COMPUTER SCIENCE III (CPS315) SECTIONS 03/04

Course Details

Credit Hours: 4

Class Days, Time, Location: *Mondays and Thursdays*: 12.30 -1.45 PM in HUM 209

Course Modality: Fully Seated

Pre -requisites: CPS310 or equivalent, with at least a C- grade.

Instructor Details

Name and Title: Chirakkal Easwaran, Professor

Pronouns: He

Campus Email: easwarac@newpaltz.edu

Office Phone: 845-257-3514

Office Location: SH 244

Office Hours: Monday, Thursday 11 AM -12.30 PM, Wednesday 11.30 AM-12.30 PM and by appointment (please email me to make appointments).

Course Description

A continuation of Computer Science II: Techniques for operating on advanced data structures, hash tables, search trees, heaps, and graphs; design, analysis, and implementation of algorithms for searching, sorting, and graph processes.

Student Learning Outcomes (SLO)

Upon completion of this course, students will be able to understand and use advanced data structures to program and build complex software.

Reading Materials

I will provide notes as necessary and post links to additional reading materials. There are no required text books for the course.

For the first part on advanced data structures, your CS2 book, or any Java data strucures book will be sufficient. Here are some suggestions:
1. Y. Daniel Liang, *Introduction to Java Programming and Data Structures, 12E*
2. Robert Sedgewick, Kevin Wayne (*Algorithms, 4th Ed*)

https://algs4.cs.princeton.edu/home/
3. http://www.openbookproject.net/books/ Tons of resources for free here.
4. https://opendsa-server.cs.vt.edu/home/books Very good e-books on Data structures

Attendance
Attendance at all classes is expected. Notes will be posted on Brightspace after each class, but far more detail will be discussed in class than is included on the slides, so regular attendance and note-taking is strongly recommended. In the case of any absence, you are responsible for obtaining the missed information from another student.

Attendance in Labs are mandatory. Your lab instructor will give details.

Please see the following for additional campus-wide policies on attendance.
Religious Beliefs & Class Attendance
Black Solidarity Day

Grading Information

- Test 1 – 25% - **Thursday October 2 , 2025, in class**
- Test 2 – 25% - **Thursday November 20, 2025, in class**
- Lab Quizzes – 20% - **Every week in the lab**
- Lab attendance – 5%
- Final Exam – 25% - **December 15, 2025, 12.30 – 2.30 PM**

Grade Scale (by percentage)

A	100 – 93	A-	92.9 – 90
B+	89.9 – 87.5	B	87.4 – 82.6
B-	82.5 – 80	C+	79.9 – 77.5
C	77.4 – 72.6	C-	72.5 – 70
D+	69.9 – 67.5	D	67.4 – 62.6
D-	62.5 – 60	F	Below 60

Please Note: Except for documented medical emergencies, there will be no makeup tests.

Homework

Homework will be posted on the course web site covering material from the lectures. In general these homework need not be submitted and they will not be graded. However, you will get a chance to clarify doubts about the homework in the lab (see below). Working through these exercises is the primary way you will learn the material in the course. Don't skip them, and keep up with them so you don't fall behind in the class.

Labs

There is a weekly 3-hour lab for this course. There are two lab sections, and you need to know which lab section you have to go to. Labs are held in a designated classroom, where a TA will be available to answer all your questions. **Lab attendance is mandatory**. The TA will give full credit for a lab attendance only if you are present for the whole time.

For sections 3 and 4 TA will be Dhyankumar Anilbhai Patel (pateld42@newpaltz.edu)

The TAs will talk to you about the Labs when you meet first. Please note that to ensure uniformity, labs will **start meeting only from Week 2 of classes.**

The structure of the lab will be as follows:

1) The TA will initially step you through some examples, based on the previous week's homeworks, and answer your questions. The TA will also discuss the previous week's quiz and its grading scheme.

2) Afterwards, you will have a chance to work on additional homework problems on your own, with help from the TA.

3) Towards the end of the lab, you will be given a short quiz based on material done during the lab. The quiz must be done individually, without consulting others. You need to remain in the lab to take the quiz.

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Summary of Topics Covered and Course Schedule (These schedules are approximate, and subject to change as the course progresses. This is more for general information about the course materials organization)

Weeks 1 & 2 Review

a. *Data structures you must have seen*
Arrays
Array Lists
Linked lists
Stacks
Queues
Priority Queues
Trees & Binary Search trees, Programming

b. *Sorting/Searching algorithms you must have seen*
Insertion sort, Bubble sort, Merge sort, Quick sort, Heap sort, Bucket and Radix sort

Weeks 3 Review
Recursion, examples of programming recursive algorithms
Stacks and Recursion

Weeks 4 & 5 Hashing and Hash-based datastructures
Hashing , HashSets, HashMaps, TreeMaps

Week 6 Heaps
Heap data structure, implementation

Weeks 7 & 8 Self-Balancing Trees
AVL and Red-Black trees, Splay trees
Programming.

Weeks 9, 10, 11 Graph Data Structure
Graph Data Structures, Programming Graphs
Graph representation, visualization and traversals
Types of graphs, directed and weighted graphs
Depth-first and Breadth-first Search
Spanning Trees
Shortest Path algorithms

Week 12 Algorithm complexity
Big(O) and computational complexity calculations

Week 13 Databases
Creating and accessing databases

Week 14 Review

Campus Policies

Please be aware of the most **current Campus Policies** applicable to issues such as Academic Integrity, Computer/Network Use, Identity Verification, Accommodation of Individuals with Disabilities, Title IX, and Veteran & Military Services.

Last Day to Withdraw without Grade Penalty

November 14, 2025

Last Day to opt for S/U option

December 8, 2025

Student Evaluation of Instruction (SEI)

You are responsible for completing the Student Evaluation of Instruction (SEI) for this course and for all your courses with an enrollment of five (5) or more students. I value your feedback and use it to improve my teaching and planning. Please complete the online form during the appropriate period.

Basic Needs

To learn effectively you must have basic security: a roof over your head, a safe place to sleep, enough food to eat. The **Division of Student Affairs** has compiled a broad range of resources, including a **list of campus services, local agencies, and support networks**, that can assist students with managing their basic needs. Please consult these resources or **contact the Division of Student Affairs** should you need additional information.

Names & Pronouns

SUNY New Paltz recognizes the importance of a diverse student body, and we are committed to fostering equitable classroom environments. You are invited to share how you want to be referred to, both in terms of your name and your pronouns (he/him, she/her, they/them, etc.). I will do my best to address and refer to all students accordingly and will support you in doing so as well. In this classroom, we will respect and refer to people using the names and personal pronouns that they share.

Taking Care: Illness and Absences

While the national COVID-19 public health emergency has ended, SUNY New Paltz still has policies in place to protect the health of our community. **Click here to view COVID-19 FAQs and up-to-date information about those policies**.

Students with an illness that prevents them from attending class (COVID-19, influenza, etc.) should exercise self-care and consult the testing recommendations on the **Student Health Service (SHS) website**. Faculty will receive "professor notes" from the SHS when a student has an illness that prevents them from attending class.