CHEM 4985 Special Topics in Chemistry – Materials Chemistry Fall 2018

Instructors

Dr. Martin R. McPhail Office: TLC 2129 Phone: (678) 839-60196 Email: mmcphail@westga.edu Office hours: M/W/F: 9:00 am - 12:00 pm	Dr. Douglas Stuart Office: TLC 2125 Phone: (678) 839-6022 Email: dstuart@westga.edu Office hours: M-F 9:00 am – 9:30 am

Course Description

Materials Chemistry is an elective course appropriate for all Chemistry and selected science majors. The course uses basic concepts from organic, inorganic, and physical chemistry to describe the structure and properties of a variety of materials. Lectures, hands-on activities, and tours of local industries expose the student to the theoretical basis and practical applications in the field of materials.

Course Policies and Guidelines

- The official communication method between the instructors and students will be through campus e-mail (myUWG email account).
- The class meets on Fridays from 2:00 pm – 5:00 pm in TLC 2105 and/or TLC 3115. Please come to class on time, and do not leave early.
- You are expected to behave **professionally** in this course, which means considering the effect that your behavior will have on other people involved in the course. Use of cell phones and/or personal laptops will not be allowed.
- All written reports must be submitted via Dropbox and will incur a 10% late penalty per day.
- Failure to submit three or more reports will result in an automatic withdraw/F in the course.

Academic Honesty Policy

Plagiarism of any sort will not be tolerated. Plagiarism is the use of someone else's ideas or words as your own. This definition includes copying another student's exam or assignment, as well as using material from a book or Internet site without acknowledging the source. If you plagiarize any part of an assignment for this course, you will receive a zero for the entire assignment, and disciplinary action will be taken. UWG Academic Integrity and Honor Code Pledge is available at http://www.westga.edu/handbook/59.php.

Learning Outcomes

Students successfully completing the course will:

- Understand theoretically, and in some cases practically, the chemical principles and physical properties of a variety of materials, including polymers, ceramics and glasses, metals and alloys, and nanomaterials.
- Perform basic laboratory procedures and techniques involving the synthesis of materials, the characterization of materials, measurement of materials properties, and structure/function relationships.
- Characterize and select materials for design by evaluating the linkages between material properties, microstructures and processing.
- Explore equipment used by local industries to manufacture and process modern materials.
- Forge connections between the classroom learning experience and real world implementation of those concepts and techniques as demonstrated by industry and society.
- Communicate materials knowledge and experimental results through written reports and oral presentations. Articulate and justify technical solutions to diverse audiences.
- Use information resources to search and access current and prior research in materials chemistry for an independent class project.

Semester Grades

In-class activities	32%
Field trip reports	16 %
Unit Quizzes	5 %
Class participation	5 %
Project Presentation	12 %
Midterm	15 %
Final	15 %
TOTAL	**100 %**

Grading scale: 90% : A; 80 – 89% : B; 70 – 79% : C; 60 – 69% : D; < 60% : F

Tentative Schedule

Day #	Topic
1 (Aug 17)	Introduction to Materials Chemistry (in-class activities)
2 (Aug 24)	Polymer processing (Decostar Field Trip)
3 (Aug 31)	Types of polymers and polymerization (in-class activities)
4 (Sep 7)	Polymer structure and properties (Southwire Field Trip)
5 (Sep 14)	Fibers and natural materials (in-class activities)
6 (Sep 21)	Metals, alloys, composites, ceramics, glasses (in-class activities)
7 (Sep 28)	MIDTERM
8 (Oct 5)	FALL BREAK
9 (Oct 12)	Alloys, Composites, and Defects (Cofer Center Field Trip)
(Oct 19)	Semi- and super-conductors, insulators (in-class activities)
10 (Oct 26)	Optical and photonic materials (in-class activities)
11 (Nov 2)	Optical and photonic materials (OFS Field Trip)
12 (Nov 9)	Solar cells and nano-materials (in-class activities)
13 (Nov 16)	SEM/NClear Field Trip
14 (Nov 23)	THANKSGIVING BREAK
15 (Nov 30)	Art and archeology materials (in-class activities) Waring Lab
16 (Dec 7)	Project oral presentation
	FINAL EXAM