COURSE DESCRIPTION
Spring 2023

LUDDY SCHOOL OF INFORMATICS, COMPUTING, AND ENGINEERING
INDIANA UNIVERSITY

CSCI-C 291 – System Programming in C and UNIX

Class Number:	13995 & 13996
Term:	Spring 2023 – Jan 9 to May 5
Meeting Time:	11:30AM-12:45PM and 1:15PM-2:30PM Monday and Wednesday
Meeting Location:	IF 1019
Course Website:	TBA
Course Material Instructor:	Accessible through Canvas (https://canvas.iu.edu) Kurt Seiffert, CS Lecturer
Office Phone:	TBA
Office Location:	IF 2016 (Luddy Hall)
Email:	seiffert@iu.edu
Office Hours:	Monday and Wednesday 3-4:30PM, Tuesday and Thursday 10-11:30AM or by appointment
Zoom Link	https://iu.zoom.us/my/seiffert

Course Description
3 Credit Hours: This course introduces C programming and focusses on advanced concepts like pointers, structures, dynamic memory allocation, file system and debuggers while working with basic shell commands within UNIX environment, the Emacs text editor and github.

Pre-requisite Course(s): CSCI-C 200 or C 211 or CSCI-A 201

Course Format: In classroom and in person
This is an in-person class and lectures will be delivered in the classroom. Video recordings may not be available later.

Students are expected to attend class regularly. Attendance is REQUIRED for group presentation days and occasional status meetings.

Learning Objectives
Students are expected to demonstrate:

- write a complete C program with proper variable declaration, loops, conditional statements and functions (non-recursive and recursive); demonstrate the proper use and read/write of 1D and 2D arrays, and pointer access; demonstrate the proper use of structures, element read/write access, and access using pointers; demonstrate the proper use of pointers; demonstrate the use of dynamic memory allocation; file IO, basic algorithms including sorting.
- utilize git and iu github to do the following - clone a repository, stage files for a commit, commit changes, push changes to a repository, and resolve a merge conflict.
- Using a linux editor like emacs to open/edit/save a file.
- demonstrate the ability to use common shell commands - ls, cd, mkdir, chmod, rm,

ps and kill.
- write a bash shell program utilizing environment variables, inline evaluations, and IO redirection
- debug a program using gdb. The student will be able to set a breakpoint, inspect a variable, step a program.

Required Textbook and Reference Books

- There is no required textbook for this course and any standard C book should be sufficient for this course. The following books will be used for this course:
- Modern C for Absolute Beginners by Slobodan Dmitrović ISBN: 9781484266427 (Available in skillport.iu.edu.)
- A Book on C: Programming in C by Al Kelley & Ira Pohl, 4th Edition, Addison-Wesley, ISBN-13: 978-0201183993 [1]
- C How to Program by Paul Deitel & Harvey Deitel, 8th Edition, ISBN-13: 978-0133976892, Pearson [2]
- Understanding and Using C Pointers: Core Techniques for Memory Management by Richard M Reese, ISBN-13: 978-1449344184 [3]
- Learn C the Hard Way: Practical Exercises on the Computational Subjects You Keep Avoiding (Like C) by Zed Shaw, ISBN 978-0321884923, Addison-Wesley Prof. [4]

Course Work-Load Expectations

Federal regulations define a credit hour in the amount of work as 'no less than one hour of class room instruction' and 'a minimum of two hours out of class student work' per week for 15-week semester. The credit hour definition is a minimum standard and it **DOES NOT** restrict an institution from setting a higher standard that requires more student work per credit hour.

*For this 3-credit hour 15-week course you should be prepared to spend a minimum of 6-9 hours per week outside of lectures. It is not uncommon for students to spend (on average) **9+** hours per week.*

Grading Scheme

Attendance / Participation	10%
Quizzes	25%
Assignments	50%
Exams (1)	15%

Grading Scale

Score	Letter Grade
90–92.9, 93-96.9, 97-100	A-, A, A+
80–82.9, 83-86.9, 87-89.9	B-, B, B+
70–72.9, 73-76.9, 77-79.9	C-, C, C+
60–62.9, 63-66.9, 67-69.9	D-, D, D+
0 – 59.9	F

Minimum Technical Requirements for Course

You will need the following in order to participate in this course:

- Computer with microphone and speakers/headphones
- Reliable internet connection and web browser

Late Policy and Makeup Work

No late submissions will be allowed for this course. There will be a grace period of 1 hour after the deadline. Anything submitted within the grace period will receive 5% penalty. *Any course*

module submitted after the grace period will NOT receive any credit. It is student's responsibility to ensure that the correct files have been submitted by the deadline. No resubmission or makeup is allowed in this class. If you have ***properly documented*** university-approved excuse (which includes chronic illness or injury, family emergencies, university approved curricular and extracurricular activities, religious and civil observance), please contact the instructor immediately for appropriate accommodation.

Office Hours / Email Communication with the Instructor / Customers / AIs

The contact information, links to zoom meeting rooms and the schedule of office hours for customers and AIs can be found on Canvas. You may also communicate with your instructor, customers & Associate Instructors by e-mail. Allow 24 hours for a reply. The response time during the weekend may be longer than 24 hours.Please be sure to identify the course you are taking.

Individual Work, Research and Plagiarism

All course assignments, discussions, quizzes or exams are assigned for individual work. No group work is permitted unless specifically allowed. Students are encouraged to engage in discussion or use other available resources (such as research papers, library books or internet articles) but must write their own answers and provide references to the resources used. At any time, student must not reproduce code/answers from other resources (as is or cosmetic changes) and the answers must not be shared. *Any plagiarism (even partial work) or cheating on home works, assignments, quizzes, projects and exams is NOT acceptable and will result in an immediate failure for the class*

Student Rights

Any student who believes another person in a class is threatening the safety of the class by not wearing a mask or observing physical distancing requirements may leave the class without consequence.

Attendance

Attendance will not be a factor in the final grade. Attendance may still be taken to comply with accreditation requirements.

Summary Suspension Policy

A student may be summarily suspended from the university and summarily excluded from university property and programs by the Provost or designee of a university campus. The Provost or designee may act summarily without following the hearing procedures established by this section if the officer is satisfied that the student's continued presence on the campus constitutes a serious threat of harm to the student or to any other person on the campus or to the property of the university or property of other persons on the university campus.

Other University Policies

You should also review the following university policies:

- Disability Services for Students (DSS): For accommodations, visit: https://studentaffairs.indiana.edu/disability-services-students/
- Code of Student Rights, Responsibilities, and Conduct: visit https://studentcode.iu.edu/responsibilities/index.html
- Title IX Sexual Misconduct related info can be found at https://stopsexualviolence.iu.edu/
- Counseling and Psychological Services: Visit: http://healthcenter.indiana.edu/counseling/index.shtml

Technical Support

You may also receive support from:

- UITS (human support) and IUKB (guides)

- IUWare (to download free software)

Disclaimer: *The instructor reserves the right to make any changes to the syllabus any time during the term.*

Class Schedule and Weekly outline

Note: This course outline was last updated on 1/07/2022 and will be updated on weekly basis.

Week Of	Week #	Topic	Quiz	Assignments	Readings
January 9	1	Syllabus Linux Environment Hello World Program & GitHub		#1	Linux Guide & Chap. 2
January 16	2	Basic Syntax of C (Variables, Conditionals, Loops), bash shell	#1	#2	Chap. 3,4, & Makefile Notes
January 23	3	Functions & Variable Scope Code Debugging Using Makefile	#2	#3	Chap. 5
January 30	4	Formatted Input / Output Arrays & C-Strings	#3	#4	Chap. 9 & 6
February 6	5	Number systems & Bit-wise Operations Mulit-Dimensional Arrays Character/String Library	#4	#5	Number System Notes, Chap. 6 & 8
February 13	6	Common Algorithms Pointers	#5	#6	Chap. 7 & 8
February 20	7	Characters & Strings More Pointers (Double Pointers, Arrays of Pointers)	#6	#7	Chap. 7 & Notes
February 27	8	Dynamic Allocation Structures Structures and Pointers	#7	#8	Chap. 10 & Notes
March 6	9	Unions, Bit-fields **Midterm Exam**			
March 13	**Spring Break (NO CLASSES)**				
March 20	10	Structures, Pointers, & Dynamic Allocation Using Debugger	#8	#9	Chap. 10
March 27	11	File Processing More Linux Commands	#9	#10	Chap. 11
April 3	12	TBD	#10	#11	
April 10	13	TBD	#11	#12	

Week Of	Week #	Topic	Quiz	Assignments	Readings
April 17	14	TBD	#12	#13	
April 24	15	TBD			