

# Idaho PTE Business Education Course with Essential Learning Outcomes and Learning Indicators

Course Title	COMPUTER PROGRAMMING AND SOFTWARE DEVELOPMENT II		
SDPTE Course ID	BE 0260	IBED	IBED 10156

A course designed to build on the skills and knowledge established in Computer Programming and Software Development I.

Term	Semester	Preq	BE 0250
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Notes:

## Business Law BLaw\_7: Demonstrate Knowledge of Computer Law

**BLaw\_7.1 Explain how the advances in computer technology impact upon such areas as property law, contract law, criminal law, and international law.**

Learning Indicator: BLaw_7.1.1	Define the key terms and new issues involved in computer law including security, privacy, computer crime and viruses
Learning Indicator: BLaw_7.1.2	Determine when a computer program can be protected by a patent or a copyright and explain the steps in applying for each
Learning Indicator: BLaw_7.1.3	Identify the circumstances under which the copyright of a computer program has been violated
Learning Indicator: BLaw_7.1.4	Determine when computer-related contracts are service contracts and when they are sale of goods contracts
Learning Indicator: BLaw_7.1.5	Outline the various claims and defenses that are available in civil suits involving computer contracts
Learning Indicator: BLaw_7.1.6	Explain how common law, constitutional law, statutory law, and administrative regulations can be used to prevent the use of computers to invade privacy
Learning Indicator: BLaw_7.1.7	Outline the various types of federal and state statutes designed to combat computer crime
Learning Indicator: BLaw_7.1.8	Discuss the impact of the law of different countries and the impact of international law on computer law

## Information Systems IS\_12: Demonstrate Knowledge of Programming

**IS\_12.10 Demonstrate ability to use Advanced Object Oriented Class Concepts.**

Learning Indicator: IS_12.10.1	Know when it is appropriate to include class variables and methods in a class
Learning Indicator: IS_12.10.2	Understand the role of Java interfaces in a software system and define an interface for a set of implementing classes
Learning Indicator: IS_12.10.3	Describe the use of inheritance by extending a class
Learning Indicator: IS_12.10.4	Describe the use of polymorphism and know how to override methods in a superclass
Learning Indicator: IS_12.10.5	Place the common features (variables and methods) of a set of classes in an abstract class
Learning Indicator: IS_12.10.6	State the implications of reference types of equality, copying, and mixed-mode operations
Learning Indicator: IS_12.10.7	Define and use methods that have preconditions, postconditions, and throw exceptions

**IS\_12.11 Demonstrate ability to use Advanced Arrays Concepts.**

Learning Indicator: IS_12.11.1	Use string methods appropriately
Learning Indicator: IS_12.11.2	Write a method for searching an array
Learning Indicator: IS_12.11.3	Describe why a sorted array can be searched more efficiently than an unsorted array

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- Learning Indicator: IS\_12.11.4 Write a method to sort an array
- Learning Indicator: IS\_12.11.5 Write methods to perform insertions and removals at given positions in an array
- Learning Indicator: IS\_12.11.6 Explain the issues involved when working with arrays of objects
- Learning Indicator: IS\_12.11.7 Perform simple operations with Java's Array List class

## IS\_12.12 Demonstrate ability to use Recursion, Searching, and Sorting.

- Learning Indicator: IS\_12.12.1 Design and implement a recursive method to solve a problem
- Learning Indicator: IS\_12.12.2 Differentiate between recursive and interactive solutions of a problem
- Learning Indicator: IS\_12.12.3 Check and test a recursive method for correctness.
- Learning Indicator: IS\_12.12.4 Explain how a computer executes a recursive method
- Learning Indicator: IS\_12.12.5 Perform a simple complexity analysis an algorithm using big-O notation
- Learning Indicator: IS\_12.12.6 Recognize some typical orders of complexity
- Learning Indicator: IS\_12.12.7 Interpret the behavior of a complex sort algorithm such as quicksort

## IS\_12.13 Demonstrate ability to use Object-Oriented Analysis & Design.

- Learning Indicator: IS\_12.13.1 Describe the general role of analysis and design in the software development process
- Learning Indicator: IS\_12.13.2 Given a problem's description, pick out the classes and their attributes
- Learning Indicator: IS\_12.13.3 Describe the role of a graphical notation such as Unified Modeling Language (UML) in object-oriented analysis and design
- Learning Indicator: IS\_12.13.4 Interpret simple class diagrams and their basic features
- Learning Indicator: IS\_12.13.5 Differentiate between aggregation, inheritance, and other relationships among classes
- Learning Indicator: IS\_12.13.6 Given the description of an activity and its collaboration diagram, write a narrative or pseudo code for that activity

## IS\_12.14 Demonstrate ability to use Lists.

- Learning Indicator: IS\_12.14.1 Distinguish fundamental categories of collections, such as linear, hierarchical, graph, and unordered
- Learning Indicator: IS\_12.14.2 Describe the basic features of lists and their applications
- Learning Indicator: IS\_12.14.3 Use the List interface and the major list implementation classes
- Learning Indicator: IS\_12.14.4 Recognize the difference between index-based operations and content-based operations on a list
- Learning Indicator: IS\_12.14.5 Describe the restrictions on the use of list operations

## IS\_12.15 Demonstrate ability to use Stacks and Queues.

- Learning Indicator: IS\_12.15.1 Interpret the behavior of a stack and recognize applications in which a stack would be useful
- Learning Indicator: IS\_12.15.2 Interpret the behavior of a queue and recognize applications in which a queue would be useful
- Learning Indicator: IS\_12.15.3 Interpret the behavior of a priority queue and recognize applications in which a priority queue would be useful

## IS\_12.16 Demonstrate ability to use Sets and Maps.

- Learning Indicator: IS\_12.16.1 Identify the basic features of sets and their applications
- Learning Indicator: IS\_12.16.2 Use the set interface and the set implementation class
- Learning Indicator: IS\_12.16.3 Differentiate between a set and a sorted set

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Learning Indicator: IS_12.16.4	Recognize the basic features of maps and their applications
Learning Indicator: IS_12.16.5	Use the map interface and the map implementation class
Learning Indicator: IS_12.16.6	Differentiate between a map and a sorted map
Learning Indicator: IS_12.16.7	Describe the general features of collections
Learning Indicator: IS_12.16.8	Use the collection interface

## IS\_12.17 Demonstrate ability to Implement Lists.

Learning Indicator: IS_12.17.1	Use an array to implement and indexed list
Learning Indicator: IS_12.17.2	Use a singly linked structure to implement an indexed list
Learning Indicator: IS_12.17.3	Use an array to implement a positional list
Learning Indicator: IS_12.17.4	Use a doubly linked structure to implement a positional list
Learning Indicator: IS_12.17.5	Describe the run-time and memory trade-offs of array-based and link-based implementations of linear collections

## IS\_12.18 Demonstrate ability to Implement Sets and Maps.

Learning Indicator: IS_12.18.1	Explain why a list implementation of sets and maps is simple but inefficient
Learning Indicator: IS_12.18.2	Develop hash functions to implement sets and maps
Learning Indicator: IS_12.18.3	Utilize different strategies for resolving collisions during hashing.
Learning Indicator: IS_12.18.4	Describe why a hashing implementation of sets and maps can be very efficient

## IS\_12.19 Demonstrate ability to Implement Trees & Priority Queues.

Learning Indicator: IS_12.19.1	Use the appropriate terminology to describe trees
Learning Indicator: IS_12.19.2	Distinguish different types of hierarchical collections, such as general trees, binary trees, binary search trees, and heaps
Learning Indicator: IS_12.19.3	Describe the basic tree traversals
Learning Indicator: IS_12.19.4	Use binary search trees to implement sorted sets and sorted maps
Learning Indicator: IS_12.19.5	Use heaps to implement priority queues

## Information Systems IS\_13: Demonstrate Knowledge of Communications Systems and Networking

### IS\_13.1 Design and implement security plans and procedures for information systems.

Learning Indicator: IS_13.1.1	Identify risks to information systems facilities, data, communications systems, and applications
Learning Indicator: IS_13.1.2	Identify and select controls for information systems facilities, data, communications, and applications appropriate to specific risks
Learning Indicator: IS_13.1.3	Apply procedures used to restart and recover from situations such as system failure and viral infection
Learning Indicator: IS_13.1.4	Identify federal and state legislation pertaining to computer crime, fraud, and abuse
Learning Indicator: IS_13.1.5	Design and implement a security plan for an information system
Learning Indicator: IS_13.1.6	Develop and implement data retention and destruction schedules
Learning Indicator: IS_13.1.7	Develop and implement disaster prevention and recovery procedures

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## Information Systems IS\_14: Demonstrate Knowledge of Information Systems Careers

### IS\_14.1 Describe positions and career paths in information systems.

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Learning Indicator: IS\_14.1.1 Identify positions and career paths in the field of information systems

Learning Indicator: IS\_14.1.2 Identify common tasks performed by information systems workers

Learning Indicator: IS\_14.1.3 Describe education, experience, skills, and personal requirements for careers in information systems

Learning Indicator: IS\_14.1.4 Recognize the impact of technological change on information systems positions and the resulting need for lifelong learning and retraining

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