CNIT 31500 – Systems Programming, Spring 2023

Purdue University

Instructor: Rey Gonzalez, PhD Student, CIT
Office: e-mail, Teams
Office Hours: M 1:30pm – 3:30pm; R 10:30am – 12:30pm
Email: gonza736@purdue.edu

Teaching Assistants: Nidhi Bhardwaj
Office Hours: TBD
Email: bhardwan@purdue.edu

Anuj Dubey
Office Hours: TBD
Email: dubey22@purdue.edu

Location:	Lectures:	LWSN 1142
	Labs:	Knoy 228
Class Time:	Lectures:	MW 10:30am – 11:20am
	Labs:	W 1:30pm – 3:20pm (TBD)
		W 3:30pm – 5:20pm (TBD)
		R 1:30pm – 3:20pm (TBD)
		F 9:30am – 11:20am (TBD)

Course Abstract: This course introduces concepts of lower level systems programming in C/C++ on a Unix/Linux operating system platform. Command level development, algorithms, data structures, iteration and recursion, algorithms and analysis will be covered. Development of small systems using system level programming.

Course Learning Outcomes

1. Develop for and using the command line
2. Identify number systems and perform arithmetic operations
3. Develop programs on Linux/Unix operating systems
4. Develop ANSI C/C++ programming proficiency
5. Explain and use linear and tree-based data structures
6. Explain and use data structure algorithms
7. Analyze algorithms
8. Explain and use iteration and recursion
9. Explain and use techniques of memory management
10. Explain and use text and binary file I/O

Evaluations (subject to change)

1.	Class participation/Attendance:	100 points
2.	Laboratory assignments:	150 points
3.	Semester team project:	100 points
4.	Exam 1:	100 points
5.	Exam 2:	100 points
	Total:	**550 points**

Grading:

We will follow the following range for +/- grades:
97 and above: A+

93 – 96: A
90 – 92: A-
Same distribution for B, C, D
Anything below 60% receives an F

Late policy: 30 hrs of late lab work throughout semesters, penalty free. More information on Brightspace, under Policies.

Textbook:
Required:

- A First Book of ANSI C, 4th edition, Gary Bronson.

Tentative Schedule, subject to change

Week (Lecture Dates)	Monday	Wednesday	Reading	Labs
Week 1 (Aug 21, 23)	Intro to the Course	Intro to C	Ch. 1, 2	Lab intro, Lab 1 assigned
Week 2 (Aug 28, 30)	Program Basics	Program Basics	Ch. 3, 4	Lab 1.1 checkoff
Week 3 (Sept 4, 6)	Labor Day	Processing/Decisions	Ch. 5, 6	**Lab 1 due**
Week 4 (Sept 11, 13)	Functions	Recursion	Ch. 6, 7	Lab 2 assigned, 2.1-2 Checkoff
Week 5 (Sept 18, 20)	Pointers and Memory	Pointers and Memory	Ch. 7	**Lab 2 due**
Week 6 (Sept 25, 27)	Arrays	Strings	Ch. 8, 9	Lab 3 assigned + checkoff, **Projects assigned**
Week 7 (Oct 2, 4)	Files	Exam 1	Ch. 10	**Lab 3 due**
Week 8 (Oct 9, 11)	Structures	Linked lists	Ch. 12, 13	Lab 4 Structures, Insertion check-off
Week 9 (Oct 16, 18)	Arrays, dynamic Structures, linked lists		Ch. 11, 13	
Week 10 (Oct 23, 25)	Linked lists		Ch. 13	**Lab 4 due**
Week 11 (Oct 30, Nov 1)	Queues	Queues	Ch. 13	Lab 5 assigned + checkoff
Week 12 (Nov 6, 8)	Stacks		Ch. 13	**Lab 5 due**
Week 13 (Nov 13, 15)	Trees	Binary trees		Lab 6 assigned + checkoff
Week 14 (Nov 20, 22)	Binary trees	Exam 2		**Lab 6 due**
Week 15 (Nov 27, 29)	Presentations due	Presentation evaluations due		Project submission[1]
Week 16 (Dec 4, 6)	TBD	TBD		
Finals Week – there is no final exam				

Expectations:

[1] Extension (several days) granted by request

- We will be using **Gradescope, Brightspace, and Hotseat** in this class. Please familiarize yourself with these tools by the end of week 1.
- Clarifications on Policies for the course will be uploaded to Brightspace – please check when in doubt. They will be updated with clarifications based on student questions.
- Lab assignments must execute and will be graded on the linux machines in Knoy 242. If you use another environment to develop, you must test your submissions on the Knoy 242 machines to insure they work before submission. If the submitted does not compile on the Knoy 242 lab machines it will result in a score of zero.
- This course follows Purdue's academic regulations regarding attendance, which states that **students are expected to be present for every meeting of the classes in which they are enrolled**. Attendance may be taken during each class by using quizzes or other forms of class work. It is possible that quizzes will be done in the beginning of a class.
- When conflicts or absences can be anticipated, such as for many University-sponsored activities and religious observations, the student should inform the instructor of the situation as far in advance as possible. For unanticipated or emergency absences when advance notification to the instructor is not possible, the student should contact the instructor as soon as possible by email. When the student is unable to make direct contact with the instructor and is unable to leave word with the instructor's department because of circumstances beyond the student's control, and in cases falling under excused absence regulations, the student or the student's representative should contact or go to the Office of the Dean of Students (ODOS) website to complete appropriate forms for instructor notification. Under academic regulations, excused absences may be granted by ODOS for cases of grief/bereavement, military service, jury duty, parenting leave, or emergent or urgent care medical care.
- The sender of all email correspondence must be clearly identifiable or it may not be answered. For example, it is recommended you include CIT3XX in the subject line and your full name. Additionally, email should be written in a professional, courteous, non-offensive manner. Email that contains unprofessional, discourteous, or otherwise offensive language will likely not be answered.
- Teaching Assistants only have authority to help with programming assignments. Personal matters should be directed to the course instructor.
- Any unprofessional or threatening behavior towards the teaching assistants will not be tolerated and will result in the student being turned over to the appropriate Purdue personnel.
- Make-up examinations will only be given under extenuating and unavoidable circumstances. The burden of proof of said circumstances is on the student. No make-up quizzes will be given.
- Finally, students are expected to follow Purdue's Honor's Pledge.

Lab Policies and Expectations

- When using ITAP or ECN computer laboratories, you are responsible for any and all laboratory policies - including the security policies that govern your account. Failure to do so may result in the loss of all laboratory privileges, with no reduction in course requirements. Policies do change from time to time; therefore, you should review the Policies and Standards at the beginning of each semester. Accounts can be temporarily or permanently suspended for policy violations.
- In the event that your account is suspended for any laboratory or network policy violation, this course will not extend deadlines for assignments that could not be completed because of the suspension.
- You are responsible for maintaining adequate backups of all programs you create. Furthermore, you are responsible for keeping an exact copy of anything you hand in for a

grade. Your instructor is not responsible for loss of data or workstation or printer failure. Loss of programs due to inadequate backups may result in work that cannot be submitted on time.

- You are expected to be present during the entire lab session.
- If you are not present in the lab for check-off, you will get 0 points for that lab.
- Almost all assignments will require some work outside of scheduled class meetings. Check the lab schedules for available lab facilities. Workstations are available on a first-come, first-serve basis. Workstations may not be available when other courses' scheduled laboratories are in session. Be considerate of other students and professors when using these workstations! Also, plan your schedules so that you will have time outside of class to get your assignments done in a timely manner.
- Use anti-virus software on a regular basis to protect your computer against virus infection.
- Software piracy is a serious matter. Making copies of the software in the lab is considered theft of Purdue University property. Any student stealing software is subject to administrative action and/or disciplinary penalties. The LAN software constantly monitors software copying. Students may not install any software on the workstations or the file servers.

Standard Purdue Policies that will be followed in this class:

Re-Grading Policies

According to University regulations, only final course grades can be appealed. There is a formal College and University timetable and process for grade appeals. Questions about grade appeals should be directed to the Department Head of Computer and Information Technology or the Chair of the College Grade Appeals Committee.

Regrade requests for individual assignments should be done through Gradescope. Students wishing to appeal any score must return their work to their course instructor with a written statement explaining the appeal no later than one week after the original scores were posted. Any work submitted for re-grade (other than misrecorded material) may be totally re-graded. Do not assume the instructor will only re-grade those portions that the student wishes to be re-graded. This also means you could end up with a lower grade if new errors or other program shortcomings are found.

Accessibility:

Purdue University strives to make learning experiences accessible to all participants. If you anticipate or experience physical or academic barriers based on disability, you are welcome to let me know so that we can discuss options. You are also encouraged to contact the Disability Resource Center at: **drc@purdue.edu** or by phone at 765-494-1247.

Academic Integrity:

Academic integrity is one of the highest values that Purdue University holds. Individuals are encouraged to alert university officials to potential breaches of this value by either emailing integrity@purdue.edu or by calling 765-494-8778. While information may be submitted anonymously, the more information is submitted the greater the opportunity for the university to investigate the concern. More details are available on our course Brightspace under University Policies.

Nondiscrimination Statement:

Purdue University is committed to maintaining a community that recognizes and values the inherent worth and dignity of every person; fosters tolerance, sensitivity, understanding, and mutual respect among its members; and encourages each individual to strive to reach his or her potential. In pursuit of its goal of academic excellence, the University seeks to develop and nurture diversity. The University believes that diversity among its many members

strengthens the institution, stimulates creativity, promotes the exchange of ideas, and enriches campus life. A hyperlink to Purdue's full Nondiscrimination Policy Statement is included in our course Brightspace under University Policies.

Mental Health/Wellness Statement:

If you find yourself beginning to feel some stress, anxiety and/or feeling slightly overwhelmed, try WellTrack**.** Sign in and find information and tools at your fingertips, available to you at any time.

If you need support and information about options and resources, please contact or see the Office of the Dean of Students. Call 765-494-1747. Hours of operation are M-F, 8 am- 5 pm.

If you find yourself struggling to find a healthy balance between academics, social life, stress, etc., sign up for free one-on-one virtual or in-person sessions with a Purdue Wellness Coach at RecWell. Student coaches can help you navigate through barriers and challenges toward your goals throughout the semester. Sign up is free and can be done on BoilerConnect.

If you're struggling and need mental health services: Purdue University is committed to advancing the mental health and well-being of its students. If you or someone you know is feeling overwhelmed, depressed, and/or in need of mental health support, services are available. For help, such individuals should contact Counseling and Psychological Services (CAPS) at 765-494-6995 during and after hours, on weekends and holidays, or by going to the CAPS office on the second floor of the Purdue University Student Health Center (PUSH) during business hours. The CAPS website also offers resources specific to situations such as COVID-19.

Basic Needs Security:

Any student who faces challenges securing their food or housing and believes this may affect their performance in the course is urged to contact the Dean of Students for support. There is no appointment needed and Student Support Services is available to serve students 8 a.m.-5 p.m. Monday through Friday. Considering the significant disruptions caused by the current global crisis as it relates to COVID-19, students may submit requests for emergency assistance from the Critical Need Fund

Emergency Preparation:

In the event of a major campus emergency, course requirements, deadlines and grading percentages are subject to changes that may be necessitated by a revised semester calendar or other circumstances beyond the instructor's control. Relevant changes to this course will be posted onto the course website or can be obtained by contacting me via email. You are expected to read your @purdue.edu email on a frequent basis.

EMERGENCY PREPAREDNESS SYLLABUS ATTACHMENT

EMERGENCY NOTIFICATION PROCEDURES are based on a simple concept – if you hear a fire alarm inside, proceed outside. If you hear a siren outside, proceed inside.

- **Indoor Fire Alarms** mean to stop class or research and immediately **evacuate** the building.
  - Proceed to your Emergency Assembly Area away from building doors. **Remain outside** until police, fire, or other emergency response personnel provide additional guidance or tell you it is safe to leave.
- **All Hazards Outdoor Emergency Warning Sirens** mean to immediately seek shelter (**Shelter in Place**) in a safe location within the closest building.
  - "Shelter in place" means seeking immediate shelter inside a building or University residence. This course of action may need to be taken during a tornado, a civil disturbance including a shooting or release of hazardous materials in the outside air. Once safely inside, find out more details about the emergency*. **Remain in place** until police, fire, or other emergency response personnel provide additional guidance or tell you it is safe to leave.

**In both cases, you should seek additional clarifying information by all means possible…Purdue Emergency Status page, text message, Twitter, Desktop Alert, Albertus Beacon, digital signs, email alert, TV, radio, etc.…review the Purdue Emergency Warning Notification System multi-communication layers at http://www.purdue.edu/ehps/emergency_preparedness/warning-system.html*

EMERGENCY RESPONSE PROCEDURES:

- Review the **Emergency Procedures Guidelines**
  https://www.purdue.edu/emergency_preparedness/flipchart/index.html
- Review the **Building Emergency Plan** for:
  - evacuation routes, exit points, and emergency assembly area
  - when and how to evacuate the building.
  - shelter in place procedures and locations

EMERGENCY PREPAREDNESS AWARENESS VIDEOS

- **"The Coming Storm"** The Coming Storm is a movie that dramatizes the aftermath of a campus shooting, weaving within the story the best practices and lessons learned from active shooter incidents that have occurred throughout the United States. View FBI Short Movie [here].
- **"Run. Hide. Fight.®"** YouTube Video Produced by the City of Houston Mayor's Office of Public Safety and Homeland Security through a grant provided by a Department of Homeland Security Grant Funded Project of the Regional Catastrophic Planning Initiative, provides critical options for consideration to survive an active shooter event.
- **"Run. Hide. Fight.®"** Text Version.
- Department of Homeland Security Active Shooter web site…resources and tips on how to prepare for this type of horrific incident…learn more
- **Ready: Whenever, Wherever**—A public service campaign, from the Indiana Department of Homeland Security, which encourages Hoosiers to practice reasonable awareness and develop a plan for action in the event of an emergency