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

Course Syllabus: Chemical Thermodynamics - CBE 201

Division	Physical Science and Engineering Division
Course Number	CBE 201
Course Title	Chemical Thermodynamics
Academic Semester	Fall
Academic Year	2018/2019
Semester Start Date	08/26/2018
Semester End Date	12/11/2018
Class Schedule (Days & Time)	09:00 AM - 10:30 AM | Mon Thu

Instructor(s)

Name	Email	Phone	Office Location	Office Hours
Jorge Gascon Sabate	JORGE.GASCON@KAUST.EDU.SA	+966128080723	4235, 3, Ibn Sina (bldg. 3)	

Teaching Assistant(s)

Name	Email

Course Information

Comprehensive Course Description	The primary goal of chemical thermodynamics is the physical explanation of the fundamental principles governing the variety of chemical phenomena taking place in the world around us. The goal of this course is to give students a conceptual understanding of the main principles of thermodynamics. Topics include: the concept of entropy; the Clausius, Gibbs, Boltzmann and Shannon definition of entropy; entropy and information; Maxwells demon; the Boltzmann distribution law; the Maxwell-Boltzmann speed distribution; Gibbs and Helmholtz free energy; the chemical potential; Gibbs-Duhem and Euler equation; the Gibbs phase rule; entropy of mixing and Gibbs paradox; phase diagrams, the Flory-Huggins phase diagram; spontaneous and non-spontaneous processes; thermodynamics of chemical reactions; thermodynamics of osmosis and reverse osmosis, entropy and irreversible phase transitions; introduction in thermodynamics of irreversible processes; introduction in statistical thermodynamics; biological evolution, entropy and information
Course Description from Program Guide	The primary goal of chemical thermodynamics is the physical explanation of the fundamental principles governing the variety of chemical phenomena taking place in the work around us. The goal of this course is to give students a conceptual understanding of the main principles of thermodynamics. Topics include: the concept of entropy; the Clausius, Gibbs, Boltzmann and Shannon definition of entropy; entropy and information; Maxwells demon; the Boltzmann distribution law; the Maxwell-Boltzmann speed distribution; Gibbs and Helmholtz free energy; the chemical potential; Gibbs-Duhem and Euler equation; the Gibbs phase rule; entropy of mixing and Gibbs paradox; phase diagrams, the Flory- Huggins phase diagram; spontaneous and non-spontaneous processes; thermodynamics of chemical reactions; thermodynamics of osmosis and reverse osmosis, entropy and irreversible phase transitions; introduction in thermodynamics of irreversible processes; introduction in statistical thermodynamics;
Goals and Objectives	The goal of this course is to give students a conceptual understanding of the main principles of thermodynamics. the concept of entropy will be discussed in detail; Students will learn the Clausius, Gibbs, Boltzmann and Shannon definition of entropy; relation entropy and informationwill be discussed; Students will learn about Maxwells demon, the Boltzmann distribution law, the Maxwell-Boltzmann speed distribution, Gibbs and Helmholtz free energy, the chemical potential, the Gibbs-Duhem and Euler equation, the Gibbs phase rule; entropy of mixing and Gibbs paradox; phase diagrams, the Flory-Huggins phase diagram; spontaneous and non-spontaneous processes; thermodynamics of chemical reactions; thermodynamics of osmosis and reverse osmosis, entropy and irreversible phase transitions; introduction in thermodynamics of irreversible processes; students will learn the basics of statistical thermodynamics;

Required Knowledge	An undergraduate thermodynamic course
Reference Texts	**REQUIRED TEXT** : Atkins' Physical Chemistry **REFERENCE TEXTS** : E. Fermi, Thermodynamics Henry A. Bent, An introduction to classical and statistical thermodynamics Mikhail V. Volkenstein, Entropy and Information
Method of evaluation	**35.00**% - Exam 2 **30.00**% - Homework /Assignments **35.00**% - Exam 1
Nature of the assignments	2 homeworks (maximum points 15 per homework), mid-term exam (max. points 35), final exam (max. points 35)
Course Policies	In accordance with the University policy and professional standards, the highest levels of academic integrity are expected in this class. The code of student conduct is strictly enforced. Academic dishonesty will result in reductions in grades and/or expulsions from this class and/or the University.
Additional Information	

Tentative Course Schedule *(Time, topic/emphasis & resources)*		
Week	**Lectures**	**Topic**
1	Mon 08/27/2018	T.b.d
1	Thu 08/30/2018	T.b.d.
2	Mon 09/03/2018	T.b.d.
2	Thu 09/06/2018	T.b.d.
3	Mon 09/10/2018	T.b.d.
3	Thu 09/13/2018	T.b.d.
4	Mon 09/17/2018	T.b.d.
4	Thu 09/20/2018	T.b.d.
5	Mon 09/24/2018	T.b.d.
5	Thu 09/27/2018	T.b.d.
6	Mon 10/01/2018	T.b.d.
6	Thu 10/04/2018	T.b.d.
7	Mon 10/08/2018	T.b.d.
7	Thu 10/11/2018	T.b.d.
8	Mon 10/15/2018	T.b.d.
8	Thu 10/18/2018	T.b.d.
9	Mon 10/22/2018	T.b.d.
9	Thu 10/25/2018	T.b.d.
10	Mon 10/29/2018	T.b.d.
10	Thu 11/01/2018	T.b.d.
11	Mon 11/05/2018	T.b.d.
11	Thu 11/08/2018	T.b.d.
12	Mon 11/12/2018	T.b.d.
12	Thu 11/15/2018	T.b.d.
13	Mon 11/19/2018	T.b.d.
13	Thu 11/22/2018	T.b.d.
14	Mon 11/26/2018	T.b.d.
14	Thu 11/29/2018	T.b.d.
15	Mon 12/03/2018	T.b.d.
15	Thu 12/06/2018	T.b.d.
16	Mon 12/10/2018	T.b.d.

Note

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