INFO I590

Statistical Methods in Bioinformatics

Department of BioHealth Informatics
Indiana University School of Informatics and Computing
Indianapolis
Summer 2015

Section No.: 
Time: 1:00pm to 4:00pm
Location: IT 257
Meets: MTWRF - 6/1/15 – 6/5/15
Instructor: Meeta Pradhan, Ph.D., Assistant Research Professor
Office Hours: Appointment
Office: WK 306, Walker Plaza Building
719 Indiana Avenue, Indianapolis, IN 46202
Phone: (317) 278-0148 (Office)
Email: mpradhan@iupui.edu
Prerequisites: High School Math

COURSE DESCRIPTION

There is a large in-flux of data in recent times. Handling, understanding and extracting knowledge from data requires the application of statistical principles. This is the first module in the series of three module course that is being offered in the School. This module covers the basic principles of statistics focusing on their application to Bioinformatics. The topics covered in this module are: understanding data and data type, qualitative and quantitative methods, hypothesis testing, exploring the data, data collection, comparing means, exploring assumptions, correlation and introduction to regression. The data will be analyzed using the statistical computing tool R.

Required Text(s): There is no required text book. Slides and material will be provided.

Reference Text book: Handbook of Biological Statistics by John H. McDonald
(http://biostathandbook.com/)
EXPECTATIONS, GUIDELINES, AND POLICIES

ATTENDANCE

• Class attendance is required for classroom-based courses.
• Attendance shall be taken in every class. If you do not sign the attendance sheet while in class, you shall be marked absent.
• Signing the attendance sheet for another student is prohibited.
• The instructor is required to submit to the Registrar a record of student attendance, and action shall be taken if the record conveys a trend of absenteeism.
• Absences must be explained to the satisfaction of the instructor, who will decide whether omitted work may be made up.
• Missing class reduces your grade through the following grade reduction policy:
  • You are allowed ONE excused or unexcused absences.
  • Regardless of the reason, a 2nd absence results in a 25% reduction in your final grade
  • A 3rd absence results in a 50% reduction.
  • Further absences result in an F in the course.
• Missing class may also reduce your grade by eliminating opportunities for class participation.

CLASS PREPARATION

• You are expected to read the chapters
• Research shows that regular attendance, preparation and active class participation have a positive impact on your final grade for a course.
• Ask whatever questions you have pertaining to the course, while we are face to face.
• When not in class, ask on the class forum and ask your questions and receive answers. In this way, the entire class can benefit from your question. There are no silly questions!!!!

LATE ASSIGNMENTS AND SUBMISSION OF ASSIGNMENTS

• All work (unless otherwise noted) should be submitted via an attachment in the Assignments area.
• Class Work will be due by 11:55 PM of the specified day. If your Class Work is late, your respective assignment will be assessed a 25% late penalty. Any assignment that is not turned in by 24 hours after the due date will not be
accepted and you will receive a zero (0) for that particular assignment. Also, if I give out a solution and you have not submitted your work, you will not be able to turn in the late work and you will also receive a zero (0) for that particular assignment.

MAKE-UP QUIZ AND EXAM

• Make-up Quiz and Exam will be handled on a case by case basis. Generally, make-up Quiz/Exam are given only under documented emergency situations. You should contact your instructor as soon as possible to schedule a make-up. Make up quiz/exams may be harder than scheduled quiz/exams.
• If you are going to miss an quiz and exam date, it is your responsibility to contact the instructor BEFORE the examination is given to schedule an alternate time to take the test.

GRADE ALLOCATION

• Class participation 10%
• Homework 30%
• Quiz 40%
• Final Exam 20%

GRADING SCALE

• A 100% - 95%
• A - 94.9% - 90%
• B + 89.9% - 87%
• B 86.9% - 83%
• B - 82.9% - 80%
• C + 79.9% - 77%
• C 76.9% - 73%
• C - 72.9% - 70%
• D + 69.9% - 67%
• D 66.9% - 63%
• D - 62.9% - 60%
• F 59.9%
ACADEMIC INTEGRITY STATEMENT

Cheating is absolutely not tolerated at IUPUI!

The IUPUI Code of Ethics is based on the need for trust in an academic community. IUPUI's system is developed by and maintained for the welfare of its students, and all students should make sure that they read and understand the provisions outlined in the Student Handbook. The code, which is available in the Office of the Dean of Students and in all school office, spells out what constitutes unacceptable behavior and the procedures to be followed when there are alleged cases of misconduct. The dean of students also has some very brief pamphlets on key areas of the code. The link that follows is not the code but rather abbreviated and paraphrased statements on key elements of the code: academic and personal misconduct as well as a section on what students should do if they believe that other students, faculty, or staff have violated their rights. The code also explains the procedures employed and how students may appeal decisions. For more information, consult the Code of Student Rights, Responsibilities, and Conduct as well as brochures located in the Office of the Dean of Students.

Indiana University Purdue University Indianapolis Code of Conduct

Any form of cheating/plagiarism on an assignment, homework or quiz will result in both a zero score for the assignment, and a one-letter grade penalty in the course. The case will be reported to the Chairman of the School of Informatics and Computing and a letter describing the infraction will be placed in your student file. Further disciplinary action will be pursued according to university policy as described in Part III of the Code of Student Rights, Responsibilities, and Conduct (Issued August 15, 1997). Cheating, or helping another student to cheat, are considered equal cases of academic dishonesty and will be dealt with as noted above.

What constitutes cheating?

Giving another student access to your computer account, or negligently permitting another student to access your computer account constitutes cheating on your part if that other student copies any files that become implicated in a cheating case. Protect your account as if your academic career depends on it!

Giving another student your code "just to look at" has resulted in serious problems for both students in the past—even with the best of intentions. Do not give your code to other students.
If you are confused as to the difference between helping each other (which is encouraged) and plagiarism (which will not be tolerated), please ask me.

**WEEKLY SCHEDULE (subject to change)**

<table>
<thead>
<tr>
<th>Day</th>
<th>Dates</th>
<th>Content</th>
<th>Reading</th>
<th>Due Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday</td>
<td>7/27/2015</td>
<td>Data and data type, qualitative and quantitative methods, understanding the variables.</td>
<td>Class Material</td>
<td>Class quiz 1</td>
</tr>
<tr>
<td>Tuesday</td>
<td>7/28/2015</td>
<td>Introduction to R, exploration to the data, data collection, comparing the mean</td>
<td>Class Material</td>
<td>Class quiz 2, Homework 1</td>
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<tr>
<td>Wednesday</td>
<td>7/29/2015</td>
<td>Hypothesis, chi-square, t-test, application to biological data</td>
<td>Class Material</td>
<td>Class quiz 3, Homework 2</td>
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<tr>
<td>Thursday</td>
<td>7/30/2015</td>
<td>Introduction to assumption and correlation</td>
<td>Class Material</td>
<td>Class quiz 4, Homework 3</td>
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<tr>
<td>Friday</td>
<td>7/31/2015</td>
<td>Introduction to Regression</td>
<td>Class Material</td>
<td>Final Exam</td>
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