



## Course Syllabus: Contemporary Topics in EnSE - EnSE 394

<b>Division</b>	Biological and Environmental Sciences & Engineering Division
<b>Course Number</b>	EnSE 394
<b>Course Title</b>	Contemporary Topics in EnSE
<b>Academic Semester</b>	Spring
<b>Academic Year</b>	2018/2019
<b>Semester Start Date</b>	01/27/2019
<b>Semester End Date</b>	05/23/2019
<b>Class Schedule</b> (Days & Time)	05:30 PM - 08:00 PM   Mon Thu

Instructor(s)				
Name	Email	Phone	Office Location	Office Hours
Peiyong Hong	Peiyong.Hong@kaust.edu.sa	+966128082218	4275, 4, Al-Jazri (bldg. 4)	8 AM to 5.30 PM Building 4 Room 4275

Teaching Assistant(s)	
Name	Email
Not applicable	

Course Information	
<b>Comprehensive Course Description</b>	<p>This Contemporary Course Topic aims to explore global water scarcity issue and challenges. The course serves to highlight potential mitigation strategies to address water scarcity issues using various countries as case studies. The students learn about this topic through weekly discussion with instructor, reading of related articles (not restricted to peer-reviewed scientific papers), presentation and writing. Two case studies are exemplified below.</p> <p><b>Case study 1: Saudi Arabia</b> Students are asked to identify all the groundwater aquifers in Saudi Arabia, recharge rates and historical usage of groundwaters. Water quality of the groundwater should be collated from available literature. Students are asked to determine if the water quality correlate to that of anthropogenic activities nearby to the groundwater aquifers. Groundwater recharge by means of treated wastewater is explored as a potential mitigation strategy. Students are asked to collate scientific evidence to vote for or against this mitigation strategy and other strategies put forward.</p> <p><b>Case study 2: Singapore</b> Students are asked to identify the technological solutions implemented by Singapore to achieve water security despite being a water scarce island country. Students are kept abreast with the latest research and development funded by Singapore Public Utilities Board, and asked to critically evaluate why these investments are made. Students are then asked to philosophically debate if the management and technological solutions implemented in Singapore would be applicable for other countries.</p>
<b>Course Description from Program Guide</b>	
<b>Goals and Objectives</b>	This course aims to provide students with a well-rounded macro perspective towards water scarcity issues through learning from resources beyond that in the typical scientific research papers.

<b>Required Knowledge</b>	Student who take this course should preferably be enrolled in the Environmental Science and Engineering program, or familiar with wastewater/water treatment technologies
<b>Reference Texts</b>	No reference texts
<b>Method of evaluation</b>	<b>60.00%</b> - Written report <b>20.00%</b> - Homework /Assignments <b>20.00%</b> - Active participation
<b>Nature of the assignments</b>	Case studies, assigned readings, paper presentations, discussion
<b>Course Policies</b>	No unaccounted for absences. Assignments are to be turned in punctually. No plagiarism.
<b>Additional Information</b>	

### Tentative Course Schedule

*(Time, topic/emphasis & resources)*

<b>Week</b>	<b>Lectures</b>	<b>Topic</b>
1	Mon 01/28/2019 Thu 01/31/2019	Discussion of assigned case studies Outline of discussion topics
2	Mon 02/04/2019 Thu 02/07/2019	Collation of materials related to assigned topic, discussion
3	Mon 02/11/2019 Thu 02/14/2019	Submission of report on assigned subtopic 1, critical evaluation and feedback
4	Mon 02/18/2019 Thu 02/21/2019	Collation of materials related to assigned topic, discussion
5	Mon 02/25/2019 Thu 02/28/2019	Submission of report on assigned subtopic 2, critical evaluation and feedback
6	Mon 03/04/2019 Thu 03/07/2019	Collation of materials related to assigned topic, discussion
7	Mon 03/11/2019 Thu 03/14/2019	Submission of report on assigned subtopic 3, critical evaluation and feedback
8	Mon 03/18/2019 Thu 03/21/2019	Mini presentation
9	Mon 03/25/2019 Thu 03/28/2019	Spring Break
10	Mon 04/01/2019 Thu 04/04/2019	Collation of materials related to assigned topic, discussion
11	Mon 04/08/2019 Thu 04/11/2019	Submission of report on assigned subtopic 4, critical evaluation and feedback
12	Mon 04/15/2019 Thu 04/18/2019	Collation of materials related to assigned topic, discussion
13	Mon 04/22/2019 Thu 04/25/2019	Submission of report on assigned subtopic 5, critical evaluation and feedback
14	Mon 04/29/2019 Thu 05/02/2019	Collation of materials related to assigned topic, discussion
15	Mon 05/06/2019 Thu 05/09/2019	Submission of report on assigned subtopic 6, critical evaluation and feedback
16	Mon 05/13/2019 Thu 05/16/2019	Study week
17	Mon 05/20/2019 Thu 05/23/2019	Final Exam Week

#### Note

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

# Course Syllabus: Contemporary Topics in EnSE - EnSE 394

<b>Division</b>	Biological and Environmental Sciences & Engineering Division
<b>Course Number</b>	EnSE 394
<b>Course Title</b>	Contemporary Topics in EnSE
<b>Academic Semester</b>	Spring
<b>Academic Year</b>	2018/2019
<b>Semester Start Date</b>	01/27/2019
<b>Semester End Date</b>	05/23/2019
<b>Class Schedule</b> (Days & Time)	05:30 PM - 08:00 PM   Mon Thu

Instructor(s)				
Name	Email	Phone	Office Location	Office Hours
Pascal Saikaly	Pascal.Saikaly@kaust.edu.sa	+966128084903	4237, 4, Al-Jazri (bldg. 4)	

Teaching Assistant(s)	
Name	Email

Course Information	
<b>Comprehensive Course Description</b>	<p>Sustainable and cost effective production of biofuels is a key factor for the future development of a bio-based economy. This Contemporary Course Topic aims to explore innovative technologies for converting wastewater and other organic waste streams into valuable and energy-dense chemicals. The course serves to highlight chain elongation anaerobic fermentation as a novel biotechnological approach of converting waste streams into medium-chain fatty acids. The students will learn about this topic through weekly discussions with the instructor, reading of peer-reviewed journal articles, presentations, writing and hands-on-experience by operating lab-scale chain elongation reactors. Topics to be discussed in the course include the following:</p> <ol style="list-style-type: none"> <li>1. What are the key operating conditions for chain elongation?</li> <li>2. What reactor configuration is more suitable for chain elongation?</li> <li>3. What are the main extraction and purity technologies?</li> <li>4. What are the microbial communities involved in chain elongation?</li> </ol>
<b>Course Description from Program Guide</b>	
<b>Goals and Objectives</b>	This course aims to provide students with the basic understanding of chain elongation technologies through learning from resources available in peer-reviewed journal articles and operating lab-scale systems.
<b>Required Knowledge</b>	Student who take this course should preferably be enrolled in the Environmental Science and Engineering program, or familiar with wastewater/water treatment technologies.
<b>Reference Texts</b>	Scientific papers.
<b>Method of evaluation</b>	<b>40.00%</b> - Written report <b>30.00%</b> - Oral presentation <b>20.00%</b> - Homework /Assignments <b>10.00%</b> - Attendance and Participation
<b>Nature of the assignments</b>	Assigned readings, discussions.
<b>Course Policies</b>	Attendance is mandatory. A total of three absences for the semester will be permitted without penalty. For every absence beyond the two absences, 2 points will be deducted from the final course grade.
<b>Additional Information</b>	

## Tentative Course Schedule

*(Time, topic/emphasis & resources)*

<b>Week</b>	<b>Lectures</b>	<b>Topic</b>
1	Mon 01/28/2019 Thu 01/31/2019	Litertaure reading and discussions
2	Mon 02/04/2019 Thu 02/07/2019	Litertaure reading and discussions
3	Mon 02/11/2019 Thu 02/14/2019	Litertaure reading and discussions
4	Mon 02/18/2019 Thu 02/21/2019	Litertaure reading and discussions
5	Mon 02/25/2019 Thu 02/28/2019	Litertaure reading and discussions
6	Mon 03/04/2019 Thu 03/07/2019	Litertaure reading, discussions and presentation
7	Mon 03/11/2019 Thu 03/14/2019	Lab practical
8	Mon 03/18/2019 Thu 03/21/2019	Lab practical
9	Mon 03/25/2019 Thu 03/28/2019	Spring Break
10	Mon 04/01/2019 Thu 04/04/2019	Litertaure reading, discussions and presentation
11	Mon 04/08/2019 Thu 04/11/2019	Litertaure reading and discussions
12	Mon 04/15/2019 Thu 04/18/2019	Litertaure reading and discussions
13	Mon 04/22/2019 Thu 04/25/2019	Litertaure reading, discussions and presentation
14	Mon 04/29/2019 Thu 05/02/2019	Lab practical
15	Mon 05/06/2019 Thu 05/09/2019	Lab practical
16	Mon 05/13/2019 Thu 05/16/2019	Litertaure reading, discussions and presentation
17	Mon 05/20/2019 Thu 05/23/2019	No final exam

### Note

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