Synthetic Biology and Biotechnology - Course Syllabus

Course Number: B 206

Course Title: Synthetic Biology and Biotechnology

Academic Semester:	Spring	**Academic Year:**	2015/ 2016
Semester Start Date:	Jan 24, 2016	**Semester End Date:**	May 19, 2016

Class Schedule: Monday and Thursday, weekly, 10:30am - 12:00pm

Classroom Number:

Instructor(s) Name(s): Charlotte A. E. Hauser
Email: charlotte.hauser@kaust.edu.sa

Office Location: Bldg 2, Level 4, Office 4217
Office Hours: By appointment
Teaching Assistant name:
Email:

COURSE DESCRIPTION FROM PROGRAM GUIDE

Introduction to genetic circuits in natural systems; engineering principles in biology; BioBricks and standardization of biological components; numerical methods for systems analysis and design; fabrication of genetic systems in theory and practice; transformation and characterization; examples of engineered systems.

COMPREHENSIVE COURSE DESCRIPTION

The course covers major topics in Biotechnology at the level of fundamental principle and of specific applications

- Biotechnology: Scope and applications in medicine, agriculture, marine biology and industry

- Synthetic Biology: Principles and application

- Overview of enabling technologies

- Ethics and Patentability

Course Schedule: see Additional Information

GOALS AND OBJECTIVES

This course aims that the students obtain knowledge and understanding about the subject biotechnology and synthetic biotechnology. The objectives are given that students will learn about key technologies, such as recombinant DNA technologies, genomics and proteomics and how these technologies are used for specific applications. Additionally, emphasis is on entrepreneurial aspects using biotechnology and/or synthetic biology.

REQUIRED KNOWLEDGE

Sufficient knowledge in Molecular Biology

REFERENCE TEXTS

Books which can be found at the KAUST library:

- Synthetic Biology: Tools and Applications

Edited by: Huimin Zhao

http://www.sciencedirect.com/science/book/9780123944306

- Bioengineering: A Conceptual Approach

by Mirjana Pavlovic

http://0-link.springer.com.library.kaust.edu.sa/book/10.1007/978-3-319-10798-1

METHOD OF EVALUATION

Graded content
- 20% for active participation during coursework (this does not include attendance - see course policies) **- 10% for oral presentation (10 minutes)** **- 10% for group project (written paper)** **- 30% for Midterm Exam** **- 30% for Final Exam**

COURSE REQUIREMENTS

Assignments

- Readings of given course material (e.g. text books and publications)
- The group project is a collectively prepared scientific manuscript on a given subject
- An oral presentation has to be prepared summarizing a specified paper (8 minute presentation followed by 2 minutes of questioning/answers)

Exams:

- Midterm Examination
- Final Examination

Course Policies

Failure to fulfill the following requirements will result in failure of the course:

- Extension on assignments (presentation and group work) only allowed with valid reason and early notification
- Punctual presence on Midterm/Final exam

Additional Information

Tentative Course Schedule:

Week 1 - Introduction to Biotechnology and Synthetic Biology

Week 2 - Recombinant DNA technology

Week 3 - Genomics and Proteomics

Week 4 - Protein design/expression in prokaryotic and eukaryotic cells (Vaccine therapeutics)

Week 5 - Tutorial and examination

Week 6 - Bio-remediation and microbial biotechnology

Week 7 - Plant and marine biotechnology

Week 8 - Animal biotechnology

Week 9 - Medical biotechnology and gene therapy

Week 10 - Synthetic biology: Biological components and circuits

Week 11 - Synthetic biology: Novel organisms

Week 12 - Ethics and patentability

Week 13 - Entrepreneurship, spin-offs and industrial enterprises

Week 14 - Tutorial and examination

NOTE
The instructor reserves the right to make changes to this syllabus as necessary.