CS 320-1 Programming Languages

Fall 2020

Credits: 3 units
Contact Hours: Monday/Wednesday 1600-1715, Zoom Meeting ID: 943 0594 4330
Instructor: Patty Kraft **Virtual Office**: Zoom Meeting 764-159-137 **Email**: pkraft@sdsu.edu
Office Hours Days: M/W
Office Hours: 1200 – 1300 and by appointment

Course Materials

Required text: *Concepts of Programming Languages***,** 11th Edition, by Robert Sebesta. Addison-Wesley Press. ISBN 9780136073475.

Immediate Access Course: Some of the required course materials for this class are provided in a digital format by the first day of classes and are free through the add/drop date. Your SDSU student account will then be charged a special reduced price for use of the materials for the remainder of the semester unless you opt-out of the content by 11:59 PM on the add/drop date. Please visit www.shopaztecs.com/immediateaccess for additional information about Immediate Access pricing, digital subscription duration, print add-ons, opting out and other frequently asked questions.

Required interactive software: ***TopHat*.**
Public domain documentation as needed during the course.

Course Information for CS 320

Description from the Official Course Catalog

- Programming Language History, Syntax and Semantics, Lexical Analysis, Syntax Analysis, Names, Bindings, Scopes, Data Types, Control Constructs, Function Invocation, Recursion, Functional Programming, and details of specific programming languages.
- Prerequisites: CS108 is a sufficient prerequisite; if you have already (or are concurrently) taking CS 237 (Assembly Language), you will find that this will deepen your understanding.
- Course Type: Upper division required course

Specific Goals for CS 320

CS 320 course-level student learning outcomes. The objectives are for students to:

1. Learn to recognize distinguishing programming language features.
2. Understand the importance of language design in program development.
3. Understand the process of breaking down source code into lexemes, tokens, and parse trees.

4. Understand and use basic UNIX commands, compilers, and file structure.
5. Be able to apply scoping rules to variables, functions, modules, and namespaces.
6. Understand object-oriented methodologies by use of public, private, protected, and friend constructs.
7. Understand the concept of functional programming list processing through application of basic methods.
8. Be able to code a program in a previously unused programming language by studying examples and researching language constructs as needed.

CS 320 relationship to CS Program Course Outcomes

a) An ability to apply knowledge of computing and mathematics appropriate to the program's student outcomes and to the discipline
b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution
c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs
d) Recognition of the need for and an ability to engage in continuing professional development
e) An ability to use current techniques, skills, and tools necessary for computing practice.

Topics Covered

The following topics are covered in CS 320 :

1. Overview of programming language properties, categories, and history.
2. Introduction to LINUX, text editors, compiling, and running programs on the LINUX operating system.
3. Language syntax, semantics, syntactical analysis, and lexical analysis.
4. Naming, binding, and scope of variables.
5. Data types, arrays, and structures.
6. Function and module structure and invocation.
7. C programming language: input/output, static and dynamic allocation, pointers, arrays, structures; debugging, compiling, and executing a program.
8. FORTRAN programming language: input/output, static and dynamic allocation, subprograms, syntax, control structures, recursion; compiling, and executing a program.
9. Expressions and assignment statements.
10. Object-oriented objectives and properties: abstraction, encapsulation, polymorphism, and inheritance.
11. C++ programming language: input/output, classes, objects, structures, arrays of objects.
12. Functional languages composition and programming language (LISP or Racket).
13. (Optional) Shell programming using csh.
14. (Optional) Python as a general purpose language.

Course Structure and Conduct

Style of the Course: lecture, individual homework, and individual programming assignments

Technology Utilized in the Course: Blackboard, various IDEs, compilers, SDSU server *edoras* class accounts and development environment, SSH connection utilities, VirtualBox software

Programming Assignments and Exams

Programming assignments: There will be 5-7 programming assignments throughout the semester. Programming work is to be done on an individual basis. All programming assignments will be submitted online. You are required to follow coding guidelines which will be outlined in class and on assignments.

Assignments will be collected electronically, at 11:59pm on the due date. To maintain fairness and uniformity of grading, I cannot accept late assignments. You will be assigned edoras (edoras.sdsu.edu) accounts for use in this course; results of your grade scores will be sent to this account (so you should add an entry to your .forward file if you don't intend to check it for mail regularly).

Homework assignments: There will be 3-5 homework assignments throughout the semester. Assignments are written work to be turned in at the start of class on the due date given.

Late work policy: All programming and homework assignments are due at the start of class on the due date given. Late work is not accepted. Please plan to allow plenty of time to complete programming assignments—start early!

Exams: There will be three midterm exams and one final exam. Make-up exams are not given. Unless a compelling reason exists (to be determined by me), failure to appear for an exam at the indicated date and time will result in a zero score. If you know in advance that you will miss an exam, see me about it in advance. Refer to http://registrar.sdsu.edu/calendars/final_exam_schedule/fall_2020_final_exam_schedule and note now that the date of our final exam is **Monday, December 14, 2020, from 1530-1730**; don't make plans that conflict with the final. The final will be taken online, or possibly in a large classroom or auditorium on campus. Note that the university policy prohibits taking the final early.

Course Assessment and Grading

Assignments will comprise 40% of your grade, the midterms will be 30% of your grade, and the final will be worth 20% of your grade. Grading Scale (%):

Score Range	Corresponding Letter Grade
93.0 <= score <= 100	**A**
90.0 <= score < 93	**A-**
87.0 <= score < 90	**B+**
83.0 <= score < 87	**B**
80.0 <= score < 83	**B-**
77.0 <= score < 80	**C+**

Score Range	Corresponding Letter Grade
73.0 <= score < 77	**C**
70.0 <= score < 73	**C-**
67.0 <= score < 70	**D+**
63.0 <= score < 67	**D**
60.0 <= score < 63	**D-**
0 <= score < 60	**F**

Other Course Policies

1. **Adding/Dropping Procedures:** Students that do not show up the first week of class will be dropped at the end of the first week. Students will be allowed to add the course based on space available, provided they have attended all lectures from the first week of class.
2. **Cheating/Plagiarism:** You are free to discuss ideas and strategies for approaching problems with others, but each student must complete his/her own work. Cheating and plagiarism WILL NOT BE TOLERATED. If a student is found cheating, sharing their work, or plagiarizing material written by someone else (including information posted on websites), that student will fail this course and should expect to face disciplinary proceedings. See more in the University Policies section below.
3. **Extra Credit Policy:** If you are having problems with the assignments or tests, contact the instructor as soon as possible. It will NOT be possible to earn extra credit to improve a poor grade at the end of the semester.
4. **Classroom Focus:** Background noise must be silenced as much as possible. The student should join the virtual class session in Mute setting and continue in it unless asking a question or being instructed to unmute. Technology in use must be focused on lecture; any other use is distracting to others. Students causing distraction may be asked to leave the classroom.

UNIVERSITY POLICIES (required text)

Accommodations: If you are a student with a disability and are in need of accommodations for this class, please contact Student Ability Success Center at (619) 594-6473 as soon as possible. Please know accommodations are not retroactive, and I cannot provide accommodations based upon disability until I have received an accommodation letter from Student Ability Success Center.

Student Privacy and Intellectual Property: The Family Educational Rights and Privacy Act (FERPA) mandates the protection of student information, including contact information, grades, and graded assignments. I will use [Canvas / Blackboard] to communicate with you, and I will not post grades or leave graded assignments in public places. Students will be notified at the time of an assignment if copies of student work will be retained beyond the end of the semester or used as examples for future students or the wider public. Students maintain intellectual property rights to work products they create as part of this course unless they are formally notified otherwise.

Religious observances: According to the University Policy File, students should notify the instructors of affected courses of planned absences for religious observances by the end of the second week of classes.

Resources for students: A complete list of all academic support services--including the Writing Center and Math Learning Center--is available on the Student Affairs' Academic Success website. Counseling and Psychological Services (619-594-5220) offers confidential counseling services by licensed therapists; you can Live Chat with a counselor at http://go.sdsu.edu/student_affairs/cps/therapist-consultation.aspx between 4:00pm and 10:00pm, or call San Diego Access and Crisis 24-hour Hotline at (888) 724-7240.

You can find additional supplemental instruction, tutoring and academic support here: (insert information about departmental or course-specific tutoring or supplemental instruction)

SDSU Economic Crisis Response Team: If you or a friend are experiencing food or housing insecurity, or any unforeseen financial crisis, visit sdsu.edu/ecrt, email ecrt@sdsu.edu, or walk-in to Well-being & Health Promotion on the 3rd floor of Calpulli Center.

Academic Honesty: The University adheres to a strict policy prohibiting cheating and plagiarism. Examples of academic dishonesty include but are not limited to:

- copying, in part or in whole, from another's test or other examination;
- obtaining copies of a test, an examination, or other course material without the permission of the instructor;
- collaborating with another or others in work to be presented without the permission of the instructor;
- falsifying records, laboratory work, or other course data;
- submitting work previously presented in another course, if contrary to the rules of the course;
- altering or interfering with grading procedures;
- assisting another student in any of the above;
- using sources verbatim or paraphrasing without giving proper attribution (this can include phrases, sentences, paragraphs and/or pages of work);
- copying and pasting work from an online or offline source directly and calling it your own;
- using information you find from an online or offline source without giving the author credit;
- replacing words or phrases from another source and inserting your own words or phrases.

The California State University system requires instructors to report all instances of academic misconduct to the Center for Student Rights and Responsibilities. Academic dishonesty will result in disciplinary review by the University and may lead to probation, suspension, or expulsion. Instructors may also, at their discretion, penalize student grades on any assignment or assessment discovered to have been produced in an academically dishonest manner. The instructor reserves the right to lower student course grade for academic misconduct.

Classroom Conduct Standards: SDSU students are expected to abide by the terms of the Student Conduct Code in classrooms and other instructional settings. Violation of these standards will result in referral to appropriate campus authorities. Prohibited conduct includes:

- Willful, material and substantial disruption or obstruction of a University-related activity, or any on-campus activity.
- Participating in an activity that substantially and materially disrupts the normal operations of the University or infringes on the rights of members of the University community.
- Unauthorized recording, dissemination, or publication (including on websites or social media) of lectures or other course materials.
- Conduct that threatens or endangers the health or safety of any person within or related to the University community, including

1. physical abuse, threats, intimidation, or harassment.
2. sexual misconduct.

Medical-related absences: Students are instructed to contact their instructor in the event they need to miss class, etc. due to an illness, injury or emergency. All decisions about the impact of an absence, as well as any arrangements for making up work, rest with the instructors. Student Health Services (SHS) does not provide medical excuses for short-term absences due to illness or injury. When a medical-related absence persists beyond five days, SHS will work with students to provide appropriate documentation. When a student is hospitalized or has a serious, ongoing illness or injury, SHS will, at the student's request and with the student's consent, communicate with the student's instructors via the Vice President for Student Affairs and may communicate with the student's Assistant Dean and/or the Student Ability Success Center.

Sexual violence / TItle IX mandated reporting: As an instructor, one of my responsibilities is to help create a safe learning environment on our campus. I am a mandated reporter in my role as an SDSU employee. It is my goal that you feel able to share information related to your life experiences in classroom discussions, in your written work, and in our one-on-one meetings. I will seek to keep the information you share private to the greatest extent possible. However, I am required to share information regarding sexual violence on SDSU's campus with the Title IX coordinator, Jessica Rentto 619-594-6017. She (or her designee) will contact you to let you know about accommodations and support services at SDSU and possibilities for holding accountable the person who harmed you. Know that you will not be forced to share information you do not wish to disclose and your level of involvement will be your choice. If you do not want the Title IX Officer notified, instead of disclosing this information to your instructor, you can speak confidentially with the following people on campus and in the community. They can connect you with support services and discuss options for pursuing a University or criminal investigation. Sexual Violence Victim Advocate 619-594-0210 or Counseling and Psychological Services 619-594-5220, psycserv@sdsu.edu. For more information regarding your university rights and options as a survivor of sexual misconduct or sexual violence, please visit titleix.sdsu.edu or sdsutalks.sdsu.edu.

Approximate Schedule—subject to change.

See separate "Schedule" on Blackboard for updates.

	Topic
Week 1	Overview and language categories
Week 2-3	C Language, Syntax, Lexical Analysis
Week 4	***Midterm exam***
Week 5-8	FORTRAN, scripting language, data types
Week 9	***Midterm exam***
Week 10-12	C++ Language
Week 13	***Midterm exam***
Week 14-16	Functional language
14-Dec	***Final exam*** *1530-1730*

TopHat

We will be using the Top Hat (www.tophat.com) classroom response system in class. You will be able to submit answers to in-class questions using Apple or Android smartphones and tablets, laptops, or through text message.

You can visit the Top Hat Overview (https://success.tophat.com/s/article/Student-Top-Hat-Overview-and-Getting-Started-Guide) within the Top Hat Success Center which outlines how you will register for a Top Hat account, as well as providing a brief overview to get you up and running on the system.

An email invitation will be sent to you by email, but if don't receive this email, you can register by simply visiting our TopHat course website: https://app.tophat.com/e/937181

Note: our Course Join Code is **937181**

Top Hat requires a paid subscription, and a full breakdown of all subscription options available can be found here: www.tophat.com/pricing.

Should you require assistance with Top Hat at any time, due to the fact that they require specific user information to troubleshoot these issues, please contact their Support Team directly by way of email (support@tophat.com), the in app support button, or by calling 1-888-663-5491.

Approximate Due Dates for Major Assignments and Exams

Week	Date	Topic	Reading	Assignment
1	24-Aug	Course Introduction.	Chapter 1 & 2 Sebesta	
	26-Aug	Overview of PL topics.	Sections 1 - 6 "Beej" online	
2	31-Aug	Syntax & Semantics / Unix	Chapter 3 Sebesta Sections 7 - 10 "Beej" online	Homework 0 due
	2-Sep	Lexical & Syntax analysis / C language	Chapter 4 Sebesta	Homework 1 due
3	7-Sep	*No class—Labor Day*		Lab 0 due
	9-Sep	Lexical & Syntax analysis /C language	Sections 10 - 12"Beej" online	
4	14-Sep	C language, file i/o, argc/argv	Sections 13 - 15"Beej" online Stanford Lexical Analysis PDF	Lab 1 due
	16-Sep	***Midterm exam***		
5	21-Sep	C language, gdb, addressing		
	23-Sep	C language: pointers, arrays, arithmetic, dynamic allocation	Read Fortran tutorial	
6	28-Sep	Names, binding, scope FORTRAN	Chapter 5 Sebesta Read class notes	Lab 2 due
	30-Sep	FORTRAN	Write skeleton Fortran program	
7	5-Oct	FORTRAN Data types Expressions & Assignments Statements	Chapters 6 & 7 Sebesta Scope in Fortran Arrays in Fortran	Homework 2 due
	7-Oct	FORTRAN		
8	12-Oct	FORTRAN		
	14-Oct	***Midterm exam***		
9	19-Oct	C++ Language	C++ Tutorial/Classes	Lab 3 due
	21-Oct	C++ Language	Intro to OOP	
10	26-Oct	C++ Language	Using a makefile Program 5	
	28-Oct	C++ Language	Format output	Homework 3 due
11	2-Nov	Abstract Data Types & Encapsulation C++ Language	Chapters 11 & 12 Sebesta	
	4-Nov	Object-Oriented Programming C++ Language	Inheritance & Polymorphism	
12	9-Nov	***Midterm exam***		
	11-Nov	*No class: Veterans Day*		
13	16-Nov	Subprograms / C++ Language	Chapter 9 Sebesta OperatorOverloading.pdf	Lab 4 due
	18-Nov	Scripting Language		
14	23-Nov	Functional languages	Chapter 15 Sebesta	
	25-Nov	*No class—Thanksgiving Day*		

15	30-Nov	Functional language	Scheme1	Homework 4 due
	2-Dec	Functional language	Scheme exercises	
16	7-Dec	Functional language		
	9-Dec	Functional language		Lab 5 due
17	14-Dec	***Final exam*** *1530-1730*		