

ESG 312 Engineering Laboratory (Required)

Course website: <http://www.matscieng.sunysb.edu/esg312/>

Course Catalog description

Laboratory exercises and lectures covering the theory, practice, and design of engineering experimentation. The course has three components: error analysis and data massage; electrical circuits and experiment control; and mechanical and optical measurement. Laboratory fee required.

3 credits

Prerequisites: PHY 126 and 127 or PHY 132/134; U2standing **Corequisite:** ESG 300

Text(s) or other required material:

On-line experimental procedures (<http://www.matscieng.sunysb.edu/esg312> username/password required)

Course learning outcomes:

How to follow standard procedures to obtain repeatable and reproducible results;
How to acquire, process, and analyze data to express those results;

Topics Covered:

Laboratory Safety and Ethics;
Literature and Standards Searching;
Statistical Analysis;
Interference/ Diffraction;
Birefringence/Photoelasticity;
Truss design, construction, and testing;
Optical Light Microscopy;
ASTM E113, grain sizing;
Electron Microscopy;
Oscilloscope;
Thermometry, contact, and noncontact;
Fluids and Flow;

Class/ Laboratory Schedule, i.e. number of sessions each week and duration of each session:

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|-----|-----|------------------------|-----|-----|------|----------|----------|
| ESG | 312 | Engineering Laboratory | LEC | 1 | MW | 10:40 AM | 11:35 AM |
| | | | REC | R01 | RETH | 8:20 AM | 9:15 AM |
| | | | LAB | L01 | TU | 2:00 PM | 5:00 PM |
| | | | REC | R02 | RETH | 8:20 AM | 9:15 AM |
| | | | LAB | L02 | TU | 5:20 PM | 8:20 PM |
| | | | REC | R03 | M | 8:20 AM | 9:15 AM |
| | | | LAB | L03 | M | 2:20 PM | 5:10 PM |

Contribution of Course to meet requirement of Criterion 5:

This course (in general laboratory instrumentation and standard procedures) emphasizes all of the ESG program's outcomes. The students are treated like employees in an engineering firm. They must apply their previous knowledge toward completing processes and experiments to determine a well known and reproducible result.

Relationship of course to program outcomes:

As the students are considered to be employees, they quickly realize that processes and experiments are akin to what they may do in their own future. Hence, they must be able to follow, create, and evaluate standard procedures for future experiments and processes. The results of this work must work toward the goals of their employer and community.

Person(s) who prepared this description and date of preparation:

Jim Quinn 01/08/2009