Fall 2015 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
WSC 120

III. Required 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
≥ 900	90 – 100%	A
800-899	80 – 89%	B
700-799	70 – 79%	C
600-699	60 – 69%	D
≤ 599	≤ 60%	F

IX. Assignments and Grading

Quizzes	20% (200 points)
Mid-term Exam	25% (250 points)
Journal or Clinical Trial Paper	20% (200 points)
Research Poster or presentation	25% (250 points)
Attendance/Participation	10% (100 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	25-27 Aug	Chapter 1. Biological Systems
2	1-3 Sep	Chapter 2. Introduction to Mathematical Modeling
3	8-10 Sep	Chapter 3. Static Network Models
4	15-17 Sep	Chapter 4. The Mathematics of Biological Systems
5	22-24 Sep	Chapter 5. Parameter Estimation
6	29 Sep- 1 Oct	Chapter 6. Gene Systems
7	6-8 Oct	Mid-term 7 Oct, Start Chapter 7 Protein Systems 9 Oct
8	13-15 Oct	Chapter 7. Protein Systems
9	20-22 Oct	Chapter 8. Metabolic Systems
10	27-29 Oct	Chapter 9. Signaling Systems
11	3-5 Nov	Chapter 10. Population Systems
12	12 Nov	Chapter 11. Integrative Analysis of Genome, Protein, and Metabolic Data
13	17-19 Nov	Chapter 13. Systems Biology in Medicine and Drug Development
14	24 Nov	Chapter 14. Design of Biological Systems
15	1-3 Dec	Projects
16	7-11 Dec	Final Due