

ASTR 5210: Computational Methods

<http://www.ap.smu.ca/~thacker/teaching/5210.html>

11:30-12:45 Monday-Wednesday, AT 305

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Office hours: 9-11 Thurs & Friday, other times by appointment as well

Cancelled class notifications will appear on the class website and in emergencies I may send emails.

Syllabus

1. Introductory concepts

- Computer architecture and organization, its relation to programming. Key language concepts and optimization of codes.

2. Parallelization

- Threads and OpenMP. Message Passing Interface

3. New developments in parallelism and the changing face of computational astrophysics

- Grids and the rise of clouds. Mapreduce implementations like Hadoop.

4. Machine learning techniques in astrophysics

- Support vector machines, artificial neural networks.

5. Introduction to R.

Text

No single text covers all the material in this course. Useful resources include

“Parallel Programming in OpenMP” Chandra, Academic Press.

“Using MPI” Gropp et al, MIT Press.

Marking Scheme

75%: Assignments (3 assignments over the term)

25%: Final exam (Concept-based multiple choice)

Late assignment policy: all assignments are due on the date given, no credit will be given for late assignments.

Collaboration and Academic Integrity

Please ensure you read the regulations in the graduate calendar on academic integrity - there are some important rules in there. In a course where codes are developed it is obviously expected that you will have developed your own rather than plagiarising others.

With that said, collaboration and discussion is an expected part of working as a graduate student, and it is obviously a good thing to talk to peers about the assignments and approaches to solutions.