

מקבול משתף זיכרון: מעבדים, מאיצים ומה שביניהם

– Shared-Memory Parallelism: CPUs, GPUs and in-between

מספר הקורס – 236606

חורף – 1/2022

מרצה:	ד"ר גל אורן
מתרגל/בודק תרגילים:	יהונתן פרידמן
שעות הרצאה:	2 שעות שבועיות
דרישות קדם:	מערכות הפעלה (חובה), ידע מקיף ב-C או CPP או Fortran (חובה)
אתר הקורס: (כתובת האתר)	

תיאור הקורס

This course is primarily designed for under and graduate students to learn the basics and the advances of shared memory programming (with OpenMP), with a special focus on CPUs, GPUs and in-between.

תוצרי למידה

This course will introduce you to the multiple forms of parallelism found in modern multi and many core architecture processors and teach you the programming frameworks for handling this parallelism in applications. You will get access to a cluster of modern multi (CPUs) and many (GPUs) core processors (Intel Xeon + Nvidia GPUs architecture) for experiments with graded programming exercises. This course can apply to various HPC and datacenter workloads and framework including artificial intelligence (AI). You will learn how to handle data parallelism with vector instructions, task parallelism in shared memory with threads, vector programming and SIMD extensions, and offloading to accelerators. This knowledge will help you to accelerate computational applications by orders of magnitude, all the while keeping your code portable and future-proof.

דרישות הקורס

- Programming in C/C++ or Fortran (but even in Python!)
- Programming in the Linux environment and Linux shell proficiency (navigation, file copying, editing files in text-based editors, compilation).
- OS profound understanding.
- Grading Policy: Homework (30%), Competitive Project (70%).

רשימת ספרים

\\pc\Z:\סילבוס\חורף תשפ"ג\אורן.doc

- Mattson, Timothy G., Yun Helen He, and Alice E. Koniges. **The OpenMP Common Core: Making OpenMP Simple Again**. MIT Press, 2019.
- Van der Pas, Ruud, Eric Stotzer, and Christian Terboven. **Using OpenMP - The Next Step: Affinity, Accelerators, Tasking, and SIMD**. MIT press, 2017.