

Syllabus

MATH663/AMSC663 Fall 2015 Advanced Scientific Computing I (ASC I)

Instructors: Radu Balan, Howard Elman

Classes: Tuesday, Thursday, 9:30am – 10:45am (or as needed) in CSIC 4122

Office Hours: Radu Balan: Tuesday, 12:30pm-1:30pm in CSCAMM; Howard Elman: Wednesday, 11:00am-12:00pm and Thursday, 11:0am-12:00pm in AV Williams 3125; or by appointment otherwise

Contact Information:

Radu Balan: rvbalan@math.umd.edu, Math Building, Room 2308, x55492 / (CSCAMM) CSIC Building, Room 4131, x51217

Howard Elman: elman@cs.umd.edu, AV Williams 3125, x52694

- Project Proposal
 - By the end of September each student must find a faculty advisor and identify a suitable project that includes a deliverable suite of software that is designed to carry out a computational scientific task, propose appropriate algorithms, languages, and platforms for the development of this software, write a short project proposal that also includes a scientific justification, and present the proposal orally. The proposal must also include the description of the computational facilities to be used in the project.
 - Project description should also include outline of a test problem that will be used for verification.
 - Meeting with both instructors and scientific advisor at least one week before oral presentation.
 - Project proposal should have about 5 pages, or more as needed.
 - Oral presentations at the end of September. Plan on 30 minutes, including questions and discussion.
- Code Development
 - modularity, portability, memory management
 - post-processing, restarting, and writing to databases
 - interactivity
 - scientific visualization
 - documentation and version management tools
 - debugging and profiling tools
- Implementation of Parallel Algorithms (time permitting)
 - OpenMP, MPI, GPU programming
 - masking communication costs, load balancing, granularity
 - parallel numerical linear algebra
- Project Progress Report
 - Each student must give a written and oral mid-year report on the state of his or her project, explain how the software has been developed and tested, give his or her current vision of the finished product, and detail how that vision has evolved over the course of the project.

- Class Attendance by Scientific Advisor
 - During the academic year (the sequence AMSC 663/664) your scientific advisor is required to attend a total of three oral presentations (in addition to the pre-oral presentation meeting described above): the project proposal presentation, the end-of-Fall-semester (mid-year) presentation (November/December), and the end-of-Spring-semester (final) presentation (April/May).

Students will provide weekly statements of their project status. The statements are due before the beginning of the scheduled weekly class period.

Students are responsible for achieving the project goals that were listed in the proposal. Grading takes into account student's understanding of the project, its implementation, timing of the weekly reports, presentation quality and the mid-year report quality.