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**Master Syllabus**

**Course:** *EGR, 111 Introduction to Engineering and Computing*

**Cluster Requirement:** *1E*

This University Studies Master Syllabus serves as a guide and standard for all instructors teaching an approved course in the University Studies program. Individual instructors have full academic freedom in teaching their courses, but as a condition of course approval, agree to focus on the outcomes listed below, to cover the identified material, to use these or comparable assignments as part of the course work, and to make available the agreed-upon artifacts for assessment of learning outcomes.

**Course Overview:**

Introduction to engineering and computing with emphasis on development of problem solving skills through projects. The course is designed to increase the success of first year students. It includes an overview of majors in the college, and the importance of engaged learning. Team work, written and oral communication skills are covered. Ethical issues in engineering and computing are discussed.

**Learning Outcomes:**

Course-Specific Learning Outcomes:

After completing this course, students will be able to:

1. Explain ways in which engineers have an impact on society
2. Explain differences among and connections between different engineering disciplines
3. Identify important aspects of successful teaming
4. Articulate the major steps in the design process
5. Demonstrate competency in basic math concepts for engineers
6. Apply basic study skills (reading, note taking, preparing for tests and projects, accepting personal responsibility, using university resources) to engage in the classroom as a motivated participant in the educational process.
7. Explain importance of ethical behaviors by engineers
8. Become aware of student engineering organizations on campus

University Studies Learning Outcomes:

**Cluster 1E. Foundation for Learning through Engagement**

After completing this course, students will be able to:

1. Express the rationale for a broad education, as described in the UMD Commitment to Student Learning:
2. Define engaged learning in the context of their major, discipline or community.
3. Apply the concept of engaged learning to their personal goals.
4. Explain how perspectives within one or more academic disciplines impact the community.
5. Explain how issues in the community can be understood within an academic discipline.

**Examples of Texts and/or Assigned Readings:**

2015: Thinking Like an Engineer (3rd Edition, Stephan, Bowman, Park, Sill & Ohland), Pearson, 2015

Chapter 1: Everyday Engineering

Chapter 2: Ethics

Chapter 3: Design and Teamwork

Chapter 7: Fundamental Dimensions & Base Units

Chapter 8: Universal Units

Chapter 9: Dimensionless Numbers

Chapter 10: Excel Workbooks

Chapter 11: Graphical Solutions

2015: Choices for College Success (3rd Edition, Piscitelli), Pearson, 2015

Chapter 2: Critical Thinking

Chapter 3: Priority Management

Chapter 7: Class-Time Listening & Note Taking

Chapter 8: Memory & Studying

Chapter 10: Test Preparation & Test Taking

2013, 2014: Studying Engineering, (4th Edition, Landis) Discovery Press 2013

Chapter 1: Keys to Success in Engineering Study

Chapter 2: The Engineering Profession

Chapter 3: Understanding the Teaching/Learning Process

Chapter 4: Making the Most of How You Are Taught

Chapter 5: Making the Learning Process Work for You

Chapter 6: Personal Growth and Student Development

Chapter 7: Broadening Your Education

Chapter 8: Orientation to Engineering Education

**Example Learning Activities and Assignments:**

Ideal Job Description – Students had to describe the kind of engineering job they’d like to have and relate that job to the NAE Grand Challenges (global problems that engineers can address). **1E5**

Team Peer Evaluations – Students evaluate themselves and fellow group members based on a pre-defined performance rubric at the end of two design projects. **1E3**

Ethics Activity – Students watched an interview with an engineer who worked for Morton Thyocol, the company who manufactured the o-rings that caused the Challenger explosion in 1985, and wrote down 5 ethical issues that were mentioned. Discussion followed. **1E4**

Ethics Assignment – Students watched a video that told a story in which several engineers responded to problems that had ethical consequences. Students then had to list ethical challenges and how the main characters should have responded **1E4**

Major Activity/Assignment – Based on textbook readings and talks by representatives of each College of Engineering department, students had to write an essay describing their chosen major and another engineering major relating the skills each would bring to a project they might end up working on together. **1E3**

Term Project: Design Your Process – Based on textbook readings, class lectures, independent research and several small assignments. Students are asked to 1) Clarify their career goals, including the goals expressed in the UMD Commitment to Student Learning, 2) Express their understanding of their own major, another engineering or computer science major and how two professionals from those different majors might collaborate on a project, 3) Demonstrate their understanding of their personal path to graduation (including prerequisite requirements and scheduling issues), 4) Discuss their relationship with peers and faculty, 5) Discuss their time management, test taking and impact of personality traits on their ability to succeed. **1E1, 1E2**

**Outcome Map:**

|  |  |  |
| --- | --- | --- |
| **Univ St Learning Outcome** | **Teaching and Learning Activities** | **Student Work Products** |
| 1: UMD Commitment to Student Learning | Readings, lectures & small assignments, covering goal setting, impact of engineering on society, working in groups, time management, test-taking/study skills, differences/similarities among the COE majors | Term Project: Design Your Process |
| 2: Define engaged learning in context of discipline | Readings, lectures, assignment on DARPA Grand Challenges for the 21st century, Lectures on impact of engineering on society, differences/similarities among the COE majors | Term Project: Design Your Process |
| 3: Apply engaged learning to personal goals | 5 Lectures, covering the majors in the college, the impact of engineers on society, readings discussing the field, majors and relevant job descriptions, videos of working engineers | Major Assignment, practice working in teams, give and receive peer evaluations of teaming performance |
| 4: Explain how perspectives within an academic discipline impact the community | Watch an interview with a Morton Thyocol engineer discussing the attempts made to stop the Challenger launch and the ethical lapses. Students write down at least 5. Discussion follows.  | Ethics Assignment |
| 5: Explain how issues in the community can be understood within an academic discipline | Readings and lecture on the field of engineering, differences among the majors, assigned web links discussing Grand Challenges of engineers for the 21st century | Ideal job description assignment |

**Sample Course Outline (from Fall 2015):**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Week** | **Date** | **Day** | **TB** | **Chapter** | **Topic** |
|  Week 1  | 9/2/15 | W |   |   | Course introduction |
| 9/4/15 | F | Recitation/wifi connectivity  |
|  Week 2  | 9/7/15 | M | Labor Day, No class |
| 9/9/15 | W | S | 1 | Everyday Engineering |
|  | T, R or F | S |  3 | Design process, Teaming |
| 9/11/15 | F | Recitation: design/teamwork (mostly covered in lab) |
|  Week 3  | 9/14/15 | M | S | 7 | Fundamental Dimensions and Base Units |
| 9/16/15 | W | S | 7 | Fundamental Dimensions and Base Units |
|  | T, R or F | S |  3 |  Design process, Teaming |
| 9/18/15 | F | Recitation: units |
|  Week 4  | 9/21/15 | M | P | 3 | Priority Management  |
| 9/23/15 | W | P | 7 | Class listening/note taking |
|  | T, R or F | Design Project 1 |
| 9/25/15 | F | Recitation Quiz 1 - Fund. Dim & Units |
|  Week 5  | 9/28/15 | M | S | 8 | Universal Units |
| 9/30/15 | W | S | 8 | Universal Units  |
|  | T, R or F | Design Project 1 |
| 10/2/15 | F | Recitation |
|  Week 6  | 10/5/15 | M | P | 8 & 10 | Studying & Test taking |
| 10/7/15 | W | P | 8 & 10 | Studying & Test taking |
|  | T, R or F | Design Project 1 |
| 10/9/15 | F | Recitation Quiz 2 - Universal Units |
|  Week 7  | 10/12/15 | M | Columbus Day, No class |
| 10/13/15 | T | S | 9 | Monday Schedule, Dimensionless numbers |
| 10/14/15 | W | S | 9 | Dimensionless numbers |
|  | T, R or F | Design Project 1 |
| 10/16/15 | F | Recitation |
|  Week 8  | 10/19/15 | M |   |   | Trigonometry |
| 10/21/15 | W |   |   | Trigonometry |
|  | T, R or F | Design Project 1 |
| 10/23/15 | F | Recitation |
|  Week 9  | 10/26/15 | M | P | 2 | Trigonometry |
| 10/28/15 | W |   |   | Critical Thinking |
|  | T, R or F | Design Project 2 |
| 10/30/15 | F | Recitation Quiz 3 - Dimensionless numbers  |
|  Week 10  | 11/2/15 | M | S | 2 | Plagiarism, Ethics or University resources (library) |
| 11/4/15 | W | S | 2 | University resources (library) or Plagiarism, Ethics |
|  | T, R or F | Design Project 2 |
| 11/6/15 | F | Recitation |
|  Week 11 | 11/9/15 | M | S | 2 | Plagiarism, Ethics |
| 11/11/15 | W | Veteran’s Day, No class |
|  | T, R or F | Design Project 2 |
| 11/13/15 | F | Recitation Quiz 4- Trigonometry |
|  Week 12 | 11/16/15 | M |   |   | Major 1 |
| 11/18/15 | W |   |   | Major 2 |
|  | T, R or F | Design Project 2 |
| 11/20/15 | F | Recitation / Career Services |
|  Week 13 | 11/23/15 | M |   |   | Major 3 |
| 11/25/15 | W |   |   | No Class |
| 11/27/15 | F | Thanksgiving Break, No Class |
|  Week 14 | 11/30/15 | M |   |   | Major 4 |
| 12/2/15 | W |   |   | Major 5 |
|  | T, R or F | Design Project 2 |
| 12/4/15 | F | Recitation |
|  Week 15 | 12/7/15 | M | Last lecture class: use to summarize course/explain final |
| 12/9/15 | W | Study Day before finals begin |
| 12/11/15 | F |   |