



**Catholic
Memorial**
HIGH SCHOOL

Year Long Course Plan

Department: Computer Science

Course: Java Programming 487/488

Essential Learning Outcomes: After successfully completing this course, students will be able to:

1. Communicate their knowledge of computer operations, capabilities and limitations for both hardware and software.
2. Demonstrate logical problem solving strategies, not using the computer.
3. Describe the efficiency of using various algorithms and data structures.
4. Understand and apply logical design, testing and integration techniques to solve a problem using the computer.
5. Discuss the Systems life cycle and software development, including social significance and implications of computer systems.
6. Explain computing system fundamentals including language translators, computer architecture, and networking.
7. Demonstrate knowledge of data representation in the decimal, binary and hexadecimal number systems.
8. Construct algorithms, such as searching and sorting algorithms, in Java
9. Demonstrate a mastery of the Java language by creating programs using primitive data types, objects, multiple classes and methods which include parameter passing and return statements.
10. Demonstrate a mastery of the Java language by creating programs that use decision control, and loop structures.
11. Demonstrate a mastery of specific aspects of Java by creating programs using both keyboard and file input/output.
12. Demonstrate knowledge of appropriate vocabulary when dealing with computers.

Quarter 1	Quarter 2
<p>Unit 1: Introduction to Computer Science and Java using BlueJ (ELO 1, 6, 12)</p> <ul style="list-style-type: none"> • History of computers • Programming Languages and translators • BlueJ IDE • vocabulary • ASSESSMENT: Written quiz, create programs <p>Unit 2: Java Basics (ELO 1, 6, 9, 11, 12)</p> <ul style="list-style-type: none"> • Learn about variables • Storage of data and instructions • Steps in the machine instruction cycle • Primary vs secondary memory • Concepts of classes and objects • Calling methods • Parameters and return values • Browsing the API documentation • Objects vs. object references 	<p>Unit 5: Decision control (ELO 2, 4, 7, 9, 10, 11, 12)</p> <ul style="list-style-type: none"> • If and nested if statements • Comparing int, floating-point and Strings • Comparing objects • Switch statement • Boolean type • Boolean operators • De Morgan's law • Flow charts • ASSESSMENT: Written quiz, written test, create programs <p>Unit 6: Iteration (ELO 1, 2, 4, 7, 9, 10, 11, 12)</p> <ul style="list-style-type: none"> • While loop and do loop structure • Flow charts • Infinite loops

<ul style="list-style-type: none"> • ASSESSMENT: Written Test, written quiz, write programs <p>Unit 3: Implementing classes(ELO 4, 9, 11, 12)</p> <ul style="list-style-type: none"> • Creating classes • Creating methods • Use of constructors • Access instance fields and local variables • Documentation • ASSESSMENT: Written Test, written quiz, write programs <p>Unit 4: Fundamental Data Types (ELO 1, 7, 9, 11, 12)</p> <ul style="list-style-type: none"> • Use of Integer vs. floating-point numbers • Limitations, overflow, round off errors • Storage, binary vs. hexadecimal vs. decimal • Constants • Arithmetic expressions and math function • String data type • vocabulary • ASSESSMENT: Written quiz, written test, create programs 	<ul style="list-style-type: none"> • For loop structure • Nested loops • Tracing loop structures • debugging • Random number generator • ASSESSMENT: Written quiz, written test, create programs <p>Unit 7: One-dimensional arrays, sorts and searches (ELO 2, 3, 4, 8, 9, 10, 11, 12)</p> <ul style="list-style-type: none"> • Define One-dimensional array • Arraylist vs. array • Accessing elements of an array • Copying arrays • Searching arrays • Sorting arrays • Efficiency of sorts and searches • ASSESSMENT: Written quiz, written test, create programs
<p>Quarter 3</p>	<p>Quarter 4</p>
<p>Unit 8: Files and 2-dimensional arrays (ELO 2, 8, 9, 10, 11, 12)</p> <ul style="list-style-type: none"> • Define 2-dimensional array, table • Creating a table of values • Searching a table of values • Accessing an element by row/column • Sequential file output • Sequential file output • File I/O with arrays and try/catch • vocabulary • ASSESSMENT: Written quiz, written test, create programs <p>Unit 9: Designing Classes and System Life Cycle application (ELO 2, 3, 4, 8, 9, 10, 11, 12)</p> <ul style="list-style-type: none"> • Designing classes • Appropriate data structures to hold data • Pre- and post- conditions • Techniques for data collection • Formulating a problem to solve • vocabulary • ASSESSMENT: written quiz, major project as test grade 	<p>Unit 10: Event handling, systems (ELO 1,2,3,4,9,10,11,12)</p> <ul style="list-style-type: none"> • Event handling and try/catch • Parts of a system • Data held, processed, captured, output • System testing, implementation and maintenance • Appropriate hardware components • Suitable interface • Systems flowchart • vocabulary • ASSESSMENT: Written Test, written quiz, program, work on dossier <p>Unit 11: social significance and implications of computer systems(ELO 4, 5)</p> <ul style="list-style-type: none"> • Social and economic implications of installing new software • Significance of widespread use of computers in society • Trends in computer systems • Cyclical nature of software production • ASSESSMENT: Written quiz, written Test, stage of dossier <p>Unit 12: Computer Systems, networked computers and</p>

	<p>the case study (ELO 1,2,3,5,7,9,10)</p> <ul style="list-style-type: none">• Types of computers• Ways to process information• Networks and network topology• Networking hardware and software• Protocol, security, integrity, speed• Two's complement used for positive and negative numbers• Data conversion• Utility software• ASSESSMENT: Written quiz, written test
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