TIGP Sustainable Chemical Science and Technology Program
Introduction to Sustainable Chemical Science and Technology

Period: 2014/Sep. - 2015/June.
Classroom: B105, IoC, AS

Goals:
1. Know the backgrounds and chemistry of sustainability-related issues.
2. Learn the spirit of green chemistry and the challenges/opportunities in the real world.
3. Get exposed to important research directions.

Syllabus

1	**Importance of Chemistry, Course Expectation, and Literature Search Skill**	2014/9/17
2	**Chemistry Related Global Challenges**	
	2.1 Global Materials Cycling (Carbon Cycle, Nitrogen Cycle, Ocean Acidification, Heavy Metals...)	2014/9/24
	2.2 Environmental Impact of Chemicals (Organic Toxic Compounds, Persistent Compounds, Ozone Hole...)	2014/10/1
	2.3 Climate Change and Our Future (Green House Gases, Temperature Elevation…)	2014/10/8
3	**Sustainability and the Concept of Footprints**	2014/10/15, 10/22
4	**Green Chemistry**	
	4.1 Spirits	
	4.2 Principles	
	4.3 Metrics to Evaluate Greeness and Life Cycle Analysis	
	4.4 Alternative Reaction Energy Sources (Microwave, Mechano, Ultrasound, Flow...)	2014/10/29
	4.5 Solvents (Water, Supercritical fluids, Ionic Liquids, Switchable Solvents, Bio-based Solvents...)	2014/11/5
	***** Mid Term Exam*****	2014/11/12
	4.6 Catalysis (Heterogeneous, Homogeneous, Phase Transfer, Bio, Photo, Organo, Earth Abundant Element...)	2014/11/19, 11/26
	4.7 Basic Toxicology, Bioremediation, and Design Principles for Degradation/Less Toxicity	2014/12/10
	4.8 Some Real World Cases in Industry	2014/12/17
	4.9 Challenges in Green Chemistry	
5	**Energy and Related Technologies**	
	5.1 Energy from Renewables	2014/12/24
	5.2 Photosynthetic System in Biology and Recent Photoelectric Materials	2014/12/31
	5.3 Fuel Cells, Batteries, Capacitors, and Other Energy Conversion Materials	2015/1/7
	***** Final Exam*****	2015/1/14
Note:	2014/12/3 is a school holiday	
	5.4 Carbon Capture and Storage	2015/2/25
6	**Chemicals from Different Feedstocks**	
	6.1 Biomass	2015/3/4
	6.2 CO_2 and Natural Gas	2015/3/11
7	**Degradable Polymers**	2015/3/18
8	**From Waste to Wealth (CO_2; E-waste; Food Waste; Plastic Waste…)**	2015/3/25
9	**Green Nano**	2015/4/1, 4/8
10	**Bio-Synthesis**	2015/4/15
	***** Mid Term Exam*****	2014/4/22
11	**Disease-Related Sustainable Life Science**	
	11.1 Aging and Neurodegenerative Diseases	2015/4/29
	11.2 Current Advances in Cancer-related Studies	2015/5/6
	11.3 Novel Techniques toward Exploring Disease Mechanism	2015/5/13
	11.4 Drug Development for Human Diseases	2015/5/20, 5/27
	11.5 Nanotechnology in Life Science and Health Care	2015/6/3, 6/10
	11.5.1 Introduction of Nano-based Medicine	
	11.5.2 Company Case Studies of Nanotechnology in Life Science and Health Care	
12	**Information Sharing**	2015/6/17
	***** Final Exam*****	2015/6/24