ITP220
Java Programming II

COURSE OUTLINE

Prerequisites:

ITP120 with ITD130 as a co-requisite or instructor's permission

Course Description:

Imparts instruction in application of advanced object-oriented techniques to application development using Java. Emphasizes database connectivity, inner classes, collection classes, networking, and threads.

ITP 220 is the second semester of Java programming. The Java programming language is one of the most important computer languages for both client-side and server-side applications. Java allows you write intranet applications and other e-business solutions that are the foundation of corporate computing. It also is integral to the development of client-side applications for everything from games to Droid applications.

This course builds on the fundamentals of Java programming that were introduced in ITP120. Advanced language constructs are covered with an emphasis on integrated object oriented programming concepts. In depth concentration on database applications and simulations are included. All aspects of collection classes are studied.

Topics included allow the student to prepare for the Oracle Certified Professional, Java SE 8 Programmer certification. The actual certification test is not a required part of the course.

Semester Credits: 4 Lecture Hours: 4 Lab/Recitation Hours: 0

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Course Outcomes

At the completion of this course, the student should be able to:

1. Be able to review and program using the introductory topics from the Java programming language. (those from ITP120)
2. Be able to program with advanced language constructs
3. Understand the advanced concepts of inheritance and polymorphism
4. Understand flat file and serializable file I/O concepts
5. Be able to work with inner classes
6. Be able to create fat client graphical user interface-based applications
7. Understand how to connect Java to databases with both raw code and tools such as Hibernate
8. Understand Java threading concepts and programming aspects
9. Prepare for the first Java certification test.
10. Expand your **knowledge of object-oriented programming techniques** by introducing advanced principles of computer programming and problem solving;
11. Introduce **fundamental object-oriented design strategies**;
12. Increase **object-oriented problem-solving abilities**, through the use of real-world practical problems;
13. Evaluate various forms of **data abstraction** based on metrics such as maintainability and efficiency;
14. Introduce algorithms, program development, and construction techniques that use **abstraction, encapsulation, information hiding, and advanced data structures**;
15. Provide a foundation for **further studies in computer science and information technology**.

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Required Materials:

NetBeans Software (Open source from Oracle)

Textbook:

<u>Java, How to Program, 10th edition</u>, Paul and Harvey Deitel, ISBN-978-0-13-380780-6.
Certification book: **<u>OCA Oracle Certified Associate Java SE8 Programmer I Study Guide</u>**
Jeanne Boyarsky and Scott Selikoff, Sybex, 9781118957400

The following supplementary materials are available:
1. Safari Online is available for students to view other Java books online for free
2. Internet searches are a fundamental source for auxiliary materials on Java
3. Materials from the Oracle Academy of which Virginia Western is a member
4. Video movies provided by the instructor.

ITP220 Java Programming I

Topical Description: (Outline chapters and sections to be covered in the book – may include timeline)

Course Topics

1. Programming Fundamentals including multi-dimensional arrays and recursion.
2. Java Topics including interfaces, abstract classes and inner classes.
3. Graphical User Interface events, listeners, and components.
4. Data Structures including stacks, queues, lists, binary tree concepts and binary search tree concepts.
5. Recursive Sorting and Searching Concepts including quicksort, mergesort and binary search.
6. Object Oriented Design and Programming Concepts including objects, references, classes, methods, fields, instance vs. class members, inheritance, polymorphism and overriding.
7. Software Engineering Concepts including problem solving, software analysis and design, testing and debugging, documentation and program structure, UML, encapsulation, abstraction and data structures.
8. Language Topics including linked structures, recursion and exceptions.
9. Analysis of Algorithms
10. Introduction to Java Database

	Regular Class Material	
Module	**Topics**	**Deitel Chapters**
1	Introduction, Programming, Selections and Loops, Classes, Objects, Methods, Arrays, ArrayLists, Strings	1-7 plus 16 (9th ed) or 14 (10th ed)
2	More Mod 1, Inheritance, Polymorphism, Abstract Classes, Interfaces	8-10
3	Exception handling and filing, New APIS for JDK7	11,17 (9th ed) or 11,15 (10th ed)
4	Java Database	28 (9th ed) or 24 (10th ed)
5	Java GUI, inner classes, Java FX	14 (9th ed) or 12 (10th ed) plus Ch 25 (10th ed only)
6	Analysis of Algorithms,	18-19

	Recursion, Searching, Sorting and Big O	
7	Generic Collections, Lists and Stacks, Queues, Priority Queues, Trees	20, 22 (9th ed) or 16,20,21 (10th ed) + handouts
8	Other Topics: Annotations, Functional Programming and Unit Testing	Sec 10.10 + Ch 17 (10th edition only) plus other references
Project	TBA	
Final Exam	Design Patterns	NOTE: You need to do the final or the optional part of the project

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Notes to Instructors
(List information about optional topics, departmental exams, etc)

1. Each module is two weeks long and requires both a quiz and a laboratory assignment submitted through Blackboard
2. A midterm and final exam are required
3. Preparation for the Java certification is optional