

# ET580 Object-Oriented Programming in C++

## Spring 2021 Course Schedule 8/26 - 12/14

|               | Topics   | Watch  | Learning Activities   | Submissions   | Due Dates                           |
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| 01/29 - 01/31 | Start Here   | Syllabus Video<br>Software Setup Video<br>Resource Video             | Setup Software<br>Setup Discord/Piazza<br>View Course<br>Schedule |   | 01/31                               |
| 02/01 - 02/07 | Asymptotic Analysis<br><br>Review:<br>Functions & Arrays<br>Partially Filled Arrays<br>Runtime Stack<br>Recursive Functions                | Lecture Video<br><br>Reference:<br>Savitch<br>Ch. 1-5, 9, 12, 13     | Review Problems   | Practice Quiz   | 02/07<br><br>PQ 02/05               |
| 02/08 - 02/14 | Classes I<br><br>Classes<br>Objects<br>Accessors<br>Mutators<br>Constructors<br>Access Modifiers<br>AddressOf<br>Scope/Lifetime<br>Structs | Lecture Video<br>Practice Video<br><br>Reference:<br>Savitch<br>Ch.6 | Practice Problems<br>Homework Problems                            | Quiz 1a, 1b:<br>1D Array Algorithms<br>Tracing Recursive Functions<br>Asymptotic Analysis | 02/14<br><br>Q1a 02/12<br>Q1b 02/14 |

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| 02/15 - 02/21 | <p>Classes II</p> <p>Default Constructors<br/>User Defined Constructor<br/>Member Initialization<br/>Constructor Delegation<br/>Const Member Functions<br/>Static Members<br/>Inline vs. Out-of-Line<br/>Composition<br/>Nested Classes<br/>Temporary Objects<br/>L-Values vs R-Values<br/>N-Queens IsSafe</p> | <p>Lecture Video<br/>Practice Video</p> <p>Reference:<br/>Savitch<br/>Ch. 6-7</p>                     | Practice Problems<br>Homework Problems | Q 2a, 2b:<br>Classes I:<br>Member Functions<br>Defining Classes                                      | <p>02/21</p> <p>Q2a 02/19<br/>Q2b 02/21</p> |
| 02/22 - 03/07 | <p>Operator Overloading</p> <p>Unary Member<br/>Subscript Member<br/>Shortcut Member<br/>Relational Member<br/>Relational Non-Member<br/>Arithmetic Member<br/>Arithmetic Non-Member<br/>Friend Non-Member<br/>Automatic Type Conversion<br/>Input/Output<br/>Postfix/Prefix</p>                               | <p>Lecture Video<br/>Practice Video<br/>Backtracking Video</p> <p>Reference:<br/>Savitch<br/>Ch.8</p> | Practice Problems<br>Homework Problems | Q 3a, 3b:<br>Classes II:<br>Constructors<br>Const Member Functions<br>Composition<br>Nesting Classes | <p>03/07</p> <p>Q3a 03/05<br/>Q3b 03/07</p> |
| 03/08 - 03/14 | <p>Separate Compilation</p> <p>Backtracking</p>  | <p>Lecture Video<br/>Practice Video</p> <p>Reference:<br/>Savitch<br/>Ch.11</p>                       | Practice Problems<br>Homework Problems | <p>Cumulative Quizzes 1A/1B</p> <p>Classes I<br/>Classes II<br/>Operator Overloading</p>             | <p>03/14</p> <p>Q4a 03/12<br/>Q4b 03/14</p> |

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| 03/15 - 03/28 | Pointers and Dynamic Arrays<br><br>Pointers vs. References<br>Pointers and Functions<br>Dynamic Variables<br>Scope vs Lifetime<br>Function Pointers<br>Typedef<br>Memory Leaks<br>Dangling Pointers<br>Dynamic Arrays<br>Pointer Arithmetic<br>Dynamic Array Functions<br>Dynamic Arrays of Arrays<br><br>Dynamic Programming | Lecture Video<br>Practice Video<br>Dynamic Prog. Video<br><br>Reference:<br>Savitch<br>Ch.10 | Practice Problems<br>Homework Problems | Q 5:<br>Separate Compilation  | 03/28<br><br>Q5 03/21               |
| 04/05 - 04/11 | Pointers and Classes<br><br>Copy Constructor<br>Assignment Overload<br>Destructor<br>Arrow Operator<br>This Pointer<br>Shallow vs. Deep Copy<br>Copy Elision, RVO, NRVO   | Lecture Video<br>Practice Video<br><br>Reference:<br>Savitch<br>Ch.10                        | Practice Problems<br>Homework Problems | Q 6a, 6b:<br>Pointers:<br>Memory Leaks<br>Dynamic Variables<br><br>Dynamic Arrays:<br>Memory Leaks<br>Pointer Arithmetic<br>Grow Function | 04/11<br><br>Q6a 04/09<br>Q6b 04/11 |
| 04/12 - 04/18 | Object Relationships<br><br>Composition, Aggregation<br>Inheritance and the Big Three<br>Multiple Inheritance<br>Diamond problem<br>Redefined Functions   | Lecture Video<br>Practice Video<br><br>Reference:<br>Savitch<br>Ch.14                        | Practice Problems<br>Homework Problems | Q 7a, 7b:<br>The Big Three<br>Deep vs. Shallow Copy<br>This<br>Arrow Operator   | 04/18<br><br>Q7a 04/16<br>Q7b 04/18 |

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| 04/19 - 04/25 | Polymorphism<br><br>Virtual Functions<br>Early/Late Binding<br>Overriding<br>Covariant Functions<br>Virtual Destructors<br>Pure Virtual Functions<br>Abstract Classes<br>Slicing Problem<br>Function Objects | Lecture Video<br>Practice Video<br><br>Reference:<br>Savitch<br>Ch.15                     | Practice Problems<br>Homework Problems                         | Cumulative Quizzes 2A/2B<br><br>Pointers<br>Dynamic Arrays<br>Pointers and Classes<br>Aggregation<br>Inheritance | 04/25<br><br>Q8a 04/23<br>Q8b 04/25   |
| 04/26 - 05/02 | Template Programming<br><br>Exceptions<br>Templates & Functions<br>Templates & Classes<br>Templates & Inheritance<br>Templates & Polymorphism<br>Template Containers   | Lecture Video<br>Practice Video<br><br>Reference:<br>Savitch<br>Ch.16                     | Practice Problems<br>Homework Problems                         | Q 9a, 9b:<br>Polymorphism<br>Abstract classes<br>Slicing problem<br>Virtual functions<br>Early/Late binding      | 05/02<br><br>Q9a 04/30<br>Q9b 05/02   |
| 05/03 - 05/09 | Data Structures and STL<br><br>Stack, Queue<br>Singly and Doubly Linked List<br>Iterators<br>Containers<br>STL Containers<br>STL Iterators<br>STL Algorithms   | Lecture Video<br>Practice Video<br>Project Video<br><br>Reference:<br>Savitch<br>Ch.17,19 | Practice Problems<br>Homework Problems<br>Project Introduction | Q 10a, 10b:<br>Exceptions<br>Template Functions<br>Template Classes  | 05/09<br><br>Q10a 05/07<br>Q10b 05/09 |

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| 05/10 - 05/16 | <p>Searching and Sorting</p> <p>Review: Binary Search, Selection Sort, Insertion Sort</p> <p>Exceptions, Merge Sort, Quick Sort and Big O</p> | <p>Lecture Video<br/>Practice Video</p> <p>Reference:<br/>Savitch<br/>Ch.18</p> | Project (Due 5/18) | <p>Q 11a, 11b:<br/>Vectors<br/>Linked Lists<br/>Stacks<br/>Queues<br/>STL Containers</p> | <p>05/16</p> <p>Q11a 05/14<br/>Q11b 05/16</p> |
| 05/19 - 05/23 | Final Exam  |   |                    | Cumulative Examination   | 05/19 – 05/23                                 |