

New Course Request

NOV 11 2008 Indiana University

Indianapolis Campus

Check Appropriate Boxes: Undergraduate credit Graduate credit Professional credit 90

1. School/Division Informatics 2. Academic Subject Code INFO-I

3. Course Number 656 (must be cleared with University Enrollment Services) 4. Instructor Perumal

5. Course Title Translational Bioinformatics Applications

Recommended Abbreviation (Optional) _____
(Limited to 32 Characters including spaces)

6. First time this course is to be offered (Semester/Year): Fall 2008

7. Credit Hours: Fixed at 3 or Variable from _____ to _____

8. Is this course to be graded S-F (only)? Yes _____ No X

9. Is variable title approval being requested? Yes _____ No X

10. Course description (not to exceed 50 words) for Bulletin publication: This course entails a cohesive approach to the theory and practice of bioinformatics applications in translational medicine (TM). It includes topics related to the complexities of low, medium and high-throughput applications in TM and powerful solutions to TM data management, problems by employing various informatics frameworks.

11. Lecture Contact Hours: Fixed at 3 or Variable from _____ to _____

12. Non-Lecture Contact Hours: Fixed at 0 or Variable from _____ to _____

13. Estimated enrollment: 12-15 of which 100 percent are expected to be graduate students.

14. Frequency of scheduling: Fall/Spring Will this course be required for majors? Yes

15. Justification for new course: Redesign of bioinformatics curriculum

16. Are the necessary reading materials currently available in the appropriate library? Yes

17. Please append a complete outline of the proposed course, and indicate instructor (if known), textbooks, and other materials.

18. If this course overlaps with existing courses, please explain with which courses it overlaps and whether this overlap is necessary, desirable, or unimportant.

19. A copy of every new course proposal must be submitted to departments, schools, or divisions in which there may be overlap of the new course with existing courses or areas of strong concern, with instructions that they send comments directly to the originating Curriculum Committee. Please append a list of departments, schools, or divisions thus consulted.

Submitted by: Mallik J. Lalwal Date 5/15/08
Department Chairman/Division Director

Date _____
Dean of Graduate School (when required)

Approved by: Mallik J. Lalwal Date 5/15/08
Dean

Sherry L. Greener Date 11/4/08
Chancellor/Vice-President

Date _____
University Enrollment Services

Jackie [Signature]
APPROVED SEP 3 0 7 11 08
UPUI Curriculum Subcommittee

After School/Division approval, forward the last copy (without attachments) to University Enrollment Services for initial processing, and the remaining four copies and attachments to the Campus Chancellor or Vice-President.

School of Informatics
I656 Translational Bioinformatics Applications

Course Information

- Credit Hours: 3.0
- Placement in Curriculum: Elective course for MS and required course for PhD students in Bioinformatics
- Prerequisites: Graduate standing or permission of instructor
- Co-requisites: None

Faculty: Dr.Narayanan Perumal (nperumal@iupui.edu)

Course Description and Rationale

Description: This course entails a cohesive approach to the theory and practice of bioinformatics applications in translational medicine (TM). It includes topics related to the complexities of low, medium and high-throughput applications in TM and powerful solutions to TM data management problems by employing various informatics frameworks.

Rationale: Translational medicine attempts to bring clinical and biomedical research practices and outcomes to patient care (“bench to bedside”). Informaticians have assisted clinicians and biomedical scientists in dealing with the large volumes of data derived from various high-throughput methodologies, developing disease models and drug design. To impart theoretical learning of the bioinformatics applications in TM, this course will be delivered as lectures by the instructor and TM practitioners and include discussions led by students on articles describing various informatics frameworks associated with the high-throughput methodologies. Practical aspects of the pedagogy will be a term project that captures the “bench to bedside” concept employing informatic applications to analyze patient data.

Educational Objectives

1. To learn the basics and the complexities of high-throughput methods such as genome-wide association studies, mass spectral characterizations, microarray experiments, and ChIP-on-chip analysis etc.
2. To study the mechanics of clinical trials – their design, development and implementation – with the emphasis on roles informatics plays in the process.
3. To grasp the fundamental informatics frameworks associated with TM practices.
4. To understand the foundations of disease model development and drug design.
5. To appreciate the elementary principle of personalized medicine administered at the bedside (mostly a speculative venture currently)

6. To understand the power of statistical methods and tools in analyzing data in this field.

Course Content and Preliminary Lecture Schedule

Week	Topics, Assignments, Tasks
1	Introductory Topics
2	Basic Microarray Technologies
3	Variations in Microarrays
4	Genome-wide Association Methods; Team Project Assignment
5	RNAi Studies
6	Epigenetic Characterizations
7	Pharmacogenomics/Toxicogenomics
8	Mass Spectral Analyses
9	Drug Discovery Approaches; Project Progress Report (Presentation)
10	Personalized Medicine Topics
11	Clinical Trials; Research Report Due
12	Statistical Tools and Applications in Clinical Trials
13	Disease Models
14	Guest Lecture – TM practitioner
15	Guest Lecture – TM practitioner
16	Project Presentations; Final Project Report Due

Required and Recommended Text

Review articles and other journal articles will be assigned based on the lecture and discussion topics.

Evaluation and Grading

<i>Learning Activity</i>	<i>Percentage of Grade</i>
Discussion Leads	40% (2 Discussions, 20% each)
Research Report	10%
Team Project (Group Task)	30%
Participation	20%

The final grade for the class will be based on the performance on these four categories.

Grading scale:

Point Range	Grade	Point Range	Grade
97 – 100%	A+	80 – 82%	B-
93 – 96%	A	77 – 79%	C+
90 – 92%	A-	70 – 76%	C
87 – 89%	B+	60 – 69%	D
83 – 86%	B	59 and below	F

Bibliography

1. V. Stearns et al (2007) Epigenetic regulation as a new target for breast cancer therapy. *Cancer Investigations*, 25, 659-665.
2. J. S. Kooner et al (2008) Genome-wide scan identifies variation in MLXIPL associated with plasma triglycerides, *Nature Genetics*, 40, 149-151.
3. J. H. Moore (2008) Bases, bits and disease: a mathematical theory of human genetics. *European Journal of Human Genetics*, 16, 143-144.

Cheating and Plagiarism

If students turn in work that was written by someone else, work which was bought, borrowed, stolen, or downloaded from the Internet, and pass it off as their own work, they are cheating. Penalties for this form of plagiarism may range from a lowered grade, to an F for the course, or, in extreme cases, expulsion from IUPUI. Students caught cheating will be penalized and may not receive credit for the exam or assignment.

Americans with Disability Act:

If you need any special accommodation due to a disability, please contact Adaptive Educational Services at (317) 274-3241. The office is located in CA 001E.

POLICIES for ATTENDANCE & ASSIGNMENT PROJECT DEADLINES

1. **Missing class course chat time WILL affect your grade.** Students are allowed two (excused or unexcused) absences before their grade will be effected. In other words, whether you are sick or have personal problems or issues for missing class, it will amount to the same. Missing class means you do not show for the whole or majority of the session. The grade reduction policy works in this way.

a. On the third missed class time your final grade will drop 5 points (regardless of the reason).

b. On the fourth missed class your final grade will drop 10 points (regardless of the reason), and 5 additional points there after for each additional class missed.

2. **Responsible for due dates and related materials:** All weekly due assignments are the students' responsibility. If class is missed, the student is still responsible for the assignment, as well as to find out what was covered in class, e.g., any new assignments or variations to an existing assignment. ALL assignment deadlines are outlined in the syllabus or syllabus supplemental documents provided on Oncourse. The instructor will only give one reminder of these dates. In the end, each student is responsible for the deadline. Also, weekly assignment deadlines should be adhered to, to insure fairness to all students. For the purpose of maintaining an equal and fair evaluation of each student's work, no student will receive special treatment. As a result, the following rules will apply to this course:

a. All assignments must be ready to hand in or email at the designated time and place as stated on the assignment sheet, as communicated via email, or on the syllabus.

b. All assignments handed in late will be reduced 10 points for every day late (24 hrs. from the due date and time). For example, if the assignment is due at 6PM on the due date and it is post-marked 6:01PM, it will be reduced automatically by 10 points. If the class meets in the class room, students must be ready to hand the assignment in at the start of class time.

c. Incompletes will NOT be issued except under very extreme personal conditions that have been reviewed by the instructor and in some cases in consultation with the Dean's Office.

UNIVERSITY POLICIES

1. **University Attendance Policy:** Attendance is required. The University regulations state: "Students are expected to be present for every meeting of the classes in which they are enrolled." IUPUI faculty is required to submit to the office of the Register a record of student attendance through the semester, on which they will take action if the record conveys a trend of absenteeism. As a result, ATTENDANCE WILL BE TAKEN IN ALL CLASSES. An Attendance sheet will be passed out in class for each student to sign their name. If you do not sign your name while in class you will be marked absent. The instructor is not expected to remember who attended when, so signing the sheet while in class is important. Signing the attendance sheet for another student is absolutely prohibited. Any student found doing so will be in violation of university policies on ethics and/or conduct.

2. **Bringing your children to class:** University Policy states that: "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 291*]

3. **Academic Dishonesty I Integrity I Plagiarism:** Using another student's work on a project or assignment, cheating on a test, test or any other form of dishonesty or plagiarism will result in a grade of zero on that assignment and possibly an "F" in the course, and will be referred to the Dean of Students. All students should aspire to high standards of academic honesty. This class encourages cooperation and the exchange of ideas. For further reference, students may see:

a. http://www.iupui.edu/~regrad/grad/academic_misconduct_curriculum_subcomitee.rtf.

4. **Values and ethics:** Profanity or derogatory comments about or towards the instructor or any member of the class will NOT be tolerated. Violating this rule will result in a warning and if the offense continues, administrative action will be taken.

5. **Code of Student Rights, Responsibilities and Conduct:** All students are responsible for reading, understanding, and applying the Code of Student Rights, Responsibilities and Conduct of IUPUI. (Students can access www.iupui.edu/code for further information regarding the above points)

6. **Disabilities Policy:** In compliance with the Americans with Disabilities Act (ADA), all qualified students enrolled in this course are entitled to "reasonable accommodations." Please notify the instructor during the first week of class of any accommodations needed for the course. Students with learning disabilities must provide written verification for this policy to be recognized. *If you need any special accommodation due to a disability, Please contact Adaptive Education Services at 274-3241. The office is located in CA 001E.