IE 3477 - Methods and Industrial Ergonomics

### Designation
Required

### 2006-08 Catalog Description:
Introduction to the design and analysis of human-machine systems and interfaces. Application of biomechanics, anthropometry, and work physiology to the design of work. Study of operations and process analysis, methods analysis, and work design techniques used in manufacturing and service industries. Macro and micro motion analyses, work measurement, and the relation to line balancing, machine loading, scheduling and sequencing, management control.

### Prerequisites:
BE 1205 and BE 3373, each with a grade of “C” or better.

### Textbook and/or other required material:

### Course Objectives:
Students completing IE 3477 will be able to:

1. Apply biomechanics, anthropometry and work philosophy to the design of work
2. Analyze operations, methods, and work design techniques
3. Perform Motion analysis
4. Perform work measurement, line balancing, management control

Revised March 2007
### Topics Covered:

1. Introduction / Problem-solving tools – CPM/PERT  
2. Recordkeeping and Analysis Tools  
3. Worker Machine Relationships  
4. Line Balancing  
5. Operations Analysis  
6. Intro to Jack  
7. Layout  
8. Principles of work design  
9. Motion Study; Design of manual work  
10. Low back, biomechanics  
11. NIOSH guidelines  
12. Anthropometry / Principles of work design: the workplace  
13. Principles of work design: machines and equipment  
14. Work design: tools / CTDs  
15. Work Environment Design: Illumination, Noise, Temperature & other factors  
16. TBA  
17. Work Sampling  
18. Time Study  
19. Rating  
20. Allowances  
21. Standard Data  
22. Predetermined Time Systems / MOST  
23. BasicMOST & MOST for Windows  
24. Learning Curves

### Class Schedule:

Two 80-minutes lecture sessions per week and two 80-minutes Laboratory/problem solving sessions per week

### Contribution to Professional Component:

IE 3477 a required upper division course that contributes to the engineering topics requirement.

### Relationship to Program Outcomes:

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<tr>
<th>Outcome Criteria</th>
<th>Level</th>
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<tr>
<td>(a) An ability to apply knowledge of mathematics, science and engineering to solve industrial engineering problems in varied sectors of industry.</td>
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<td>(b) An ability to design experiments, collect data, analyze data, and interpret results.</td>
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<td>(c) An ability to obtain and understand client requirements, and design a system, component, or process related to industrial engineering to meet client requirements.</td>
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<td>(d) An ability to function as a team member in team-based problem solving activities.</td>
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<td>(e) An ability to identify, formulate and solve industrial engineering problems.</td>
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<td>(f)</td>
<td>An understanding of professional and ethical responsibility.</td>
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<td>(g)</td>
<td>An ability to communicate effectively in written and verbal forms.</td>
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<td>(h)</td>
<td>The broad education necessary to understand the impact of engineering solutions in a global and societal context.</td>
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<td>(i)</td>
<td>A recognition of the need for, and an ability to engage in professional development in industrial engineering.</td>
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<td>(j)</td>
<td>Familiarity with current and emerging topics in industrial engineering.</td>
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<td>(k)</td>
<td>An ability to put into practice techniques, skills, and modern engineering tools learnt in school.</td>
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**Computer Usage:**
MOST for Windows

**Prepared by:**
Dr. Luis Rene Contreras, Spring 2007