

03-713: Bioinformatics Data Integration Practicum Spring 2013

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Class time: Tuesday 4:30–5:50pm in MI 434 and by appointment

Course objectives: The objective of this course is to provide a hands-on, self-directed experience dealing with biological data and integrating it to produce software and analyses that are of use to biologists. Students will be given a project and asked to design a solution using a combination of existing tools and their own developed software.

Course work: The primary course work will be the implementation of a large project in teams of about 4 students. The teams will be assigned by the instructors. After about 4–5 weeks, teams will swap their solutions with another team and the other team will use it and improve it. The deliverables for the project include:

1. A runnable, working piece of software that solves the posed problem.
2. A per-group **write-up** of 5–9 polished pages (due on the last day of class). The write-up should include (1) a technical description of the team's solution, including how the team has ensured the solution is correct, (2) a brief comparison of the solution with other similar software for related problems (if any).
3. An approximately 30-minute **presentation** given to the class at the end of the course describing the team's solution to the project, including the team's successes, and difficulties. Everyone on the team should speak for some portion of the presentation. The presentations will be graded based on clarity, intelligence of approach, and progress toward solving the problem.
4. A per-group **user manual** that describes how a user would run the software and how they should interpret the results. The length should be sufficient to be useful to real-world users who may not be familiar with the software. This manual is due about 2 weeks before the end of the semester, and should be given to the team to which you deliver your solution.

50% of your grade will be based on the above project deliverables.

The other course work that will be required:

5. **Peer evaluations** of two kinds: (1) at the end of the semester, each group member will anonymously evaluate their teammates' contribution to the project; (2) each team will evaluate the software they used that was created by another team. (10% of your grade.)
6. **Individual interviews** with the instructors: Each student will meet with one or both instructors for 5 to 15 minutes to describe their contributions to the project and to answer questions about their team's solution. (10% of your grade.)
7. **Progress reports, design documents, class and meeting participation.** During the semester, teams will have to produce several progress reports and documents describing their plans and their progress toward a solution. There will also be meetings with the instructors to discuss progress. (20% of your grade.)

Policies

Excused absences: Students claiming an excused absence for an in-class assessment must supply documentation (such as a doctor's note) justifying the absence. Absences for religious observances must be submitted by email to the instructor during the first two weeks of the semester.

Academic honesty: All class work should be done independently unless explicitly indicated on the assignment handout. The university's policy on cheating and plagiarism can be found here: <http://www.cmu.edu/policies/documents/Cheating.html>. In part it reads "In any presentation, creative, artistic, or research, it is the ethical responsibility of each student to identify the conceptual sources of the work submitted. Failure to do so is dishonest and is the basis for a charge of cheating or plagiarism, which is subject to disciplinary action." You should be familiar with the policy in its entirety.

Schedule

This schedule may change. The webpage will contain the most up-to-date version of the schedule.

March 19: First day of class, lecture on course organization, description of problem, start-of-class survey, teams formed by instructors.

March 25: First progress report due. This report should consist of four sections: (1) brief statement of the problem in your own words; (2) list of relevant software and tools you will continue to investigate; (3) Questions about the problem that you have tried to find the answer to but were not able to (do not include questions that are easily answered by doing your own research); (4) Assignments of roles to each member of the team.

March 26: Lecture by Luisa Hiller, Assistant Professor, Department of Biological Sciences.

Prof. Hiller has supplied this year's data and represents the intended user base of the developed software. **Come prepared with at least 1 question to ask her.**

April 1: Second progress report due: Design document.

Send, by email to the instructors, a description of your planned design for solving the problem. This should be more than an uniformed plan. By now, you should have tested software, sketched out algorithms, and have a solid start towards creating a solution. Your progress report should also include a description of which parts of the problem who have decided are too hard to tackle during the semester, a timeline for finishing the work you've chosen to do. You only have 4 weeks or so from this point to produce a working solution.

April 2: Lecture on team and software management tools.

April 9: Meetings with instructors

April 16: Third progress report in the form of mini demos.

Present to the class your work so far and your plan going forward. You should have at least some piece of the solution working at this point. Get feedback and suggestions from the class.

April 23: Meetings with instructors

April 29: Teams deliver:

- **Their software**
- **User manuals**

Teams begin to evaluate and improve the other team's solution.

Week of April 29: One-on-one interviews with the instructors (scheduled individually).

April 30: Meetings with instructors

May 2: Write up due.

Final exam: Presentations & peer evaluations due.