جامعة الملك عبدالله
للعلوم والتقنية
King Abdullah University of
Science and Technology

Course Syllabus: Materials for Energy - MSE 310

Division	Physical Science and Engineering Division
Course Number	MSE 310
Course Title	Materials for Energy
Academic Semester	Fall
Academic Year	2019/2020
Semester Start Date	08/25/2019
Semester End Date	12/10/2019
Class Schedule (Days & Time)	10:30 AM - 12:00 PM | Wed , 01:00 PM - 02:30 PM | Mon

Instructor(s)

Name	Email	Phone	Office Location	Office Hours
Husam Niman Alshareef	husam.alshareef@kaust.edu.sa	+966128084477	2228, 3, Ibn Sina (bldg. 3)	By appointment
Derya Baran	DERYA.BARAN@KAUST.EDU.SA	+966128087238	3236, 5, Al-Kindi (bldg. 5)	By appointment

Teaching Assistant(s)

Name	Email
None	

Course Information

Comprehensive Course Description	This course is intended as a review of the challenges facing materials scientists working in renewable energy and sustainability science and technology. It aims to give the student a birds-eye view of the current topics in energy harvesting and storage materials. The potential of various energy harvesting approaches will be discussed in the context of energy needs facing the world. This will be done with particular focus on materials innovations required to improve the state of the art. After this thorough introduction, the course will discuss solar power and electrochemical energy storage in more depth.
Course Description from Program Guide	This course is intended as a review of the challenges facing materials scientists working in renewable energy and sustainability science and technology. It aims to give the student a birds-eye view of the current topics in energy harvesting and storage materials. The potential of various energy harvesting approaches will be discussed in the context of energy needs facing the world. This will be done with particular focus on materials innovations required to improve the state of the art. After this thorough introduction, the course will discuss solar power and electrochemical energy storage in more depth.
Goals and Objectives	**Objectives** — **Outcome Measures** Materials, physics, and technology of solar cells — Summaries and Problem solving in Homework/Exams Materials, physics, and technology of other energy harvesting technologies — Summaries and Problem solving in Homework/Exams Materials, physics, and technology of energy storage — Summaries and Problem solving in Homework/Exams

Required Knowledge	General chemsitry and physics Introductory Materials Science Elelementary Semiconductor Theory Thermodynamics of Materials
Reference Texts	No text books, but teh following two references are useful **Sustainable Energy - Without the Hot Air** David JC MacKay Publisher: UIT Cambridge Ltd. (February 20, 2009) ISBN-10: 0954452933 ISBN-13: 978-0954452933 **Physics of Solar Cells** Jenny Nelson Imperial College Press; 1 edition (September 5, 2003) ISBN-10: 1860943497 ISBN-13: 978-1860943492 **Advanced Batteries** R.A. Huggins Springer; 1 edition (December 10, 2008) ISBN-10: 0387764232 ISBN-13: 978-0387764238
Method of evaluation	**20.00**% - Scientific review article presentation **20.00**% - Midterm exam **20.00**% - Homework /Assignments **40.00**% - Final exam
Nature of the assignments	The course will involve: 1. Review paper 2. Homeworks 3. One midterm exam 4. One final exam
Course Policies	Late home works will not be accepted No make-up exams
Additional Information	

Tentative Course Schedule *(Time, topic/emphasis & resources)*		
Week	**Lectures**	**Topic**
1	Mon 08/26/2019	Introduction
1	Wed 08/28/2019	Solar Cells
2	Mon 09/02/2019	Solar Cells
2	Wed 09/04/2019	Solar Cells
3	Mon 09/09/2019	Solar Cells
3	Wed 09/11/2019	Solar Cells
4	Mon 09/16/2019	Solar Cells
4	Wed 09/18/2019	Solar Cells
5	Mon 09/23/2019	Saudi National Day
5	Wed 09/25/2019	Solar Cells
6	Mon 09/30/2019	Solar Cells
6	Wed 10/02/2019	Thermoelectrics
7	Mon 10/07/2019	Thermoelectrics
7	Wed 10/09/2019	Thermoelectrics
8	Mon 10/14/2019	Midterm exam
8	Wed 10/16/2019	Energy Storage
9	Mon 10/21/2019	Spring Break
9	Wed 10/23/2019	Spring Break
10	Mon 10/28/2019	Energy Storage
10	Wed 10/30/2019	Energy Storage
11	Mon 11/04/2019	Energy Storage
11	Wed 11/06/2019	Energy Storage
12	Mon 11/11/2019	Energy Storage
12	Wed 11/13/2019	Energy Storage
13	Mon 11/18/2019	Energy Storage
13	Wed 11/20/2019	Energy Storage
14	Mon 11/25/2019	Energy Storage
14	Wed 11/27/2019	Energy Storage
15	Mon 12/02/2019	Energy Storage
15	Wed 12/04/2019	Energy Storage
16	Mon 12/09/2019	Exams

Note

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