HUMAN FACTORS IN SYSTEM DEVELOPMENT

PSY 531                                                   Spring 2003
Tues & Thursday: 6:30-7:45, St. Joseph's, Rm 325, 3 Credits, 30 meetings + final.

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    Web Site: http://academic.udayton.edu/WilliamMoroney/

Office Hours: Tues and Thurs: 1:15-2:00; Prefer meetings arranged by appointment.
Graduate Assistant: Chris Voorheis, voorhecm@notes.udayton.edu, St Joe’s, Rm 313, 229-2175,

Description:
    Provide an introduction to human factors during the system development process, from the initial
    conceptual stages to final test and evaluation. Emphasis is upon methods and techniques that support human factors
    functions/responsibilities throughout the system development process.

Objectives:
1. To familiarize you with the system development process, the Systems Engineering approach will be emphasized.
2. To provide hands-on experience at performing link analyses, functional analyses and task analyses
3. To involve you as a team member in the development process, in a relatively non-threatening environment.
4. If time allows, we will examine operator performance and performance measurement strategies that can be used
   during system development.

TEXTBOOK:
On reserve:
      N.J.: Lawrence Erlbaum Associates

HF in Systems 2003
Policy:

1. Honor Code applies. Submission of copied work is a violation. Do not seek content information from students who have taken the course previously, but learn from them.
2. Knowledge of the assigned readings is presumed. I will assume that you have read and are prepared to discuss the assigned readings on the date assigned.
3. Assignments are due on the date assigned. Assignments received late lose 10% of grade. Assignments which are late must be submitted within six days after they were due to receive ANY credit. Assignments may be Faxed or E-mailed to meet a deadline, but questions and answers, from the text, must be submitted by E-Mail.
4. I will lend material to you. Failure to return the material to me before the last class will result in an incomplete until the material is returned.
5. ALL team members are expected to contribute to the team’s products. The team will decide how to distribute its workload and evaluate the performance of its members. Individuals responsible for the development of each section of the response to the Request for Proposal will be listed as the lead investigator for that section. Reviewers are also to be listed. To facilitate communication, students are expected to use the E-MAIL system. If you do not have a current account you must open one and use it.
6. Feedback: Since these classes build on each other, I need to know that you understand the material that we have discussed. Therefore, you are strongly encouraged to send an E-Mail to me if anything that was presented requires clarification. I will respond to these issues immediately and/or at the beginning of the next class, because if you have a question, other students probably have the same or a related question. If there are no questions, I must assume that everything was “perfectly clear”. Comments on the material covered are also solicited.
7. Advise me of conflicts, problems, etc. when they arise, by any of the means provided above.

ASSIGNMENTS

Assignments/selected readings: These assignments are due in writing on the date specified. Be ready to participate.

Chapter Reviews and Test Questions:
I will provide you with a form on which you are to complete your chapter reviews. In addition, you need to provide three quality questions for each chapter. We will discuss "quality questions". Some of these questions will be used on your midterm and final exams. I will also add some of my own. Questions and the associated answers are to be sent to no later than 1000 on the day the reading is due.

MicroSAINT Experience. Due to your time constraints we will not be learning MicroSAINT (Systems Analysis of Integrated Networks of Tasks) this semester. However, we will review its capabilities. If you wish to learn it, I will make that opportunity available. In the past, approximately 3-4 hrs/wk were required to complete the MicroSAINT Exercises. Toward the end of the semester, individual students presented their own simulation of the TRACON System. We then integrated the modeling strategies and the team developed a composite simulation.

We will do the six MicroSAINT reading assignments and discuss them in class. You will become familiar with discrete event simulations through a lecture and readings.

HF in Systems 2003
Response to a Request For Proposal (RFP) for redesign of the controls and displays used by TRACON operators. We will use the Terminal Radar Approach Controller (TRACON) workstation in Room 321 as a BASELINE device from which to develop an improved system. You will need to learn how the system works, a canned simulation and a manual will be provided. You will need to spend 3-5 hours early in the semester (before our visit to the Dayton TRACON) learning the operating procedures. We will make one visit as a class to the Dayton Airport, and you should plan on an additional one or two visits during which you will “shadow” a TRACON controller. Before responding to the RFP, you will have performed analyses from which your display development will evolve. Subsequent analyses will support your display/control redesign. At the end of the semester, you will present your responses to a review panel of FAA representatives.

This is to be a TEAM effort and you are responsible for coordinating the assignments and responsibilities within your group. We will learn from both THE PROCESS AND THE PRODUCT. I will provide most of the literature you will need for your redesign of the workstation.

As in the real world, your performance as a team member will be evaluated (and will become part of your grade).

Laboratory Procedures: (RM 321)
1) Do not load any other programs into any PC.
2) Don't download any programs from any PC.
3) Don't modify the desktop or any programs. Don't use any of the other programs available on the PC without my approval.
4) Do report problems to my graduate assistant or to me.
5) Do “LOG” problems which you had in using the TRACON software on the yellow sheets provided in the back of the TRACON manual.
6) No smoking, eating or drinking in the lab, please. Do check that the door is locked when you leave.
7) Please schedule your use of the lab with my graduate assistant. While classes have priority, we have other students using the lab and they have schedules to meet. Call Chris (229 2175) if you will not be using the lab during the scheduled period. As a courtesy, tell your classmates and Chris via your distribution list.
8) Rm 321 is your laboratory and will also serve as a project area for your class. In addition, course related materials can be stored and exchanged in that area. Please use the form on the wall to sign the material out, so your team members know who has what.
<table>
<thead>
<tr>
<th>Date</th>
<th>TOPIC</th>
<th>Due dates for Readings/Assignments*</th>
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<tbody>
<tr>
<td>Jan 7 &amp; 9</td>
<td>Course overview</td>
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<td>Demonstration.</td>
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<td>Intro to TRACON materials</td>
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<tr>
<td>Jan 14 &amp; 16</td>
<td>Systems Engineering (SE)</td>
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<td>Introduction to Systems Engineering</td>
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<td>Definitions/Principles</td>
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<td>Jan 21 &amp; 23</td>
<td>Systems Development Process</td>
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<td>CH 2 of Weimer Handouts</td>
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<tr>
<td>TBD</td>
<td>Tour of ATC Site</td>
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<td>(Followed by review in next class)</td>
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<tr>
<td>Jan 28 &amp; 30</td>
<td>Systems Development Process</td>
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<td>Boeing 777 development &amp; discussion</td>
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<td>System Development closure</td>
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<tr>
<td>Feb 4 &amp; Feb 6</td>
<td>Boeing 777 development &amp; discussion</td>
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<td>System Development closure</td>
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* Additional Air Traffic Control Readings/assignments will also be scheduled.
### Analytical Techniques

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<thead>
<tr>
<th>Date</th>
<th>Event</th>
<th>Chapter/Reference</th>
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<tbody>
<tr>
<td>Feb 11 &amp; 13</td>
<td>Link analysis, Functional Analysis Distribute simulated RFP, Task Analysis Begins ATC Readings distributed</td>
<td>MS6 CH 5 Aerospace Garland et al CH 18,19,20, &amp; 21 (read in more detail)</td>
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<td>Feb 18</td>
<td>Gene Corley Presentation in Boll on WTC Collapse</td>
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<td>Feb 18</td>
<td>Class meeting to discuss RFP Discrete event simulation</td>
<td>CH 4 Usability</td>
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<td>Feb 20</td>
<td>More Task Analysis TRACON issues</td>
<td>CH 6 Aging, CH 7 Automotive</td>
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<td>Feb 25</td>
<td>More Task Analysis</td>
<td>CH 8 Communication</td>
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<td><strong>Mid-term</strong> (lectures, readings, &amp; your questions) Functional Analysis Of TRACON from which we will produce an Integrated functional analysis of TRACON (Class Team product)</td>
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<td>Feb 27</td>
<td>Response to RFP Team meeting</td>
<td>CH 9 Consumer</td>
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<tr>
<td>Mar 4</td>
<td>Functional Analysis Of TRACON from which we will produce an Integrated functional analysis of TRACON (Class Team product)</td>
<td>CH 10 HCI</td>
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<td>Mar 6</td>
<td>Team Meeting/class</td>
<td>CH 12 Medical</td>
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<td>Mar 11</td>
<td>Team Meeting/class</td>
<td>CH 13 Military</td>
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<td>Mar 13</td>
<td>Catch-up Day</td>
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<td>Mar 17-24</td>
<td>Spring Break</td>
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<td>Mar 25</td>
<td>Team Meeting/class</td>
<td>Ch 14 Training</td>
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Performance Measurement

Mar 27, April 1,3,8, & 10 Performance Measurement Notes

ATC Redesign

April 15 & 17  Team Meeting

April 22  FAA Presentation (tentatively)

April 24  Course eval
         Critique & eval of presentation Moray
         Lessons learned
         Catch-up class, wrap-up

April 29  Final Exam

Grading:

TRACON Redesign  250
TRACON presentation  50
Midterm  100
Final Exam
         Chapters/ human subjects  100
         Performance Measurement
         Assignments/Selected Readings:
         Task analysis of driving task  40
         Functional analysis of TRACON task  25
         Task analysis of TRACON task  40
         Link Analysis  25
         Causal Chain: Bhopal  30
         PEER REVIEWS (sent to Moroney)
           # 1 ( Feb 25)  Not scored, but communicated to student
           # 2 (Mar 27)  75
           #3 (April 24)  75

Reading Assignments (written reviews)  190
         Boeing 777 video (60 pts)
         Casey: Data Van (25 pts)
         Wasserman Xerox (50 pts)
         Rutter & Breka Portable phone (25 pts)
         Moray (30 pts)

TOTAL  1000
Grading: This scale reflects the new grading system.

A: > 966
A-: 933-965
B+: 901-932
B: 866-900
B-: 833-865
C+: 801-832
C: 766-800
C-: 733-765
D: 700-733
F: < 700