security to enterprise apps Describe different kinds of EJB clients	Lecture Demonstration Workshop for Asgn 8	Lab Assignment 8	Week 13
14	Review Complete term work	Review slides	Name key elements of JEE and how they work together to enable large-scale distributed applications	Review lecture In-class discussion	Test 2	Week 14