ESG 201 LEARNING FROM DISASTER – DEC H (REQUIRED)
Credit: 3

COURSE CATALOG DESCRIPTION:
The role of the engineer is to respond to a need by building or creating something along a certain set of guidelines (or specifications) which performs a given function. Just as importantly, that device, plan or creation should perform its function without fail. Everything, however, does eventually fail and, in some cases, fails with catastrophic results. Through discussion and analysis of engineering disasters from nuclear meltdowns to lost spacecraft to stock market crashes, this course will focus on how modern engineers learn from their mistakes in order to create designs that decrease less of a chance of failure.

PRE-OR COREQUISITE(S): One D.E.C. category E (Natural Sciences) course


Suggested Texts:
Set Phasers on Stun: And Other True Tales of Design, Technology, and Human Error, by Steven Casey, Aegean Publishing Company, Santa Barbara, 1998

To Engineer Is Human: The Role of Failure in Successful Design by Henry Petroski, Random House, 1992

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<thead>
<tr>
<th>COURSE LEARNING OUTCOMES</th>
<th>SOS</th>
<th>ASSESSMENT TOOLS</th>
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<tr>
<td>Understanding the causes of engineering failure</td>
<td>c e g</td>
<td>Report; presentation</td>
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<td>How engineering failures have resulted in better designs</td>
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<td>Report; portfolio assignment</td>
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<td>Understanding the role of engineering ethics in engineering failures and disasters</td>
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<td>Presentations</td>
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COURSE TOPICS:
Week 1. What makes an engineering failure into an engineering disaster (perception of risk)
Week 3. Case studies: A history of disaster: From the Bent Pyramid to the Space Shuttle Challenger
Week 4. Disasters of the nuclear age: Chernobyl, Three Mile Island and Idaho Falls
Week 5. The professional engineering Code of Ethics: examples of ethical problem solving
Week 6. Case studies: Galloping Gertie; The CW Post dome collapse and the nature of design
Week 7. The role of materials in engineering failure (and success)
Week 8. Case studies: 9/11 and the World Trade Center; Liberty Ships in WWII
Week 9. The “blind spot” in design and failure; the I-95 bridge collapse; the Ocean Ranger oil rig disaster; the loss of Lake Peigneur; the Columbia disaster
Week 10. Case studies: Information age disasters: Black Monday stock market crash; “Set phasers on stun”, and misplaced Mars missions
Week 11. Case study: Tsunamis, Katrina and the rebuilding of New Orleans
Week 12. Learning from Disaster: from the Scorpion to the Seawolf submarine, and from Mir to the International Space Station
Week 13. Designing for disaster: Earthquake-resistant design;
The future of disaster: Can we eliminate failure?
Week 14-15 Class presentations on semester projects

CLASS/LABORATORY SCHEDULE:

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<th>ESG Spring</th>
<th>201</th>
<th>Learning from Disaster</th>
<th>LEC</th>
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CURRICULUM:

This course contributes 3 credit hours toward meeting the required 48 hours of engineering topics.

STUDENT OUTCOMES (SCALE 1-3):

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3 – Strongly supported  2 – Supported  1- Minimally supported

LEAD COORDINATOR(S) WHO PREPARED THIS DESCRIPTION AND DATE OF PREPARATION:

Gary Halada, SEP 15, 2016