Date: January 19, 2011  
Course Number: CME680  
Course Title: Fundamentals of Microscopy

- **New Course**  
- **Changes in existing course (check all that apply):**

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This course meets the General Education standards in the following knowledge and skills area (check all that apply):

- American History  
- The Arts  
- Basic Communication  
- Humanities  
- Mathematics  
- Natural Sciences  
- Other World Civilizations  
- Social Sciences  
- Western Civilization

**Prequisites or co-requisite requirements:**

- Prerequisites: none  
- Co-requisites: none

**Institutional Impact:**

Anticipated Enrollment: 8 per semester

Technology and Classroom Resource Demands: light microscopes, electron microscopes for demonstrations

Computing Resources: none

Library Resources: none

Transportation Requirements: none

Forest Properties or Field Practicum Facilities Required: none
Health and Safety Considerations:

Conditions or situations present in association with the course? 

1. **Will substances with any of the following properties be used during instruction?** flammability, toxicity, corrosivity, reactivity, registered pesticide, legally controlled, or other characteristics with the potential to cause harm or injury? 
   - No

2. **Will any physical hazards be present during instruction?** (e.g., machines that need safety guards; razor blades or syringes; compressed gases, etc.). 
   - No

3. **Will any biological hazards be present during instruction?** (e.g., handling animals (rabies or hantavirus); cultures or stocks of infectious agents (fungal spores, viruses, bacteria, etc.). 
   - No

4. **Will any radiation hazards be present during instruction?** (e.g., radioisotopes, X-rays, ultraviolet rays, lasers, etc.). 
   - No

5. **Will any electrical equipment that, due to its design, location, or method of use, pose any threat to safety during instruction?** (Give considerable thought to electrical use outdoors, or any potentially wet location.). 
   - No

6. **Will there be any personal safety issues related to the class?** (e.g., due to time of day or location, at the end of any organized class exercise, will students be in danger of physical assault, etc.). 
   - No

7. **Will any students be driving official state or research sponsored land or water vehicles during any class or instructional exercise?** 
   - No

8. **Will any type of personal protective equipment be necessary during class exercises?** (e.g., hard-hats, eye/face protection, hearing protection, hand/foot protection, lab coat, visibility clothing, etc.) 
   - No

If the answer was “Yes” to any of the HEALTH AND SAFETY questions, please explain:

**CATALOG DESCRIPTION** (Please provide using the precise format currently used in the ESF catalog, please do not exceed 500 characters):

CME 680  (3) Fundamentals of Microscopy
Three hours of lecture/demonstration per week. Introduction to light microscopy, electron microscopy, atomic force, confocal, Raman, Near Field Optical, Correlative and other microscopic methods and their newest applications. Light microscopic techniques include brightfield, phase contrast, polarized light, Nomarski, Kohler illumination. Imaging and recording methods. Fall.
DETAILED COURSE DESCRIPTION

COURSE:  CME 680 – Fundamentals of Microscopy

3 Credit Hours – Fall Semester

3 Hours Lecture/demonstration per Week

Prerequisite(s): none

SCOPE:

1. Level of Instruction:
   a. CME 680 is a graduate level course.

2. Relation to curriculum or to other ESF or Syracuse University courses:
   a. CME 680 is a graduate level elective course offered by faculty in the N.C. Brown Center for Ultrastructure Studies in the Department of Sustainable Construction Management and Engineering. This course is open to all scientific or engineering/related disciplines at ESF and SU.
   b. Shared resource requirements: CME 480 Fundamentals of Microscopy

STUDENT LEARNING OUTCOMES:

After completing this course the student should be able to:

1. understand the wide variety of microscopic techniques currently available (light microscopy, electron microscopy, atomic force, confocal, Raman, Near Field Optical, Correlative and other microscopic methods) and their applications, latest literature, and which techniques are best suited for particular applications and specimen types
2. understand the specimen preparation required for each microscopic technique and type of specimen.
3. understand cellular ultrastructure
4. understand the basic techniques of light microscopy to optimize image quality.
5. be aware of image quality and how it affects interpretation; artifacts, their affect on interpretation of images and how they can be minimized.
6. prepare and present a comprehensive literature review of microscopic techniques used in research publications on a topic of their choosing

MAJOR CONCEPTS OR METHODOLOGIES:

Introduction to light microscopy, electron microscopy, atomic force, confocal, Raman, Near Field Optical, FISU, TIRF, correlative and other microscopic methods and their newest applications. Light microscopic techniques include brightfield, phase contrast, polarized light, fluorescence, Nomarski, Kohler illumination. Imaging and recording methods.

Students will prepare and present a paper on microscopic techniques used in research.
CATALOG DESCRIPTION (Please provide using the precise format to be included in the ESF catalog, please do not exceed 50 words)

CME 680 (3) Fundamentals of Microscopy

Three hours of lecture/demonstration per week. Introduction to light microscopy, electron microscopy, atomic force, confocal, Raman, Near Field Optical, Correlative and other microscopic methods and their newest applications. Light microscopic techniques include brightfield, phase contrast, polarized light, Nomarski, Kohler illumination. Imaging and recording methods. Fall.

COURSE HISTORY:

This is a new course.
Last approved: NA

Revised Draft: November 30, 2010 (form in protected format: 1/19/11)