



## Course Syllabus: Synthetic Biology and Biotechnology - B 206

<b>Division</b>	Biological and Environmental Sciences & Engineering Division
<b>Course Number</b>	B 206
<b>Course Title</b>	Synthetic Biology and Biotechnology
<b>Academic Semester</b>	Fall
<b>Academic Year</b>	2019/2020
<b>Semester Start Date</b>	08/25/2019
<b>Semester End Date</b>	12/10/2019
<b>Class Schedule</b> (Days & Time)	10:30 AM - 12:00 PM   Mon Thu

Instructor(s)				
Name	Email	Phone	Office Location	Office Hours
Magdy M Mahfouz	magdy.mahfouz@kaust.edu.sa	+966128082761		By appointment
Charlotte Armgard Emmy Hauser	charlotte.hauser@kaust.edu.sa	+966128082524	4217, 2, Ibn Al-Haytham (bldg. 2)	By appointment

Teaching Assistant(s)	
Name	Email

Course Information	
<b>Comprehensive Course Description</b>	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 applications - Overview of enabling technologies - Ethics and Patentability
<b>Course Description from Program Guide</b>	Principles and applications of biotechnology; introduction to key enabling technologies; 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.
<b>Goals and Objectives</b>	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, genome engineering, genomics and proteomics and how these technologies are used for specific applications. Additionally, emphasis is on entrepreneurial aspects using biotechnology and/or synthetic biology.
<b>Required Knowledge</b>	Sufficient knowledge in Molecular Biology

<b>Reference Texts</b>	Books which can be found at the KAUST library:  -Synthetic Biology: Tools and Applications Edited by: Huimin Zhao <a href="http://www.sciencedirect.com/science/book/9780123944306">http://www.sciencedirect.com/science/book/9780123944306</a>  -Bioengineering: A Conceptual Approach by Mirjana Pavlovic <a href="http://0-link.springer.com.library.kaust.edu.sa/book/10.1007/978-3-319-10798-1">http://0-link.springer.com.library.kaust.edu.sa/book/10.1007/978-3-319-10798-1</a>
<b>Method of evaluation</b>	<b>15.00%</b> - Course Project(s) <b>20.00%</b> - Presentation <b>25.00%</b> - Midterm exam <b>20.00%</b> - Homework /Assignments <b>20.00%</b> - Final exam
<b>Nature of the assignments</b>	<ul style="list-style-type: none"> <li>- Readings of given course material (e.g. text books and publications)</li> <li>- The group project is a collectively prepared scientific manuscript on a given subject</li> <li>- An oral presentation has to be prepared summarizing a specified paper ( 8 minute presentation followed by 2 minutes of questioning/answers)</li> </ul>
<b>Course Policies</b>	Failure to fulfill the following requirements will result in failure of the course: <ul style="list-style-type: none"> <li>- Extension on assignments (presentation and group work) only allowed with valid reason and early notification</li> <li>- Punctual presence on Midterm/Final exam</li> </ul>
<b>Additional Information</b>	

## Tentative Course Schedule

*(Time, topic/emphasis & resources)*

<b>Week</b>	<b>Lectures</b>	<b>Topic</b>
1	Mon 08/26/2019 Thu 08/29/2019	Introduction to Biotechnology and Synthetic Biology (Hauser)
2	Mon 09/02/2019 Thu 09/05/2019	Recombinant DNA technology (Hauser)
3	Mon 09/09/2019 Thu 09/12/2019	Genome Engineering Technologies (Mahfouz)
4	Mon 09/16/2019 Thu 09/19/2019	Genome engineering and synthetic biology applications (Mahfouz)
5	Mon 09/23/2019 Thu 09/26/2019	Genomics and Synthetic Biology (Mahfouz)
6	Mon 09/30/2019 Thu 10/03/2019	Tutorial and examination (Hauser & Mahfouz)
7	Mon 10/07/2019 Thu 10/10/2019	Protein design/expression in prokaryotic and eukaryotic cells (Vaccine therapeutics) (Hauser)
8	Mon 10/14/2019 Thu 10/17/2019	Animal biotechnology (Hauser)
9	Mon 10/21/2019 Thu 10/24/2019	Medical biotechnology and gene therapy (Hauser)
10	Mon 10/28/2019 Thu 10/31/2019	Plant biotechnology (Mahfouz)
11	Mon 11/04/2019 Thu 11/07/2019	Plant synthetic biology (Mahfouz)
12	Mon 11/11/2019 Thu 11/14/2019	Microbial biotechnology (Mahfouz)
13	Mon 11/18/2019 Thu 11/21/2019	Ethics, patentability, entrepreneurship, and industrial enterprises (Hauser)
14	Mon 11/25/2019 Thu 11/28/2019	Tutorial and examination (Hauser & Mahfouz)
15	Mon 12/02/2019 Thu 12/05/2019	Course Project
16	Mon 12/09/2019	Course Project

### Note

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