{MAT 435} Computer Coding: SCOPE & SEQUENCE

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| **Date** | **Week** | **Units** | **Vocabulary**  |  **Standards Resources** |  |  |  |
| September  | 1-3 | **Unit 1: Introduction to Programming in JavaScript with Karel the Dog (3 weeks/15 hours)**1.1 Introduction to Programming With Karel1.2 More Basic Karel1.3 Karel Can't Turn Right1.4 Functions in Karel1.5 The Start Function1.6 Top Down Design and Decomposition in Karel1.7 Commenting Your Code1.8 Super Karel1.9 For Loops1.10 If Statements1.11 If/Else Statements1.12 While Loops in Karel1.13 Control Structures Example1.14 More Karel Examples and Testing1.15 How to Indent Your Code1.16 Programming with Karel Quiz | CommandsDefining vs. Calling MethodsDesigning methodsProgram entry pointsControl flowLoopingConditionalsClassesCommenting codePreconditions and Postconditions Top Down DesignFunctionCall a FunctionCurly BracketFunction bodyDecompositionFor LoopWhile LoopControl StructureCurly BracketParentheses | 2-AP-10 Use flowcharts and/or pseudocode to address complex problems as algorithms. 2-AP-12 Design and iteratively develop programs that combine control structures, including nested loops and compound conditionals. 3A-AP-17 Decompose problems into smaller components through systematic analysis, using constructs such as procedures, modules, and/or objects. 3A-AP-18 Create artifacts by using procedures within a program, combinations of data and procedures, or independent but interrelated programs. 3A-AP-23 Document design decisions using text, graphics, presentations, and/or demonstrations in the development of complex programs. 3A-CS-01 Explain how abstractions hide the underlying implementation details of computing systems embedded in everyday objects. | <https://codehs.com/teacher/resources>[Lesson Plans | Matsulavage Introduction to Computer Science in JavaScript (Golden) 2022 | CodeHS](https://codehs.com/lms/assignments/189659/lesson_plans?ref=15)[Textbook: Intro to JavaScript Textbook | CodeHS](https://codehs.com/textbook/introjs_textbook/) |  |  |
|  | 4-5 | **Unit 2: Karel Challenges (2 weeks, 7-10 hours)**2.1.1 Fetch2.1.2 Racing Karel2.1.3 Tower Builder2.1.4 Super Cleanup Karel2.1.5 Double Tennis Balls | Break Down (Decompose)Programming StyleCommentDecompositionFencepost Problem | 3A-AP-17 Decompose problems into smaller components through systematic analysis, using constructs such as procedures, modules, and/or objects. 3A-AP-23 Document design decisions using text, graphics, presentations, and/or demonstrations in the development of complex programs. 3B-AP-14 Construct solutions to problems using student-created components, such as procedures, modules and/or objects.  | [Lesson Plans | Matsulavage Introduction to Computer Science in JavaScript (Golden) 2022 | CodeHS](https://codehs.com/lms/assignments/189659/lesson_plans?ref=15)[Textbook: Intro to JavaScript Textbook | CodeHS](https://codehs.com/textbook/introjs_textbook/) |  |  |
| October | 6 | **Unit 3: JavaScript & Graphics (1 week/5 hours)**3.1 Hello World3.2 Variables3.3 User Input3.4 Basic Math in JavaScript3.5 Using Graphics in JavaScript3.6 Programming with JavaScript Quiz | VariablesUser InputArithmetic ExpressionsGraphicsPrintlnBooleanDeclare a VariableIntegerStringInitialize a VariableFloatreadLinereadIntreadFloatConstantIncrementDecrementCoordinate systemgetWidth()getHeight()Radius | 3A-AP-18 Create artifacts by using procedures within a program, combinations of data and procedures, or independent but interrelated programs. 3A-AP-23 Document design decisions using text, graphics, presentations, and/or demonstrations in the development of complex programs. 3B-AP-14 Construct solutions to problems using student-created components, such as procedures, modules and/or objects.  | [Lesson Plans | Matsulavage Introduction to Computer Science in JavaScript (Golden) 2022 | CodeHS](https://codehs.com/lms/assignments/189659/lesson_plans?ref=15)[Textbook: Intro to JavaScript Textbook | CodeHS](https://codehs.com/textbook/introjs_textbook/) |  |  |
|  | 7 | **Unit 4: Graphics Challenges (1 week, 5 hours)**4.1 Collaborative Programming4.2 Graphics Challenges | All previous vocabulary  | 2-AP-11 Create clearly named variables that represent different data types and perform operations on their values. 2-AP-14 Create procedures with parameters to organize code and make it easier to reuse. 2-AP-19 Document programs in order to make them easier to follow, test, and debug. 3A-AP-17 Decompose problems into smaller components through systematic analysis, using constructs such as procedures, modules, and/or objects. 3A-AP-23 Document design decisions using text, graphics, presentations, and/or demonstrations in the development of complex programs. 3B-AP-12 Compare and contrast fundamental data structures and their uses. 3B-AP-16 Demonstrate code reuse by creating programming solutions using libraries and APIs. | [Lesson Plans | Matsulavage Introduction to Computer Science in JavaScript (Golden) 2022 | CodeHS](https://codehs.com/lms/assignments/189659/lesson_plans?ref=15)[Textbook: Intro to JavaScript Textbook | CodeHS](https://codehs.com/textbook/introjs_textbook/) |  |  |
| November | 8-10 | **Unit 5: JavaScript Control Structures (3 weeks/15 hours)**5.1 Booleans5.2 Logical Operators5.3 Comparison Operators5.4 If Statements5.5 For Loops in JavaScript5.6 General For Loops5.7 For Loop Practice5.8 Random Numbers5.9 While Loops5.10 Loop and a Half5.11 JavaScript Control Structures Quiz | BooleansFor LoopsConditionalsNested Control StructuresWhile LoopsLogical operatorOr operatorAnd operatorNot operatorNegateIf StatementIf Else StatementRandomizePseudorandom | 2-AP-11 Create clearly named variables that represent different data types and perform operations on their values. 2-AP-14 Create procedures with parameters to organize code and make it easier to reuse. 2-AP-19 Document programs in order to make them easier to follow, test, and debug. 3A-AP-17 Decompose problems into smaller components through systematic analysis, using constructs such as procedures, modules, and/or objects. 3A-AP-23 Document design decisions using text, graphics, presentations, and/or demonstrations in the development of complex programs. 3B-AP-12 Compare and contrast fundamental data structures and their uses. 3B-AP-14 Construct solutions to problems using student-created components, such as procedures, modules and/or objects. 3B-AP-16 Demonstrate code reuse by creating programming solutions using libraries and APIs. | [Lesson Plans | Matsulavage Introduction to Computer Science in JavaScript (Golden) 2022 | CodeHS](https://codehs.com/lms/assignments/189659/lesson_plans?ref=15)[Textbook: Intro to JavaScript Textbook | CodeHS](https://codehs.com/textbook/introjs_textbook/) |  |  |
| November 11th  |  | **10 WEEK MARKING PERIOD CLOSES**  | **10 WEEK MARKING PERIOD CLOSES** | **10 WEEK MARKING PERIOD CLOSES** | **10 WEEK MARKING PERIOD CLOSES** |  |  |
| November **20 week making period**  | 1-2 | **Unit 6: Control Structures Challenges (1-2 weeks, 5-8 hours)**6.1.1 Guessing Game6.1.2 Circles in Circles6.1.3 Circles in Squares6.1.4 Happy Birthday! | All previous vocabulary | 2-AP-11 Create clearly named variables that represent different data types and perform operations on their values. 2-AP-12 Design and iteratively develop programs that combine control structures, including nested loops and compound conditionals. 2-AP-14 Create procedures with parameters to organize code and make it easier to reuse. 2-AP-19 Document programs in order to make them easier to follow, test, and debug. | [Lesson Plans | Matsulavage Introduction to Computer Science in JavaScript (Golden) 2022 | CodeHS](https://codehs.com/lms/assignments/189659/lesson_plans?ref=15) |  |  |
|  |  |  |  |  |  |  |  |
| Nov. 23-27 | **Thanksgiving Break** |  |  |  |
| Nov. – Dec.  | 3-4 | **Unit 7: Functions and Parameters (2 weeks/10 hours)**7.1 Functions and Parameters 17.2 Functions and Parameters 27.3 Functions and Parameters 37.4 Functions and Return Values 17.5 Functions and Return Values 27.6 Local Variables and Scope7.7 Functions and Parameters Quiz | Functions with and without parametersFunctions with and without return valuesNested Control StructuresLocal variables and scopeArgumentFunction bodyParameter | 2-AP-12 Design and iteratively develop programs that combine control structures, including nested loops and compound conditionals. 2-AP-14 Create procedures with parameters to organize code and make it easier to reuse. 2-AP-19 Document programs in order to make them easier to follow, test, and debug. 3A-AP-13 Create prototypes that use algorithms to solve computational problems by leveraging prior student knowledge and personal interests. 3A-AP-17 Decompose problems into smaller components through systematic analysis, using constructs such as procedures, modules, and/or objects. 3A-AP-18 Create artifacts by using procedures within a program, combinations of data and procedures, or independent but interrelated programs. | [Lesson Plans | Matsulavage Introduction to Computer Science in JavaScript (Golden) 2022 | CodeHS](https://codehs.com/lms/assignments/189659/lesson_plans?ref=15)[Teacher Resources | CodeHS](https://codehs.com/teacher/resources) |  |  |
| December | 5-6 | **Unit 8: Functions Challenges (1-2 weeks/5-8 hours)**18.1.7 Hailstone Sequence19.2.1 Balloons17.1.4 Grades8.1.4 Ghost Invasion! | All previous vocabulary | 3B-AP-12 Compare and contrast fundamental data structures and their uses. 3B-AP-14 Construct solutions to problems using student-created components, such as procedures, modules and/or objects. 3B-AP-16 Demonstrate code reuse by creating programming solutions using libraries and APIs. 3B-AP-19 Develop programs for multiple computing platforms. 2-AP-14 Create procedures with parameters to organize code and make it easier to reuse. 2-AP-19 Document programs in order to make them easier to follow, test, and debug.  | [Lesson Plans | Matsulavage Introduction to Computer Science in JavaScript (Golden) 2022 | CodeHS](https://codehs.com/lms/assignments/189659/lesson_plans?ref=15) |  |  |
|  |  |  |  |  |  |  |  |
| Dec. 21-Jan 1 | **Christmas Break** |  |  |  |
| January 2-27 | 7-10 | **Final Project JavaScript (3-4 weeks/15-20 hours)**Collaborative open-ended final project which encourages creativity12.1.1 Planning and Design12.1.3 Write the Code! | All previous vocabulary | 2-AP-14 Create procedures with parameters to organize code and make it easier to reuse. 2-AP-19 Document programs in order to make them easier to follow, test, and debug. 3A-AP-13 Create prototypes that use algorithms to solve computational problems by leveraging prior student knowledge and personal interests. 3A-AP-17 Decompose problems into smaller components through systematic analysis, using constructs such as procedures, modules, and/or objects. 3A-AP-18 Create artifacts by using procedures within a program, combinations of data and procedures, or independent but interrelated programs. 3A-AP-23 Document design decisions using text, graphics, presentations, and/or demonstrations in the development of complex programs. | [Lesson Plans | Matsulavage Introduction to Computer Science in JavaScript (Golden) 2022 | CodeHS](https://codehs.com/lms/assignments/189659/lesson_plans?ref=15)[Teacher Resources | CodeHS](https://codehs.com/teacher/resources) |  |  |
| Jan. 27  |  | **20 WEEK MARKING PERIOD CLOSES** | **20 WEEK MARKING PERIOD CLOSES** | **20 WEEK MARKING PERIOD CLOSES** | **20 WEEK MARKING PERIOD CLOSES** |  |  |
| Jan.- Feb 30 week marking period | 1-6  | **Unit 1: Welcome to Python****Unit 2: Intro to Programming with Turtle Graphics (6 weeks/30 hours)**1.1 Welcome2.1 Intro to Python with Tracy the Turtle2.2 Tracy's Grid World2.3 Turning Tracy2.4 For Loops2.5 Turning Tracy Using Angles2.6 Comments2.7 Naming Guidelines2.8 Functions2.9 Artistic Effects2.10 Top Down Design2.11 Variables2.12 User Input2.13 Parameters2.14 Using i in For Loops2.15 Extended Loop Control2.16 If Statements2.17 If/ Else Statements2.18 While Loops2.19 Putting Together Control Structures2.20 Intro to Programming with Turtle Graphics Quiz | CommandMoving TracyTracy’s Coordinate SystemFor LoopsFunctions and ParametersTop Down DesignVariablesUser InputIf/else StatementsWhile Loopsleft(angle)right(angle)speed (number 1-10)Color("red") | 2-AP-11 Create clearly named variables that represent different data types and perform operations on their values. 3A-AP-13 Create prototypes that use algorithms to solve computational problems by leveraging prior student knowledge and personal interests. 3B-AP-15 Analyze a large-scale computational problem and identify generalizable patterns that can be applied to a solution. 3A-AP-16 Design and iteratively develop computational artifacts for practical intent, personal, expression, or to address a societal issue by using events to initiate instructions. 3A-AP-18 Create artifacts by using procedures within a program, combinations or data and procedures, or independent but interrelated programs. | [Lesson Plans | Matsulavage Intro to Computer Science in Python 3 2022 | CodeHS](https://codehs.com/lms/assignments/189660/lesson_plans?ref=15)[Teacher Resources | CodeHS](https://codehs.com/teacher/resources) |  |  |
| March  | 7-8 | **Unit 3: Basic Python and Console Interaction (2-3 weeks/10-15 hours)**3.1 Printing in Python3.2 Variables and Types3.3 User Input3.4 Mathematical Operators3.5 String Operators3.6 Comments3.7 Basic Python and Console Interaction Quiz | PrintingVariablesTypesUser InputConverting Input TypesArithmetic ExpressionsString OperatorsCommentsGraphics in Python | 2-AP-11 Create clearly names variables that represent different data types and perform operations on their values. 2-AP-12 Design and iteratively develop programs that combine control structures, including nested loops and compound conditionals. 2-AP-13 Decompose problems and subproblems into parts to facilitate the design, implementation, and review of programs. 2-AP-14 Create procedures with parameters to organize code and make it easier to reuse. 2-AP-18 Distribute tasks and maintain a project timeline when collaboratively developing computational artifacts. 3A-AP-23 Document design decisions using text, graphics, presentation, and/or demonstrations in the development of complex programs. 3B-AP-12 Compare and contrast fundamental data structures and their uses. | [Lesson Plans | Matsulavage Intro to Computer Science in Python 3 2022 | CodeHS](https://codehs.com/lms/assignments/189660/lesson_plans?ref=15)[Teacher Resources | CodeHS](https://codehs.com/teacher/resources) |  |  |
| March 24th  |  | **30 WEEK MARKING PERIOD CLOSES**  | **30 WEEK MARKING PERIOD CLOSES** | **30 WEEK MARKING PERIOD CLOSES** | **30 WEEK MARKING PERIOD CLOSES** |  |  |
|  |  |  |  |  |  |  |  |
| March 40 week marking period | 1 | **Unit 4: Conditionals (2 weeks/10 hours)**4.1 Booleans4.2 If Statements4.3 Comparison Operators4.4 Logical Operators4.5 Floating Point Numbers and Rounding4.6 Conditionals Quiz | If StatementsBoolean ValuesLogical OperatorsComparison OperatorsFloating Point Numbers and “Equality” | 2-AP-18 Distribute tasks and maintain a project timeline when collaboratively developing computational artifacts. 3A-AP-23 Document design decisions using text, graphics, presentation, and/or demonstrations in the development of complex programs.  | [Lesson Plans | Matsulavage Intro to Computer Science in Python 3 2022 | CodeHS](https://codehs.com/lms/assignments/189660/lesson_plans?ref=15)[Teacher Resources | CodeHS](https://codehs.com/teacher/resources) |  |  |
| April 1-16  | **Spring Break** |  |  |  |
| April 17 | 2 | Unit 4: Conditionals (2 weeks/10 hours)‘’  | ‘’ | ‘’  |  |  |  |
| April -May  | 3-4 | **Unit 5: Looping (2 weeks/10 hours)**5.1 While Loops5.2 For Loops5.3 Break and Continue5.4 Nested Control Structures5.5 Looping Quiz | While LoopsFor LoopsBreak and ContinueNested Control Structures | 2-AP-12 Design and iteratively develop programs that combine control structures, including nested loops and compound conditionals. 2-AP-13 Decompose problems and subproblems into parts to facilitate the design, implementation, and review of programs. 2-AP-18 Distribute tasks and maintain a project timeline when collaboratively developing computational artifacts. 3A-AP-14 Use lists to simplify solutions, generalizing computational problems instead of repeatedly using simple variables. 3B-AP-12 Compare and contrast fundamental data structures and their uses. | [Lesson Plans | Matsulavage Intro to Computer Science in Python 3 2022 | CodeHS](https://codehs.com/lms/assignments/189660/lesson_plans?ref=15)[Teacher Resources | CodeHS](https://codehs.com/teacher/resources) |  |  |
| May | 5-8 | **Unit 6: Functions and Exceptions (3 weeks/15 hours)**6.1 Functions6.2 Functions and Parameters6.3 Namespaces in Functions6.4 Functions and Return Values6.5 Exceptions6.6 Functions & Exceptions Quiz | FunctionsNamespacesParametersReturn ValuesExceptions | 2-AP-10 Use flowcharts and/or pseudocode to address complex problems as algorithms. 2-AP-12 Design and iteratively develop programs that combine control structures, including nested loops and compound conditionals. 2-AP-13 Decompose problems and subproblems into parts to facilitate the design, implementation, and review of programs. 3A-AP-13 Create prototypes that use algorithms to solve computational problems by leveraging prior student knowledge and personal interests. 3A-AP-14 Use lists to simplify solutions, generalizing computational problems instead of repeatedly using simple variables. 3A-AP-18 Create artifacts by using procedures within a program, combinations or data and procedures, or independent but interrelated programs. 3A-AP-23 Document design decisions using text, graphics, presentation, and/or demonstrations in the development of complex programs. 3B-AP-12 Compare and contrast fundamental data structures and their uses. | [Lesson Plans | Matsulavage Intro to Computer Science in Python 3 2022 | CodeHS](https://codehs.com/lms/assignments/189660/lesson_plans?ref=15)[Teacher Resources | CodeHS](https://codehs.com/teacher/resources) |  |  |
| June  | 9 | **Final Exam (.5 weeks/2-3 hours)** | Students will be tested on all topics included in the courseMultiple choice, fill-in-the-blank, short answer, and coding questions included | 3A-AP-17 Decompose problems into smaller components through systematic analysis, using constructs such as procedures, modules, and/or objects. 3A-AP-23 Document design decisions using text, graphics, presentation, and/or demonstrations in the development of complex programs. 3B-AP-12 Compare and contrast fundamental data structures and their uses. 3B-AP-14 Construct solutions to problems using student-centered component, such as procedures, module, and/or objects. 3B-AP-15 Analyze a large-scale computational problem and identify generalizable patterns that can be applied to a solution. | [Final Exam: Lesson Mapping Resource | CodeHS](https://codehs.com/library/resource/9578) |  |  |
| June 16 marking period closes |  | **40 WEEK MARKING PERIOD CLOSES**  | **40 WEEK MARKING PERIOD CLOSES** | **40 WEEK MARKING PERIOD CLOSES** | **40 WEEK MARKING PERIOD CLOSES** |  |  |