Fall 2017 Syllabus

Course Code: BI 420-01-1

I. Instructor Information
Mark Speck, PhD
Postdoctoral Fellow/Adjunct Faculty
Henry Hall Lab 9
2PM – 5PM
mark.speck@chaminade.edu

II. Course Information
T & TH, 8:30AM – 9:50AM
Kieffer Hall 31

III. Recommended Text
A First Course in Systems Biology,
Eberhard Volt. 1st Edition.
SBN-10: **0815344678**
ISBN-13: **978-0815344674**

IV. Course Title: BI 420 Systems Biology section 01

V. Course Description: This course will focus on the frontiers of our understanding of the multi-level networks that underlie biological systems. Lecture course reviewing the key concepts of the systems biology approach to ecological, organismal and cellular systems. Contribution of cornerstone technologies such as genomics, bioinformatics, proteomics and metabolomics will be reviewed, along with their computational foundations. Prerequisites: BI 308/BI 308L.

VI. Learning Outcomes

At the conclusion of BI 420, students will:

1. Define the terms 'system biology' and explain how the era of 'big data' has developed form the molecular biology and computational revolution of the last decade.
2. Explain the techniques that generate "omic" data sets, specifically genomes, transciptomes, epigenomes, microbiomes, metabolomes and proteomes.
3. Manipulate (*retrieve, reformat, merge*) and derive insights from (*interpret*) data sets that exemplify these "omes".
4. Apply sophisticated data visualization tools to extract meaning from a massive data set.
5. Relate systems approaches to a contemporary problem in medical, or environmental biology

VII. Course Elements

This course will cover the analysis of: biological, gene, protein, metabolic, signaling, and population systems. It will also introduce the student to mathematical modeling, static network models, and parameter estimation. Access to a personal computer capable of running statistical software is necessary.

VIII. Grading Scale

Points earned	Percentage of total	Letter Grade
100	90 – 100%	A
80-89	80 – 89%	B
70-79	70 – 79%	C
60-69	60 – 69%	D
≤ 59	≤ 60%	F

IX. Assignments and Grading

Mini project 1	20% (20 points)
Mini project 2	25% (25 points)
Final project	50% (50 points)
Attendance/Participation	5% (5 points)

X. Recommended software:

Free: R statistical software, PLAS – Power Law Analysis and Simulation

Proprietary: Statistica, Matlab, Stata

XI. Additional Departmental and University Polices

1. Electronic Devices

Use of music devices and cell phones is prohibited during all Natural Science and Mathematics classes at Chaminade, unless specifically permitted by your instructor. Use of cellphones and music devices in laboratories is a safety issue. In addition, use of cellphones and music devices in any class is discourteous and may lead to suspicion of academic misconduct. Students who cannot comply with this rule will be asked to leave class and may be subject to laboratory safety violation fines. You will be asked to leave class and marked absent if you do not comply. This will negatively affect your grade. Please refer any questions to the Dean of Natural Sciences and Mathematics.

2. ADAA Statement

2.1 Pursuant to several federal and state laws, including the Americans with Disabilities Act of 1990, as amended by the ADA Amendments Act of 2008, and Section 504 of the Rehabilitation Act of 1973, all qualified students with disabilities are protected from discrimination on basis of disability and are eligible for reasonable accommodations or modifications in the academic environment to enable them to enjoy equal access to academic programs, services, or activities. If a student would like to determine if they meet the criteria for accommodations, they should contact the Counseling Center at 808-735-4845 for further information.

3. Attendance & Tardiness

3.1 Students are expected to attend regularly all courses for which they are registered. Students should notify their instructors when illness or other extenuating circumstances prevents them from attending class and make arrangements to complete missed assignments. Notification may be done by emailing the instructor's Chaminade email address, calling the instructor's campus extension or by leaving a message with the instructor's division office (Natural Science and Math 1 (808) 440-4204). It is the instructor's prerogative to modify deadlines of course requirements accordingly. Any student who stops attending a course without officially **withdrawing** may receive a failing grade.

3.2 Unexcused absences equivalent to more than a week of classes may lead to a grade reduction for the course. Any unexcused absence of two consecutive weeks or more may result in being **withdrawn** from the course by the instructor, although the instructor is not required to **withdraw** students in that scenario. Repeated absences put students at risk of failing grades.

3.3. Tardiness; Class begins at 8:30 AM and ends at 9:50 AM; there is no accepted variation to this schedule.

4. Policy on Make-Up Tests

There are no extra points; the work expected from you in this course should be sufficient to obtain your desired grade. Make-Up exams will be decided on a case-by-case basis but are typically not given.

5. Policy on Communication

5.1 The University provides a Chaminade email address for all students. Official Chaminade communications will be sent to the students' Chaminade email address and instructors will use only this email to communicate with students. It is the responsibility of the student to check their email frequently. Report email-related problems to the Helpdesk at 808-735-4855 or helpdesk@chaminade.edu.

6. Laboratory Safety Information

The following guidelines are established to provide instructions in maintaining safety for students, staff, and faculty while using any of the science laboratories at Chaminade University. The Division of Natural Sciences and Mathematics (NSM), along with the University Environmental Safety Office are responsible for enforcing the regulations set forth in the current Student Handbook. Queries should be addressed to: Dean of Natural Sciences and Mathematics (808) 440-4204; Environmental Safety Officer (808) 739-4811

7. Title IX Declaration

Chaminade University of Honolulu recognizes the inherent dignity of all individuals and promotes respect for all people. Sexual misconduct, physical and/or psychological abuse will NOT be tolerated at CUH. If you have been the victim of sexual misconduct, physical and/or psychological abuse, we encourage you to report this matter promptly. As a faculty member, I am interested in promoting a safe and healthy environment, and should I learn of any sexual misconduct, physical and/or psychological abuse, I must report the matter to the Title IX Coordinator. Should you want to speak to a confidential source you may contact the following:

• Chaminade Counseling Center| 808 735-4845.

• Any priest serving as a sacramental confessor or any ordained religious leader serving in the sacred confidence role.

8. Academic Honesty

Students are expected to have read and to abide by the "Student Rules of Conduct" which are available in your copy of Chaminade University's Student Handbook. Cheating in the form of plagiarism, collusion, deception and will not be tolerated and will negatively affect your grade.

9. The instructor may modify elements of this syllabus according to the operational needs of the class.

Course content with tentative schedule

Week	Dates	Lecture Topic
1	29-31 Aug	Historical perspective on 'big data' and systems
2	5-7 Sep	Future of 'big data' and where we need to be with understanding systems
3	12-14 Sep	Case studies
4	19-21 Sep	What is the current *status quo*?
5	26-28 Sep	Mini projects
6	3- 5 Oct	Model systems
7	10-12 Oct	Model systems, genes
8	17-19 Oct	Model systems, protein
9	24-26 Oct	Model systems, signaling
10	31 Oct-2 Nov	Model systems, population
11	7-9 Nov	Mini projects
12	14-16 Nov	Integrative analysis of genome, protein, and metabolic data
13	21 Nov	Systems biology in medicine and drug development
14	28-30 Nov	Design of biological systems
15	5-7 Dec	Final projects
16	7-11 Dec	Final projects due