

1. Course Number and Name

CMPE349 Introduction to Professional Practice

2. Credits and Contact Hours

3 units, 3hours (150 minutes) of class per week

Class Schedule:

Lecture MW 9-9:50

ACTIVE learning F9-9:50 and 10-10:50

3. Instructor or Course Coordinator Name

Spring 2017 Instructor:

Dr. Chuck LaBerge

ITE 358; Phone: (410) 455-5684

E-mail: chuck.laberge@umbc.edu

Office Hours: see schedule in Contacts on Blackboard

4. Textbook and Material

E. J. Rothwell and M. J. Cloud, *Engineering Writing by Design: Creating Formal Documents of Lasting Value*. Boca Raton: CRC Press, Taylor & Francis Group, 2014.

Relevant professional practice and ethics examples from the National Academy of Engineering's Online Ethics Center, <http://www.onlineethics.org/> or other sites as assigned.

Posted class notes, examples, documents, formats, etc are important. Plan to use the Blackboard site extensively.

5. Specific Course information

a: Brief Description

An introduction to systems engineering, project management, and professional ethics intended to prepare students for immediate immersion in CMPE450 Capstone I in the following semester. Students will develop skills in the design and partitioning of a system from initial customer requirements through development of specifications, Statement of Work, and proposal documents. The emphasis will be on developing these skills in a classroom environment that simulates the professional workplace. Students will be required to develop and write various technical documents throughout the course. The professional practice experience also includes discussion and experience in real-world workplace ethics and behaviors.

b: Prerequisites

Must pass CMPE Gateway before enrolling in CMPE349.

c. Required/Elective/Selected Elective

Required course for all Computer Engineering majors. This course should be taken the Spring semester immediately prior to enrolling in CMPE450 Capstone I.

Table 2 Detailed Plan for CMPE349, Spring 2017 (revised 1/16/2017)

	Date	Class #	[L]ecture or [C]lass[W]ork	Lecture or Discussion Topic	System Design	Technical Writing	Professional Practice & Ethics	Reading before class	Ind Assignment Due	Team Assignment Due
Mon	1/30/17	1	L	Course Administration			none	Rothwell & Cloud Chapter 1	Read the syllabus	
Wed	2/1/17	2	L	Landing System Background			none	Rothwell & Cloud Chapter 2	Register with CATME	
Fri	2/3/17	3	CW	The Mordant RFI			none			
Mon	2/6/17	4	L	Organizing Your Thoughts: The Operational View				Rothwell & Cloud Chapter 3	CATME Survey Due!!	
Wed	2/8/17	5	L	System Decomposition - The Functional View			CATME TEAMS posted			
Fri	2/10/17	6	CW	Generating Oper. View Graphics	Landing System SBD/MSD	What is your purpose?				
Fri	2/10/17			Add/Drop Date						
Mon	2/13/17	7	L	A Mindset for Technical Writing	Mindmap as a design tool	Mindmap as an organizational tool		Rothwell & Cloud Chapter 5		Team SBD/MSD
Wed	2/15/17	8	L	System Decomposition - The Functional View	Decomposition	none	none			
Fri	2/17/17	9	CW	Functional View Graphics	DFD & IEM	DFD & IEM	DFD & IEM			
Mon	2/20/17	10	L	The Hybrid Landing System	Team Assignments					Team DFD/IEM
Wed	2/22/17	11	L	Creating a first-class specification			Standards of Professional Conduct			
Fri	2/24/17	12	CW	Standards of Professional Conduct	none	none				
Mon	2/27/17	13	L	Mordant Landing System				Rothwell & Cloud Chapter 5		
Wed	3/1/17	14	L	Creating a first-class specification				ICAO Annex10 Chapter 3.11		
Fri	3/3/17	15	CW	Specification Fragments				FAA-STD-022c, portions 2721		Team Spec Fragment
Mon	3/6/17	16	L	Project Management I						
Wed	3/8/17	17	L	Project Management II						
Fri	3/10/17	18	CW	WBS & Network Diagram	WBS	WBS & Network diagram	WBS & Network diagram			
Mon	3/13/17	19	L	Creating a first-class Statement of Work						Team WBS
Wed	3/15/17	20	L	Writing First Class Tech Notes	none	Tech Note	Tech Note	Rothwell & Cloud Chapters 4 & 6		
Fri	3/17/17	21	CW	Bridge Project Video	WBS & SOW	WBS & SOW	WBS & SOW		CATME#1 Due	Mordant SRS
Mon	3/20/17			Spring Break						
Wed	3/22/17			Spring Break						
Fri	3/24/17			Spring Break						
Mon	3/27/17	22	L	Writing Math Well	tbd		tbd	Rothwell & Cloud Chapter 7(!!)		
Wed	3/29/17	23	L	Technical Budgeting / Spec Partitioning						
Fri	3/31/17	24	CW	Fermi Problem A/C in NAT		Tech Note 1			Professional Practice Writing	Mordant SOW
Mon	4/3/17	25	L	Creating a first-class design document						
Wed	4/5/17	26	L	Mordant Design Document Exercise	SDD	SDD	SDD			
Fri	4/7/17	27	CW	Work on Mordant Design Document	SDD	SDD	SDD		Tech Note #1 due	
Mon	4/10/17	28	L	Work on Mordant Design Document	SDD	SDD	SDD			
Wed	4/12/17	29	L	Design Constraints	tbd	tbd	tbd			
Fri	4/14/17	30	CW	Team Meetings on SDD						
Mon	4/17/17	31	L	Writing a First Class Proposal						
Wed	4/19/17	32	L	Looking at Section L and M						
Fri	4/21/17	33	CW	Drafting Proposal Material						Mordant SDD
Mon	4/24/17	34	L	Drafting Proposal Material						
Wed	4/26/17	35	L	Drafting Proposal Material						
Fri	4/28/17	36	CW	Review and Critique of SDD						
Mon	5/1/17	37	L	Drafting Proposal Material						
Wed	5/3/17	38	L	Meeting Management						
Fri	5/5/17	39	CW	Fermi Problem tbd	tbd	Tech Note 2	tbd			Proposal Due
Mon	5/8/17	40	L	Safety Critical Design (part 1)						
Wed	5/10/17	41	L	<open>						
Fri	5/12/17	42	CW	Kickoff for CMPE450/451 Capstone I/II					CATME #2 Due/TN #2 Due	
Mon	5/15/17	43	L	Wrap up, assessment, etc.						
Wed	5/17/17	44		Reading Day						
	Final Exam Date			No Final Exam						Revised SDD Due

6. Course Outcomes

1. Students will understand the basic project design and development process.
2. Students will be familiar with the graphic and tabular artifacts associated with developing a design from a set of user requirements.
3. Students will be aware of multiple codes of professional behavior and ethics, and will have experience in applying such principles in a simulated work environment.
4. Students will have experience in writing, editing and improving technical documents including Statement of Work, System Specification, and Technical Notes.
5. Students will have the opportunity to practice the project design skills in a simulated work environment.

7. Brief List of topics to be covered

System Engineering and Architecture: The content will be based on a reduced and simplified version of introductory material developed for ENEE661 System Design and Architecture by Dr. LaBerge, including the following:

- a) Identification of Customers, Clients, Consumers and Caretakers: who wants or needs this device?
- b) Determination of the System Boundary: what's inside the project and what's outside the project
- c) Establishing how the system or product will be used: creation of the operational scenario(s) or concept
- d) Establishing how the system or product will be developed, maintained, and aged: creation of the mission scenario
- e) Partitioning the system to functional elements: the Data Flow, Control Flow and Functional Flow diagrams
- f) Identifying and describing the interfaces: internal interfaces in the data and control flows, and external interfaces in beyond the system boundary
- g) Developing the system implementation architecture: high quality block diagrams and formalized QFD / House of Quality tradeoff methodologies.
- h) Partitioning user requirements to functional and architectural blocks: functional, performance and design requirements
- i) Creating and writing good specification documents with writing intensive practice.
- j) Technical communications in written and oral form with presentation and writing intensive practice.

Professional Practice and Workplace Ethics: The content will be based on similar material developed by Dr. Spence and Dr. Rothman for use in the ENME curriculum and by Dr. deJardins for use in CMSC304, including:

- a) Introduction to workplace practices and ethics and the elements of ethical analysis in real-time and on a longer term, project- or industry-wide basis, including consideration of the stakeholders (tightly coupled with System Engineer topic a), above)

- b) A discussion of professional codes of ethics relevant to the practice of Computer Engineering in the workplace, including NSPE, IEEE, ACM, and Order of the Engineer.
- c) Ethical issues in engineering design, identification of safety critical vs. non-safety critical products and the ramifications for the design process (tightly coupled with many of the Systems Engineering topics)
- d) Processes and procedures to address ethical issues in the workplace and in the design space, with discussion of topics of current interest (Bradley Manning, WikiLeaks, Edward Snowden, etc).
- e) Case studies of engineering failures and responsibilities (Challenger, Fukushima nuclear plant, Hyatt Regency walkway, etc), with a focus on identifying roles and responsibilities and analysis of courses of action.
- f) Role-playing case studies of situations involving ethical issues

Project Management, Planning, and Communication:

- a) Developing a Work Breakdown Structure from a customer project description
- b) Developing a Statement of Work from a Work Breakdown Structure, with writing intensive practice.
- c) Creating a network diagram and Gantt charts for project planning and status measurement.
- d) Writing good status reports, with writing intensive practice.
- e) Writing good technical reports, with writing intensive practice.

Practice of Professional Skills

- a) Sample design mini-project based on industry specifications.

8. Class Policies

Homework assignments: Homework assignments in this course will focus on the preparation and improvement of graphical artifacts and associated text appropriate for technical documentation of various forms. There is no substitute for practice in developing the necessary skills.

Lecture/Class meetings: Attendance, punctuality and full participation in the discussion sessions is required for this course.

Attendance: This course is your first experience in the professional practice of engineering. **In professional practice you are expected to be at work, on time, every day.** Most engineering firms provide a sick leave policy of 10 days or so each year. This time is available if you really need it, but it is *not personal leave or vacation time!* For this class your “sick leave” allocation is three class meetings.

Missing more than three (3) class meetings will result in *failing* CMPE349, with potentially serious impact in your progress through the CMPE major. CMPE349 is a prerequisite for CMPE450/451 Capstone sequence, and is not offered in the summer!

In the professional practice of engineering, the equivalent of missing three of our class sections would be excessive absenteeism on the job. The penalty is simple: you lose your job! The equivalent here is you fail the course, which is actually *less* penalty than the real job because you can retake the course, but you are unlikely to be rehired once terminated for absenteeism.

Be on time. Tardiness is almost as bad as absenteeism, and I reserve the right to count excessive tardiness as equivalent to a missed class. **Beltway Traffic and UMBC Parking at 9 AM are issues, so leave home early enough to be on time.** I leave Towson early enough to be here on time. You need to do so, too!

Don't miss classes. Do your work on time.

9. Grading and Assessments

Student grades are based on both individual and team assessments, with a relative weighting for each assignment/assessment as shown below:

Grading

Using the weighting discussed below, the sum of the weighted scores will be used to determine the course grade. The following grade standards will be enforced:

Weighted sum $\geq 90 = A$
90 > Weighted sum $\geq 80 = B$
80 > Weighted sum $\geq 70 = C$
70 > Weighted sum $\geq 60 = D$
Weighted sum $\leq 60 = F$

Students who achieve the posted standards given above are assured of earning the indicated grades. In the interest of fairness, the instructor reserves the right to implement minor *easing* of these requirements based on actual class performance in any given semester. The requirements will *not* be made more stringent. Students are cautioned that such easing is *solely* at the discretion of the instructors and may or may not occur in any given semester. You should *not* count on any easing of the thresholds indicated here. If you want a "B", score 80 points or more, if you want an "A", earn more than 90 points.

Writing assignments will be graded on both the Rubric for Technical Writing, as posted on Blackboard, and on technical content. Because one of the goals of the course is to improve your technical writing, the Rubric for Technical writing will be more highly weighted in the grading of each assignment.

All writing assignments are to be turned in in PDF format as Blackboard assignments unless otherwise instructed during class.

For Spring 2017, the assignment weighting will be as shown below.

Papers: approximately 15-25 pages of writing per student, some elements will include team activity as indicated in Table 1.

Table 1 Weighting for Individual and Team Scores for CMPE349, Spring 2016

Individual		50
CATME Registration	1	
CATME Submissions (2)	2	
Prof Practice Writing	5	
TN001	15	
TN002	15	
Teamwork Score (2%/3%)	5	
Attendance (see text)	5	
Qualitative	2	
Team		51
SRS Fragment	3	
WBS	3	
SRS Draft	3	
SOW Draft	3	
SDD Draft	3	
SRS Final	7	
SOW Final	7	
SDD Final	7	
Proposal Draft	15	
	Total	101

10. Academic Integrity

By enrolling in this course, each student assumes full responsibility as a participant in UMBC's scholarly community in which everyone's academic work and behavior are held to the highest standards of honesty. Cheating, fabrication, plagiarism, and helping others to commit these acts are all forms of academic dishonesty. Academic misconduct could result in disciplinary action that may include, but is not limited to a grade of zero on the particular work, a grade of F in the class, suspension or dismissal. To read the full Student Academic Conduct Policy, consult the UMBC Student handbook, the Faculty Handbook,

or the UMBC Policies section of the UMBC Directory. See also <http://www.umbc.edu/provost/AcademicIntegrity/Honorcode.htm>

I'm quite serious about this. It is a matter of professional ethics (a required part of this course) that all students abide by these requirements. Please don't test me on this!

11. Course Calendar and Related Activities

The detailed course calendar is shown in Table 2 on the following page. I will attempt to adhere to this schedule. Spring 2017 is the third offering of CMPE349, so there may be some deviations as the course goes on. I'm still fine-tuning the material.

Note that the detailed calendar in Table 2 reflects a "lecture, lecture, class work" format. Details on this schedule will be provided during the first day of class.