EIND513 – Human Factors in Safety of Complex Systems
Fall 2010
(revised 8/23/10)

Instructor: Dr. Nicholas Ward, 303 Roberts Hall, 994-7218
nward@ie.montana.edu
Office Hours: TR 2:15 0 3:00

Credits: 3 (seminar)

Prerequisites: Graduate Student (or instructor approval)

Seminar: T (seminar) R (demonstration), 12:45 – 2:00, Roberts 401

Description: Human beings play a central role as operators and managers in many complex systems including medicine, aviation, process control, and surface transportation. Thus, the performance and safety of these systems are inherently dependent on the performance and reliability of the “human factor” in these systems. This graduate level course examines the role of the human factor in system safety and methods of improving safety through improved system design.

Objectives: Upon completion of this course, students will be able to:
- Understand human error and its role in system safety.
- Recognize organizational factors relevant to system safety.
- Discuss methods to manage system safety.
- Recommend designs for error-tolerant systems.

Format: This course will use a seminar format (T) based on assigned readings, instructor presentations, and guided group discussions. The course also incorporates demonstrations of human factors principles and case studies (R) of system failures to support material presented in the seminars.


Reference Text(s):  


Assessment: 
The following methods of assessment will be used in this course:

- Final Exam (35%)
- Case Study presentation (15%) and report (30%)
- Student seminar and essay (20%)

Grading: 
An individual letter grade will be using the following table as a guideline only. Plus/minus grades may be assigned in a grade category based on class participation.

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<tr>
<th>Grade</th>
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<tr>
<td>A</td>
<td>90-100%</td>
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<td>B</td>
<td>80-89%</td>
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<td>C</td>
<td>70-79%</td>
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<td>D</td>
<td>60-69%</td>
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<td>F</td>
<td>Below 60%</td>
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Communication: 
All students registered in this course can use the MSU listserv to send emails to the entire class (IME51301@listserv.montana.edu); see [https://www.montana.edu/itc/classrolls/email.html](https://www.montana.edu/itc/classrolls/email.html). Send a message from that account to listserv@listserv.montana.edu with the following as the only text in the message body:

SUBSCRIBE IME51301
QUIT

Instructor Philosophy: 
At the graduate level, my role is to facilitate the learning process for you in order to that you acquire the requisite knowledge and skills to meet the course objectives. However, you are responsible

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1 Available as reference material on reserve at campus library.
for your own learning experience and success. I expect you to actively participate in your learning experience and support the learning experience of your classmates. To that end, I recommend that you read the university guidelines for student conduct: http://www2.montana.edu/policy/student_conduct/cg300.html. Students are also responsible for all the guidelines and information presented in the Spring 2009 Registration Handbook: http://www.montana.edu/registrar/pdfs/Springbook.pdf

Course Culture:

Given that this is a graduate level seminar, participation and leadership in seminar topics is not only expected, it is assessed. It is hoped that active participation through discussion and debate about the topics presented in class will support a deeper and more adaptable form of knowledge acquisition. This can only be achieved by all students completing all assigned readings in advance of the scheduled classes.
Example Final Exam: The final exam for this class is scheduled for Dec 13th at 2pm to 3:50 pm. The exam will be a closed-book with the exception that a single 5” x 7” card will be permitted (both sides). The exam will comprise two essay questions. These questions will be selected from the following set provided in advance so that you can prepare your essay in advance (minimum of 5 references per essay):

1. USA Today recently reported that “two consecutive years have passed without a single airline passenger death in a US carrier crash” (www.usatoday.com/travel/flights/2009-01-11-airlinesafety_N.htm). In the same period (2007, 2008) there are approximately 40,000 traffic crash fatalities on public roads. From a systems-perspective, explain why the fatality risk is higher in the surface transportation system compared to the aviation transportation system. What risk factors differentiate these systems and how is the aviation system designed to be more robust?

2. Considering the human as an information processor, what are the critical imitations of humans that influence the risk of a system disaster attributable to human error? How can knowledge of the limitations of humans as information processors guide the design process to develop systems that are consistent with human capabilities and be error tolerant?

3. Automation of task functions is one approach to system design intended to reduce risk by eliminating the potential contribution of human error. Discuss the role of function allocation in system design and describe how automation may not always be a panacea for error free system operations.