UNIVERSITY OF CALGARY
FACULTY OF SCIENCE
DEPARTMENT OF CHEMISTRY
COURSE SYLLABUS
WINTER 2017

1. **Course:** CHEMISTRY 669, Selected Topics In Applied Chemistry – Chemistry of Energy Conversion and Storage

LEC	DAYS	TIME	ROOM	INSTRUCTOR	OFFICE	EMAIL	OFFICE HOURS
L01	TR (Jan 10 – Feb 14) 11 Lectures	14:00-15:15	SA123	Gregory Welch	EEEL546	gregory.welch@ucalgary.ca	Monday 15:00-17:00
L02	TR (Feb 16 – Mar 28) 11 Lectures	14:00-15:15	SA123	Roland Roesler	SB339	roesler@ucalgary.ca	Wednesday 10:00-12:00

Desire 2 Learn (D2L) course name: CHEM 669 L01 - (Winter 2017) - Selected Topics In Applied Chemistry

Departmental Office: Room SA 229, Tel: 403-220-5341, e-mail: uginfo@chem.ucalgary.ca

2. **Course Description:** ***Lectures:*** Selected topics in energy conversion and storage will be presented and discussed. Emphasis will be placed on the chemistry involved in energy conversion and storage technologies.

3. **Suggested Reference Materials:**

Functional Materials – Leclerc
Polymer Photovoltaics – Cao
Design and Synthesis of Conjugated Polymers – Leclerc
Physics of Solar Cells – Wurfel
Fundamentals of Materials for Energy and Environmental Stability – Ginley

4. **Topics Covered and Suggested Readings:**

Course Content

Introduction to Renewable Energy Conversion Technologies
Overview of non-renewable and renewable energy sources
The need for renewable energy sources
Solar energy conversion – photosynthesis and artificial photosynthesis

Introduction to Solar Cells
Basic operations and principles
Types of solar cells
Materials for solar cells

Third Generation Solar Cells
Materials design and synthesis, Materials characterisation, device performance and metrics, upscaling, sustainable materials development

Introduction to Energy Storage
How nature does it
Brief history of chemical energy storage
Non-chemical energy storage

Chemical Energy Storage
Hydrogen production and storage.
Hydrocarbon Fuels
Non-hydrocarbon fuels

Biofuels

Electrochemical Energy Storage
Primary Batteries
Flow Batteries
Secondary Batteries

Department Approval: Approved by Department Head Date: December 20, 2016