

**EMA 6938 – Nanomaterials: From Theory to Application**  
**Spring 2015 - Section 176D**

1. **Course Description:** Nanomaterials provide new and unique properties of materials not seen in the bulk. These properties can be exploited for a wide variety of applications ranging from electronics, magnetics, optics, to biomedicine. This course will cover the fundamental science behind the properties of nanomaterials. We will discuss the scaling laws of materials properties as they reach the nanometer size regime, and how these materials will drive new applications in a variety of areas. (3 Credit Hours)
2. **Course Objectives:** This is an introductory course in understanding the fundamental science that allows for the unique properties of nanomaterials. The specific objectives for the course are:
  - a. To understand general nanomaterial properties.
  - b. To understand methods of fabricating nanomaterials.
  - c. To apply nanomaterials in specific engineering applications.
3. **Prerequisites:** None
4. **Contribution of course to meeting the professional component:** This is a 3-credit course.
5. **Instructor: Dr. Jennifer Andrew**
  - a. Office location: **162 Rhines Hall**
  - b. Telephone: **352.846.3345**
  - c. E-mail address: **jandrew@mse.ufl.edu**
  - d. Office hours: **by appointment**
  - e. Website: **<http://andrewresearchgroup.com/teaching>**
6. **Meeting Times and Location: T Periods 2 8:30 – 9:20 am MAE-B 238**  
**R Period 2 & 3, 8:30 – 9:20 am & 9:35 - 10:25 am MAE-B 238**
7. **Textbook Required:** None
8. **Recommended Reading:** Supplementary reading will be provided throughout the semester.
9. **On the Web:** This course will use Sakai extensively as a communication and archival tool. The students can access all relevant course information via the Sakai entry link: <https://lss.at.ufl.edu/>.
10. **Conduct, Attendance and Expectations:** This class is taught in an interactive lecture format, and will include discussion. Cell phones should be turned off in class. Reading of newspapers, work on assignments for this or other classes, or other activities that are not part of the class are not allowed during this time.
11. **Grading:** Your final grade will be allocated based on the following distribution:

Homework & Quizzes (given randomly throughout the semester):	20%
Review Paper:	30%
Chalk Talk	30%
Class Participation	20%

**12. Grading Scale:**

Percentage	≥ 92	≥ 88	≥ 84	≥ 80	≥ 76	≥ 72	≥ 68	≥ 65	≥ 62	≥ 59	≥ 56	<56
Letter Grade	A	A-	B+	B	B-	C+	C	C-	D+	D	D-	E

**13. Course Outline:** Below is the tentative schedule of topics, activities, reading assignments, exams, and homework.

<u>Week of</u>	<u>Topic</u>	<u>Reading</u>
Jan. 5	Introduction to Nanomaterials ( <i>No Class Jan 6 (NSF)</i> )	Feynman, Smalley-Drexler
Jan. 12	Langmuir-Blodgett Films, Self Assembled Monolayers	Ullman, Chem. Rev. 1996
Jan. 19	Nanoparticles, Synthesis	LaMer, & others
Jan. 26	Nanoparticles, Properties	Neel, others
Feb. 2	Plasmonics	Halas
Feb. 9	Quantum Dots	Bawendi
Feb. 16	Carbon Nanotubes	Smalley
Feb. 23	Nanotechnology in Medicine	Ferrari
Mar. 2	<i>No class (Spring Break)</i>	
Mar. 9	Nanotechnology in Medicine	
Mar. 16	DNA Nanotechnology	Mirkin, Cha
Mar. 23	Nanowires	
Mar. 30	Energy Applications, Thermoelectrics	Snyder, Atwater
Apr. 6	Graphene	
Apr. 13	<i>No class on Apr. 16 (Sandia)</i>	
Apr. 20	<i>Last Day of class April 21</i>	
	<b>Final Paper Due April 21</b>	

**14. Make-up Quiz/Exam Policy:** Make-up quizzes are given only for reasons of illness and in accordance with University of Florida regulations.

**15. Honesty Policy** – All students admitted to the University of Florida have signed a statement of academic honesty committing them to be honest in all academic work and understanding that failure to comply with this commitment will result in disciplinary action. This statement is a reminder to uphold your obligation as a UF student and to be honest in all work submitted and exams taken in this course and all others.

**16. Accommodation for Students with Disabilities** – Students Requesting classroom accommodation must first register with the Dean of Students Office. That office will provide the student with documentation that he/she must provide to the course instructor when requesting accommodation.

**17. UF Counseling Services** – Resources are available on-campus for students having personal problems or lacking clear career and academic goals. The resources include:

- University Counseling Center, 301 Peabody Hall, 392-1575, Personal and Career Counseling.

- SHCC mental Health, Student Health Care Center, 392-1171, Personal and Counseling Center for Sexual
- Assault/Abuse Recovery and Education (CARE), Student Health Care Center, 392-1161, sexual assault counseling.
- Career Resource Center, Reitz Union, 392-1601, career development assistance and counseling.

18. **Software Use** – All faculty, staff and student of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.