



CECS 342-06, Principles of Programming Languages, Spring 2022

Instructor: Dr Claus Jürgensen

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Course: CECS 342-06

Term: Spring 2022

Class Days/Times: Friday 8–10:45pm	https://csulb.zoom.us/j/88484463856? pwd=MWh3eFRwaEFXVlFaakVlMDREUXluZz09 Meeting ID: 884 8446 3856, Passcode: 244713
Room: VEC-402	
Office Hours: Tue/Thu 2–3:15pm or by appointment	https://csulb.zoom.us/j/84813487518? pwd=TGRvOUlnNitKRdlmd1JPbTB4NlVkUT09 Meeting ID: 848 1348 7518, Passcode: 269784
Room: TBD	

Course Description

Fundamental topics in the design and implementation of programming languages. Programming language paradigms. Comparison of languages in type systems, data types, control flow, subroutines, concurrency, and exception handling.

- **Units:** 3
- **Prerequisite:** CECS 328 with a grade of "C" or better.
- **Recommended Textbook:** Programming Language Pragmatics, Fourth Edition, Scott, M. Morgan Kaufmann Publishers, 2016.

ABET Student Outcomes

1. The course satisfies following [ABET for CS](#) (scroll down to 'Program Criteria' and click 'Computer Science and Similarly Named Computing Programs') student outcomes:
2. Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions. **Applicable.**
3. Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline. **Applicable.**
4. (Communicate effectively in a variety of professional contexts. **Not applicable.**)
5. Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles. **Applicable.**
6. (Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline. **Not applicable.**)
7. Apply computer science theory and software development fundamentals to produce computing-based solutions. **Applicable.**

Course Objectives

We will study the how's and why's of programming language design and implementation to a much greater level of detail than is possible in lower-level courses. We will cover essential programming language concepts like binding time, type systems, abstraction mechanisms, reflection, recursion, memory management, lambda calculus, and message passing. We will also contrast different language paradigms (procedural, object-oriented, functional, logic, concurrent) and complete programming assignments in each. Particular emphasis will be placed on the functional programming paradigm, and its concerns of higher-order functions and immutable state.



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Course Structure and Delivery Mode

This course is conducted entirely online. You will access the course material and activities on [BeachBoard](#) and are required to participate in synchronous class meetings via [Zoom](#). If you need technical assistance at any time during the course or need to report a problem with BeachBoard, please contact the [Student Beachboard Support](#) online or at (562) 985-4959.

Course Communication

We will use BeachBoard to **make announcements**, communicate information, post assignments and corresponding due dates, and discuss course-related topics. **Please note, it is your responsibility to check** BeachBoard's dashboard **regularly, as** it will contain **important information about upcoming class assignments, activities, or concerns**.

Tentative Course Schedule

Week	Topic	Assignments
1	Introduction History of programming languages	
1-3	Imperative vs. Functional Programming Loops vs. Recursion • Algebraic Datatypes Syntax & Semantics • Turing Machine & λ -Calculus Evaluation strategies, in particular lazy evaluation	<i>Lab 1:</i> C vs. Haskell: Sorting algorithms <i>Homework 1:</i> Learn Haskell basics
4-6	Memory allocation • Binding time Programming Languages comparison: C, C++, C#, Python, & Haskell LINQ query language	<i>Lab 2:</i> Dynamic memory allocation in C <i>Homework 2:</i> Read about binding time and storage management
7-9	Generators/Enumerators • Iterables/Enumerables in C# & Python • Comparison with Haskell lazy lists Type classes vs. Interfaces vs. Duck Typing	<i>Lab 3:</i> LINQ queries in C# <i>Homework 3:</i> Learn LINQ basics
10-12	Generic types Parametric & Ad hoc polymorphism Logic Programming: Introduction to Prolog	<i>Lab 4:</i> Generic sort functions in C, C++, C#, Python, & Haskell <i>Homework 4:</i> Read about generic programming
13-15	Logic Programming: First-order logic, Horn clauses, SLD resolution, Constraint logic programming Linguistic Relativity of Programming Languages: Sapire-Whorf Hypothesis in Computer Science	<i>Lab 5:</i> Solving logic puzzles with Prolog <i>Homework 5:</i> Learn Prolog basics



Grading Policy

Grading scale:

A	$90.0\% \leq \text{Grade}$
B	$80.0\% \leq \text{Grade} < 90.0\%$
C	$70.0\% \leq \text{Grade} < 80.0\%$
D	$60.0\% \leq \text{Grade} < 70.0\%$
F	$\text{Grade} < 60.0\%$

Evaluation Components and their Percentages:

Evaluation Components	Weight
Pop Quizzes (20)	15%
Lab Assignments (5)	20%
Midterm Exams (2)	40%
Final Exam	25%

Evaluation Components:

- The two midterm and the final exam will be multiple choice BeachBoard Quizzes.
- The five lab assignments will be posted in BeachBoard.

Each lab assignment is a group programming exercise for up to 5 students.

- At the due date the group will present their running application and their well commented source code to the instructor.
- In addition all students will participate in a brief exit quiz at the due date to evaluate the understanding of the assignment.

Plagiarism/Academic Integrity Policy

There is **zero tolerance** for cheating, plagiarism, or any other act of violation of Academic Integrity policy. Work that you submit is assumed to be original unless your source material is documented appropriately, using proper citation. Using the ideas or words of another person, even a peer, or a web site, as if it were your own, is plagiarism. Any individual or group caught cheating on homework, lab assignments, or any exam/quiz will be subjected to full extent of academic actions allowed under University regulations. All instances of plagiarism or cheating, no matter how slight, will result in at least a 0 grade for the relevant assignment or exam, and your final letter grade in the course will be reduced by one full grade; the incident will be reported to administration. To learn more about the University policy on Cheating and Plagiarism, visit: [Policy on Academic Integrity regarding Cheating and Plagiarism](#)

University Withdrawal Policy

Class withdrawals during the final 3 weeks of instruction are not permitted except for a very serious and compelling reason such as accident or serious injury that is clearly beyond the student's control and the assignment of an Incomplete grade is inappropriate (see [Grades](#)). Application for withdrawal from CSULB or from a class must be filed by the student [online](#) whether the student has ever attended the class or not; otherwise, the student will receive a grade of "WU" (unauthorized withdrawal) in the course. More information regarding the University guidelines on Dropping and Withdrawing at: [Dropping and Withdrawal](#)



Attendance and Participation Policy

Attendance (joining the online class) and Participation (being alert and available if inquired by the instructor in contrast to being just online but unresponsive) are essential to your success in this class. In distance education courses you are required to attend and participate just as if you were in a face-to-face course.

Student Grievance Policy

Please check CSULB grievance policy and procedure at: [Student Grievance Procedures](#)

Special Needs Accommodations

Online courses are required to meet ADA accessibility guidelines. Students with a disability or medical restriction who are requesting a classroom accommodation should contact the [Bob Murphy Access Center \(BMAC\)](#) and also notify the instructor. BMAC personnel will work with the student to identify a reasonable accommodation in partnership with appropriate academic offices and medical providers. Only approved BMAC petitions will be accommodated.

Any student who is facing academic or personal challenges due to difficulty in affording groceries/food and/or lacking a safe and stable living environment is urged to contact the [CSULB Student Emergency Intervention & Wellness Program](#). Additional resources are available via [Basic Needs Services](#). The students can also email supportingstudents@csulb.edu, call (562) 985-2038, or if comfortable, reach out to the instructors as they may be able to identify additional resources. For mental health assistance please check out [Counseling and Psychological Services \(CAPS\)](#).

Disclaimer

In the event of extraordinary circumstances beyond the University's control, the content and/or evaluation scheme in this course is subject to change.

Additional Information

BeachBoard Access

To access this course on [BeachBoard](#) you will need access to the Internet and a supported web browser. You may access [BeachBoard](#) directly and log in with your CSULB campus ID and password. You may also access it via [Single-Sign-On](#). Once logged in, you will see the course listed under "My Courses". Click on the title to access the course page.

Technology Requirements

- **Access:** The student loan program will provide students in need with a laptop and/or an internet hotspot. The Division of Student Affairs has laptops students can borrow. To check availability, call 562-985-5587 (Monday-Friday, 8am-5pm) or visit Brotman Hall 377 (Monday-Friday, 10 am-3 pm).
- **Software and tools:** You will need to have an up-to-date browser, operating system and some additional software on your computer to take this class. Some of the documents in this course will be available to you in PDF form. If you do not have Adobe Acrobat Reader software on your computer, you can download it by going to [Adobe Acrobat Reader](#)

Please contact the department if you need support with access to the Internet, electronic devices, or any other issues related to remotely accessing your course.



Netiquette

You are training to be a professional. Consequently, we expect you to behave like a professional. A professional engineer is polite, considerate, and respectful of others. When posting on the discussion boards and chat rooms it is important to understand how to interact with one another online, *netiquette*. [Please read](#) more about the [rules of netiquette](#).

Tutoring

Take advantage of free peer tutoring (virtual) provided by Engineering Student Success Center (ESSC): [Engineering Tutoring](#)

Additional Resources

There are many services on campus to help you achieve success in your courses. Links to the following services are also available in BeachBoard course homepage under “CSULB Student Resources”:

- [Counseling and Psychological Services \(CAPS\)](#)
- [Bob Murphy Access Center \(Bmac\), formerly known as Disabled Student Services](#)
- [Enrollment Services](#)
- [Financial Aid](#)
- [The Learning Center](#)
- [Student Health Services](#)
- [Tutoring at CSULB](#)
- [University Library](#)
- [Writers Resource Lab](#)

Student Feedback about the Course

Student Feedback is highly encouraged. Please feel free to contact the instructor to share any concern or opinion about the course throughout the semester and participate in the **anonymous survey** (via BeachBoard). Early Feedback will provide the instructor the opportunity to address your concern and implement required modifications in a timely manner.