| Course Number: CSC-287-F1 | Instructor: Ethan Cerami, Ph.D. |
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| Date/Time: Saturdays 12:00 PM - 2:45 PM | Office Hours: By appointment |
|  | Email: ethan.cerami@bhcc.edu |

We will meet each week on Webex: [Course Webex URL](https://bhcc.webex.com/bhcc/j.php?MTID=mde429b915d66eab9a3c6e73ffcb0b95e)

**COURSE TITLE: OOPL for Programmers**

**WELCOME:**

Welcome to CSC-287! My name is Ethan Cerami, and I will be your instructor this semester.

This is a course in building **object-oriented software applications**. It is designed to cover: 1) language-agnostic fundamentals of object-oriented programming; and 2) language-specific applications of object-oriented programming.

To illustrate core principles of object-oriented programming, we will specifically focus on **Python** and **React**. Python is a widely popular programming language for building large-scale software applications, and increasingly the programming language of choice for data science and machine learning. React is a widely used, object-oriented JavaScript/TypeScript framework for building interactive web applications.

As we cover the fundamental principles of object-oriented programming, and the fundamentals of Python and React, we will also cover the essentials of web development and Web Application Interfaces (APIs). We will also cover best practices for building large-scale object-oriented applications, including the Unified Modeling Language (UML), design patterns, requirements specifications, source control, unit testing, and package management.

Throughout the semester, you will gain practical skills in Python and React, and practice those skills via multiple programming programming assignments and one final capstone project.

**OFFICIAL COURSE DESCRIPTION:** This course is for students who already have deep knowledge of an Object-Oriented Language (Advanced Java or Advance C++). This course will cover in depth three of the most commonly requested OOPL in the job market, C#, Visual Basic.NET and Python (languages covered may change depending on the current job market needs). The course will focus on the idiosyncrasies of the different new languages. Knowledge of programming structures and ability to implement lengthy and complex programming solutions, use of the debuggers and ease to adapt in different IDEs is assumed. Long capstone-like projects will be required for each language examined and students will be responsible to analyze and solve the problems by applying the good programming practices and styles already learned in prior semesters.

**PREREQUISITES**: Grade of C or better in Advanced Java programming (CIT285) or Advanced C++ (CIT284), and Precalculus (MAT197).

**STUDENT LEARNING OUTCOMES:** Upon completion of this course students should know and feel comfortable demonstrating the following material, concepts, and techniques of Object-Oriented Programming by creating working computer programs:

* Encapsulation
* Polymorphism
* Abstract Classes
* Inheritance
* Data Abstraction
* Aggregation vs. Composition in Class Design
* Interfaces
* Use of language libraries to enhance programs
* Basic Design Patterns
* Create and utilize UML (Unified Modeling Language) diagrams to outline classes
* Create and utilize Use Case Diagrams as part of a program specification
* Creation and use of detailed program requirements specifications

**PROCEDURES AND OBJECTIVES:** Lecture and group discussions, readings for class from texts, online resources, and other related materials, hands-on participative exercises.

**REQUIRED TEXT:**

* **Python Crash Course, 2nd Edition: A Hands-On, Project-Based Introduction To Programming**, Eric Matthes, 2019, No Starch Press, San Francisco. ISBN-13: 978-1593279288. [Amazon Link](https://www.amazon.com/Python-Crash-Course-2nd-Edition/dp/1593279280).
  + (Optional) You can also purchase cheat sheets associated with the book at: <https://leanpub.com/beginners-python-cheat-sheets/>.

**SOURCE CODE:** All source code discussed in class will be made available via GitHub at: <https://github.com/ecerami/oopl>.

**ATTENDANCE POLICY**: Students will be required to attend and participate in all online classes.

**SPECIFIC EVALUATION AND GRADING PROCEDURES (INCLUDING INTELLECTUAL SKILLS):** Students will be required to complete a variety of assignments outside of class, and create software applications in order to demonstrate competency in software development using the languages taught.

There will be a total of **8 assignments (each worth 10%)**, and **one capstone project (worth 20%)**.

| **Evaluation** | **% Value** |
| --- | --- |
| Assignment #1: Focus on Python Essentials | 14% |
| Assignment #2: Focus on Fundamentals of OO Python | 14% |
| Assignment #3: Focus on Unit Testing and Python Design Patterns | 14% |
| Assignment #4: Focus on PyGame | 14% |
| Assignment #5: Focus on TypeScript | 14% |
| Assignment #6: Hello, React! | 14% |
| Assignment #7: Focus on React | 16% |
| **Total** | **100%** |

Students will be graded on correctness, modularity and readability of code.

**INTEGRITY OF SCHOLARSHIP:** Honesty in all academic work is expected of every student. This means that projects, homework, and examinations shall be the original creation of each student.

**DISABILITY SUPPORT SERVICES:** The disability support services office is a student-focused department dedicated to assisting members of the BHCC community with documented disabilities. Students may be eligible for services that include testing and classroom accommodation. For more information or to request an accommodation, contact the disability support services office at [disabilitysupport@bhcc.edu](https://email.bhcc.edu/owa/14.3.487.0/scripts/premium/redir.aspx?C=1nruPOYq0bOyyCdwmDLCN06J7hZRi_ZvLU9n8BC1pY17NXvSzlHYCA..&URL=mailto%3adisabilitysupport%40bhcc.edu) or 617-228-2327. Students are encouraged to request accommodations as early as possible, ideally before the start of the semester. For information about programs and services please visit [https://www.bhcc.edu/disabilitysupportservices](https://email.bhcc.edu/owa/14.3.487.0/scripts/premium/redir.aspx?C=FFVNZXsU91apilRqIilC3HNkp59BOTW3HZZBlo3rI257NXvSzlHYCA..&URL=https%3a%2f%2fwww.bhcc.edu%2fdisabilitysupportservices).

**MEETING ETIQUETTE:** Please arrive on time. Please make sure your microphone is working but muted when you enter the meeting space. A webcam is not required, but a working microphone will be very helpful. If you share your workspace with others, a set of noise-cancelling headphones is recommended.

**COURSE OUTLINE**:

| **Wk** | **Class Date** | **Topic** | **Assigned Reading**  **P = Python Textbook** |
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| 1 | 9/11/2021 | Introduction to Course.  Introduction to Python.  Getting set-up.  Python variables and lists.  Git Essentials. | P: Chapters 1-3  P: Appendix A-D |
| 2 | 9/18/2021 | Python Lists, Dictionaries, User Input and Functions | P: Chapters 4-8 |
| 3 | 9/25/2021 | Python: Object-Oriented Design  Introduction to UML  Assignment #1 Due @ Midnight: Focus on Python Essentials | P: Chapter 9 |
| 4 | 10/2/2021 | Python: Files, Exception Handling, and Testing  Assignment #2 Due @ Midnight: Focus on Fundamentals of OO Python | P: Chapters 10-11 |
| 5 | 10/9/2021 | Python: Design Patterns | No assigned Reading: Please Refer to Lecture Notes |
| 6 | 10/16/2021 | Python: Design Patterns (continued), PyGame and Alien Invasion  Assignment #3 Due @ Midnight: Focus on Unit Testing and Python Design Patterns | P: Chapters 12-13 |
| 7 | 10/23/2021 | Python: Essentials of Web API Development | Online reading:   * [Using FastAPI to Build Python Web APIs](https://realpython.com/fastapi-python-web-apis/) |
| 8 | 10/30/2021 | Introduction to JavaScript  Assignment #4 Due @ Midnight: Focus on PyGame | No assigned Reading: Please Refer to Lecture Notes |
| 9 | 11/06/2021 | Introduction to TypeScript Fundamentals | No assigned Reading: Please Refer to Lecture Notes |
| 10 | 11/13/2021 | OO TypeScript | No assigned Reading: Please Refer to Lecture Notes |
| 11 | 11/20/2021 | Introduction to React. Getting set-up with create-react-app  Assignment #5 Due @ Midnight: Focus on TypeScript | No assigned Reading: Please Refer to Lecture Notes |
|  | 11/27/2021 | Thanksgiving Holiday - No Class |  |
| 12 | 12/4/2021 | React: Components, Properties and Victory Charts | No assigned Reading: Please Refer to Lecture Notes |
| 13 | 12/11/2021 | React: State Management  Assignment #6 Due @ Midnight: Hello, React! | No assigned Reading: Please Refer to Lecture Notes |
| 14 | 12/18/2021 | React: Accessing External APIs and Course Wrap-up  Assignment #7 Due @Midnight: Focus on React Components and State Management | No assigned Reading: Please Refer to Lecture Notes |