"Find the gift God gave you. Sharpen, hone, and train it. And, then go use it. Go!"
-Donald P. Shiley '51

Course Description: Provides hands-on experiences with the standard methods of processing and evaluating typical engineering materials. Includes tensile testing, hardness testing, heat treatment, microscopic examination, strain hardening and impact testing.

Instructor: Dr. Ken Lulay
Shiley Hall 236, Ph: 943-7432. e-mail: lulay@up.edu
Main web page: http://faculty.up.edu/lulay/

Course Times: EGR070ABC, M 2:40-3:35; EGR070DEF, W 2:40-3:35
EGR270A, M3:45-5:10, EGR270B, T 2:30-3:55

Number of Credits: 1

References: School of Engineering, Writing for Engineers (provided in EGR 110, available for download from the course web page). The University’s Writing Center (http://www.up.edu/lrc/writing/). Pocket Wadsworth Handbook (used in University core courses). Also, www.msdsonline.com will be required reading.

Required: Mechanical Engineering Laboratory booklet (available for download from course web page).
A three-ring notebook with tabbed separators is required. The notebook will be maintained by the students during the semester and will be required in future mechanical engineering laboratories; therefore, students are required to keep these notebooks (and its contents) for future courses.

Suggested text: Basic materials science textbook such as that used in EGR221.

Office Hours: Available any time if I’m in my office. I’ll try to be in my office:
Monday 11:25-12:00
Tuesday 10:00-12:00
Wednesday 1:35-2:30
Thursday none scheduled
Friday 11:25-12:20
Distribution: Worksheets 30% total
Technical letters and memoranda 40% total*
Independent lab (letter, presentation, technical work) 20% total
Quizzes 10% total
Detractors Instructor discretion

(Detractors include not maintaining a proper notebook, routine late attendance, and poor performance on other basic non-graded tasks).

*The four technical letters and memos will be worth 5, 10, 10, 15% respectively.

At the completion of the course, the scores from the above distributions will be combined into a letter grade according to the following scale:

90%-100% A: Excellent performance
80%-90% B: Very good performance
70%-80% C: Acceptable performance
60%-70% D: Poor performance
0%-60% F: Unacceptable performance

Attendance: Attendance is MANDATORY! Contact the instructor if you are unable to attend a session – some concession may be allowed.

E-mail: Students are required to check their UP email accounts daily.

Student Outcomes

The objectives of this course include gaining a better understanding of knowledge necessary to work in a laboratory environment especially with regards to materials science and related testing, develop skills and improving ability to function on a team, and improving oral and written communication skills (graphical communication, writing technical letters and memos, professional oral presentation).

Students shall demonstrate an ability to design and conduct experiments and tests, as well as to analyze and interpret data. Specifically, students shall demonstrate:

- An understanding of the role of measurement and test standards
- Conduct a laboratory procedure with minimal supervision.
- Analyze laboratory data to determine specified quantities.
- Create test plans (identify equipment, instruments, and materials, and determine procedures)

Students shall demonstrate an ability to communicate effectively:

- Use Excel or Matlab to create professional quality graphs of laboratory data
- Write concise technical letters and memoranda, substantiating conclusion by properly incorporating laboratory data and reference data.
- Give a professional quality oral presentation.
Assignments:
There will be about five groups: Groups A, B, C, D and E. Each group will be responsible for planning and conducting an independent group project (Independent Lab). Individuals will have several written assignments. For all written assignments (other than the independent lab) each individual must do their own work. You may work in groups to help each other – but this does NOT mean copying or cut and paste EVER! Behavior, such as copying others work, is contradictory to the engineering ethics and will be dealt with appropriately. Submission is required from each individual of their own work.

Tentative semester schedule:

<table>
<thead>
<tr>
<th>Lab #</th>
<th>Week</th>
<th>Week of:</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>11-Jan</td>
<td>Intro, standards and calibration, significant figures, graphing</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>18-Jan</td>
<td>Material specs, standardized tests</td>
</tr>
<tr>
<td>1</td>
<td>3</td>
<td>25-Jan</td>
<td>Strain gages, force measurement and calibration</td>
</tr>
<tr>
<td>2</td>
<td>4</td>
<td>1-Feb</td>
<td>Tensile test (various materials)</td>
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<tr>
<td>3</td>
<td>5</td>
<td>8-Feb</td>
<td>Cold rolling and annealing of copper</td>
</tr>
<tr>
<td>4</td>
<td>6</td>
<td>15-Feb</td>
<td>Precipitation heat treating of 2024 aluminum alloy</td>
</tr>
<tr>
<td>5</td>
<td>7</td>
<td>22-Feb</td>
<td>Heat treating steel (1045, 4140, 4340)</td>
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<tr>
<td>6, 7</td>
<td>8</td>
<td>29-Feb</td>
<td>Welding or microscopy</td>
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<tr>
<td></td>
<td>7-Mar</td>
<td></td>
<td>SPRING BREAK</td>
</tr>
<tr>
<td>6, 7</td>
<td>9</td>
<td>14-Mar</td>
<td>Microscopy or welding</td>
</tr>
<tr>
<td>7</td>
<td>10</td>
<td>21-Mar</td>
<td>Microscopy</td>
</tr>
<tr>
<td>8</td>
<td>11</td>
<td>28-Mar</td>
<td>Charpy impact (Ductile-to-Brittle Transition, DBT)</td>
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<tr>
<td>9</td>
<td>12</td>
<td>4-Apr</td>
<td>Residual stress</td>
</tr>
<tr>
<td>9</td>
<td>13</td>
<td>11-Apr</td>
<td>Residual stress</td>
</tr>
<tr>
<td>Indep.</td>
<td>14</td>
<td>18-Apr</td>
<td>Ind. Lab.</td>
</tr>
</tbody>
</table>

*Independent lab supplies will be available for pick-up Monday at 2:40
**Due to Founder’s Day and Easter, Lab 9 (residual stress) will be scheduled during different weeks. Details will be provided later.
University’s Code of Academic Integrity  Academic integrity is openness and honesty in all scholarly endeavors. The University of Portland is a scholarly community dedicated to the discovery, investigation, and dissemination of truth, and to the development of the whole person. Membership in this community is a privilege, requiring each person to practice academic integrity at its highest level, while expecting and promoting the same in others. Breaches of academic integrity will not be tolerated and will be addressed by the community with all due gravity. (Taken from the University of Portland’s Code of Academic Integrity.) All students are expected to do their own work – copying the work of others is strictly prohibited.

University’s Assessment Disclosure Statement  Student work products for this course may be used by the University for educational quality assurance purposes.

University’s Disabilities Statement  If you have a disability and require an accommodation to fully participate in this class, contact the Office for Students with Disabilities (OSWD), located in the University Health Center (503-943-7134), as soon as possible. If you have an OSWD Accommodation Plan, you should make an appointment to meet with me to discuss your accommodations. Also, you should meet with me if you wish to discuss emergency medical information or special arrangements in case the building must be evacuated.

Diversity and Green Dot Statement  All persons should feel safe to express their opinions in my class, regardless of their race, religion, political philosophy, gender, sexual orientation, or disability. In addition, I encourage anyone to speak up on behalf of themselves or others, if the classroom environment becomes uncomfortable for any reason.

Lab, Shop Access, Safety Policy (if applicable to the course/lab)  No one is allowed to work in the shops or labs without appropriate training from the shop technician and without instructor permission.

No food or beverages are allowed in the computer classrooms, shop, or labs. This includes water bottles. Put water bottles in your bag or leave on the desks.

Group Process Assistants (if applicable to the course)  Teamwork is expected in this course. Teams are encouraged to consult with Group Process Assistants, located in the Learning Resource Center in Franz 120. Group Process Assistants provide help to groups to systematically think about their social, task, and procedural needs.

Learning Resource Center (if applicable to the course)  The Learning Resource Center, located in Franz 120, houses the Writing Center, Math Resource Center, Speech Resource Center, Group Process assistants, and the International Language Lab. Furthermore, the Learning Assistance Counselor can assist students with learning strategies regarding reading comprehension, note-taking, studying skills, time-management, and test-taking.