B573- Programming for Science Informatics
Fall 2013
Class room: IT271, 3 Credit Hours

Instructor: Sarath Chandra Janga, PhD, Assistant Professor, Bioinformatics
Office Address: 719 Indiana Avenue, Room WK 309 (Walker Plaza Building)
Office Phone: 317-278-4147
Office Hours: Tue, Thu, 11:00am-12:00pm
Email Address: jangalab@iupui.edu

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  • Teaching and Learning
  • Research, Scholarship, and Creative Activity
  • Civic Engagement
With each of these core activities characterized by
  • Collaboration within and across disciplines and with the community
  • A commitment to ensuring diversity, and
  • Pursuit of best practices

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Statement of Values

IUPUI values the commitment of students to learning; of faculty to the highest standards of teaching, scholarship, and service; and of staff to the highest standards of service. IUPUI recognizes students as partners in learning. IUPUI values the opportunities afforded by its location in Indiana’s capital city and is committed to serving the needs of its community. Thus, IUPUI students, faculty, and staff are involved in the community; both to provide educational programs and patient care and to apply learning to community needs through service. As a leader in fostering collaborative relationships, IUPUI values collegiality, cooperation, creativity, innovation, and entrepreneurship as well as honesty, integrity, and support for open inquiry and dissemination of findings. IUPUI is committed to the personal and professional development of its students, faculty, and staff and to continuous improvement of its programs and services.

Electronic course site:
  – oncourse.iu.edu
  – distribution of homework assignments and class notes
  – should be accessible if you have IU ID and registered for the course

Course website: http://www.iupui.edu/~jangalab/cstudents.php
  – Syllabus, outline of lectures, course calendar and suggested reading
  – Final projects and presentation schedules
Lectures location & time:
- IT 271, Tuesday 6:00pm-8:40pm
- May have some guest lectures, not necessarily in the same room and time

Textbook:
- class notes will be distributed via course website and the following books are recommended (for course assignments, exercises and projects)

Reading (referred books):

Homework & Assignments:
- monthly homeworks (up to four programming assignments total)
- midterm (will be a take-home assignment)
- final project (read a series of papers, tackle a research problem, present the papers, demonstrate the project and write-up a short report – work in groups up to a maximum of two members per group)

Grading:
- Homeworks/Assignments (40%), Midterm (20%), Final presentation and project (40%)

Course Description and Outcomes:
In this course, we will cover the basics of programming as they are relevant to understanding and analyzing biological datasets. This will be achieved by giving a biology background to motivate a computational need/task. At the end of the course, you should be able to describe solutions (preferably elegant) to address a wide range of basic biological and biomedical problems.

The course is aimed at giving a good foundation in UNIX based administration, PERL programming, MySQL database management, R statistical analysis and application development in omics settings using these programming languages/tools.

The instructor will give introductions to each of these programming languages and commonly used applications in bioinformatics/systems biology in the first 10 weeks. Then the students will be asked to present recent articles published in the last 4 years (each student has to present couple of papers), present a project work on a particular theme/problem and submission of the project report.

Core Competencies: Some background of biology is expected and having knowledge of the logic of programming is advantageous.
Software used: Unix operating system, Perl, R and SQL (Either Oracle and Mysql)

Expectations/Guidelines/Policies:

Late Policy: You are expected to submit assignments on the due dates unless you have a medical condition which warrants it (supported by medical evidence).

Attendance: Attendance and punctuality is expected and may be encouraged/rewarded with bonus points up to 5% which will be discussed in the first lecture.

Cell phone: Cell phones are not allowed in the class unless they are switched off. Failure to comply with this policy could negatively impact your attendance scores.

Browsing: Laptops/desktops should be strictly used for course related content and chatting is banned during the lecture.

Copying policy: Help and collaboration between yourselves is encouraged for working on your assignments but copying from one another and from the internet is strictly prohibited. Note that it is easy to identify code which is copied.

Grading Scale
A+ (93-100%), A (88-92) and B (84-87%) [Tentative]

Course Evaluation

Homework/ Assignments (40%)
–A total of four programming assignments (40%)
–At least one assignment each on using Perl, R and MySQL (available from on course website)
–Strictly no copying of code from others and all the code should be functional to be awarded any grade.

Mid-term project evaluation (20%)
–A project on developing a pipeline for predicting function or phenotype by integrating different sources of functional associations in a model organism of choice (see on-course website)
–The developed system should be submitted as a short report demonstrating its functionality and the conclusions derived from it for the chosen dataset.

Note: There will be no written exam in this course and most of the evaluation is based on your programming assignments and project work.

Final project (40%)
–Will be evaluated for 40% of the total points
–Will comprise of a project for which you can work in groups of up to 2 students
–Involves reading a series of papers, tackling a research problem, presenting the read papers, demonstrating the project developed based on the papers in the class and write-up of a short report on the project.
–Presentation of the project would be towards the end of the semester and will be evaluated as a group.
–Paper presentation would weigh 20% and project demonstration/report would be for 20%.
–Each group will present a different set of papers and project to work on.
–Any questions regarding the projects should be directed to jangalab@iupui.edu

**General rules/notes:**

“Children are not permitted to attend class with parents, guardians, or childcare providers. This conduct has the effect of unreasonably interfering with an individual’s work or academic performance creating an offensive learning environment.”

“A student must not violate course rules as contained in a course syllabus, which are rationally related to the content of the course or to the enhancement of the learning process in the course.” [Code of Student Rights, Responsibilities, and Conduct, page 29]