**Marist College**

**CMPT330: System Design**

Dr. Carolyn Matheus, Assistant Professor of Information Systems

Office: Hancock Center #3008

Phone: (845) 575-3660 (this is a direct line to my office)

Office Hours: Monday: 10:30 – 12:30

Wednesday: 10:00 – 11:00

Thursday: 10:30 – 12:30

All online correspondence and course management is through <http://ilearn.marist.edu>

**Course Description**

This course discusses the processes, methods, techniques and tools that organizations use to determine how they should conduct their business, with a particular focus on how computer-based technologies can most effectively contribute to the way business is organized. The course covers articulating business requirements for the technology solution, specifying alternative approaches to acquiring the technology capabilities needed to address the business requirements, and specifying the requirements for the information systems solution in particular, in-house development, development from third-party providers, or purchased commercial-off-the-shelf (COTS) packages. This course provides an introduction to the field of human-computer interaction (HCI), an interdisciplinary field that integrates cognitive psychology, design, computer science and others. Examining the human factors associated with information systems provides the students with knowledge to understand what influences usability and acceptance of IS. This course will examine human performance, components of technology, methods and techniques used in design and evaluation of IS. Societal impacts of HCI such as accessibility will also be discussed. User-centered design methods will be introduced and evaluated. This course will also introduce students to the contemporary technologies used in empirical evaluation methods.

* Prerequisite: CMPT220 (Software Systems Analysis)

**REQUIRED READING**

* Dennis, A., Wixon, B.H., & Tegarden, D. (2012). Systems Analysis & Design: An Object-Oriented Approach (4th or 5th edition). Hoboken, NJ: Wiley. ISBN: 978-1-118-03742-3
  + Check Amazon for pricing or visit <http://www.wiley.com/WileyCDA/WileyTitle/productCd-EHEP003169.html> for a reduce priced ebook ($71.50)
* Additional readings may be assigned throughout the semester on iLearn.
* We will be using software that can be located using the following links:
  + [www.lucidchart.com/e/matheus.marist.edu](http://www.lucidchart.com/e/matheus.marist.edu)
  + <http://www.invisionapp.com/>

**GRADE DISTRIBUTION**

A = 95 – 100 C = 73 – 76

A- = 90 – 95 C- = 70 – 72

B+ = 87 – 89 D+ = 67 – 69

B = 83 – 86 D = 63 – 66

B- = 80 – 82 D- = 60 – 62

C+ = 77 – 79 F = < 60

**GRADING**

You will be assessed in the following areas:

Exam 100 points

Quizzes 100 points (4 quizzes x 25 points each)

Homework 1 50 points

Homework 2 50 points

Peer review of diagrams 25 points

Critical analysis presentation 50 points

Lightning talk 25 points

Project report 100 points

Project presentation 50 points

iLearn discussion forums 100 points (5 graded forums x 20 points each)

Total 650 points

**COURSE ACTIVITIES**

***Reading***

Most of the required reading will be chapters from the textbook. Some weeks there will be additional articles or video clips assigned. Please refer to the weekly schedule for assigned readings and/or videos.

***Exam***

There will be one comprehensive exam designed to test your mastery of the course’s basic materials. The exam will cover concepts from the textbook, as well class lectures and discussions. The exam will be divided into two parts. One part of the exam is intended to test your knowledge of the textbook and class lectures. The other part of the exam will test what you have learned from the weekly labs. Details will be discussed in class.

***Quizzes***

There will be four quizzes held at the beginning of class on scheduled days. Please be on time and refer to the weekly schedule for quiz dates. There are no make-up quizzes and you must be in class to take quizzes.

***Homework***

You will complete two homework assignments that guide you through some of the processes of creating and documenting different parts of a system design. These assignments will provide you with hands-on experience in applying the concepts you are learning about. Each team will submit two graded homework assignments that will later be part of your final project. Files must be submitted in generic graphic formats that are commonly readable (for example, .jpg), or screen shots that have been embedded in a Word document. Details for assignment submissions will be discussed in class. Please refer to the weekly schedule for assignment due dates.

* **Homework #1**: Each team will create one use case and one related activity diagram based on their selected system. The use case diagram must clearly identify the major functions of the system and all actors. The activity diagram is based on a system activity of your choice. The diagrams should be presented using UML using Lucidchart. Please refer to chapters 4 – 5 of your textbook and the UML tutorials in your iLearn Lessons.
* **Homework #2**: Each team will create and submit an E-R diagram that will be used as the data model for your project. You should carefully consider all entities and attributes that should be included in the diagram and final database, and map all the relational cardinalities. Your diagrams should be complete when you turn it in, not a rough draft. E-R diagrams should be presented using Lucidcharts for modeling.

***Peer Review of Diagrams***

Prior to handing in Homework assignment 1, each group will print 5 copies the assignment (use case and activity diagrams) and bring them to class on the designated date (see weekly schedule). Groups will be paired together to exchange and critically analyze each other’s assignment before they are due. Details will be discussed in class. If you miss this class you will receive a grade of zero for this assignment.

***Critical Analysis Presentation***

Each team will analyze an assigned product and/or system and related user interface system and instructions. Each team will then give a presentation (approximately 7-8 minutes) to the class that critically analyzes the system and interface. Each team will address one design principle from the textbook and one additional design principle during their presentation. Additional details will be discussed in class. Please refer to the weekly schedule for assignment due date.

***Lightning Talk***

Each student will give a lightning talk (approximately 3 - 4 minutes) about a bad design idea. The topic does not have to be related to computers or computer systems, but it should be relatable to people in the class. Each student should provide 1) brief overview of the object or system, 2) discuss why the design is considered to be poor/impractical/unreasonable, and 3) provide an alternative solution for design improvement. Nothing is required to be turned in and Power Point slides are not required. However, the student may wish to provide a demonstration or picture for the class. A grade will be assigned based on completeness of the presented idea and ability to stay within the designated time allotment. Students who are unable to complete the presentation of their ideas within the designated time slot will have a reduction in grade for this assignment. Student who do not present on the day they are schedule for will receive a zero. Additional details will be discussed in class.

***Project Report***

You will work in teams on a semester-long systems design project. Each team will select a system that they are interested in or familiar with and discuss their selected system with me. I must approve each team’s selected topic/system before work on the project commences. Your final project report must include the following sections and information:

* Title Page
  + Names of team members, name/section of this class, assignment name
* Executive Summary (1-page overview of your project)
* Introduction (1 paragraphs)
* Summary of Relevant Facts
  + This section should concisely state a summary of facts associated with the selected system. Questions to consider for this section include: What is the purpose of this system? What service(s) does it provide? Who are the intended users of this system? What are the goals of this system to meet user demands and requirements? What are the system processes by which user demands and requirements are met? How is the user experience taken into account? Your writing should be objective, specific, and offer no opinions.
* System specifications:
  + System/software design
    - Final functional specifications (revised use case and 5 activity diagrams) with supporting documentation
    - 5 related sequence diagrams with supporting documentation
    - Data models:
      * Final E-R Diagram with supporting documentation
      * Class diagram with supporting documentation (data dictionary)
      * 5 common SQL queries (focus on queries that require joining multiple tables together) with supporting documentation as needed
  + HCI: Navigation and interface
    - 5 mock-up system views are required (screen shots are acceptable but must be embedded into the project report). The better your presentation, the better your grade. An explanation/documentation for each system view is required, including an overview of relevant design principles as discussed in the text and/or class for each screen shot.
  + Infrastructure map and appropriate documentation
    - Data communication: LAN/WAN diagrams as appropriate
    - Server/Compute (front and back end):
      * How does the system run?
        + Database system, PoS system, Web server, etc.
      * How is backup and BCP accounted for?
        + Examples: data storage/backup, data loss, power loss, outages, etc.
    - Note: I am not looking for specific hardware specs but rather your overview/recommendations for servers, cloud services, or some hybrid of the two.
* Conclusion: a brief conclusion (1-2 paragraphs) should be provided
* References: in-text and citation list properly formatted is required (APA format preferred)

The final project report should provide complete documentation for how this system is built and presented, to the best of your knowledge. All components of the project should be presented using appropriate software for diagrams (e.g., UML). It is expected that you will work with your team mates on the throughout the entire semester. Your paper will be graded using the following criteria:

* ***Written presentation*:** Organization, clarity, appropriate use of references and supporting documentation, introduction, conclusion, grammar, overall flow of information
* ***Content:*** Depth of detail and documentation, appropriate references, overall quality of content, inclusion of all project components outlines above

***Project Presentation***

Each team will present their project to the class at the end of the semester. Presentations are expected to be 20 minutes (including a few minutes for Q & A). Teams will be called in random order to give their final presentations. All students are required to attend all classes of scheduled presentations. Failure to attend all presentations will result in a 50% reduction of your INDIVIDUAL grade for your team presentation. Thus, the entire group will not be penalized if one member does not show up for all classes of scheduled presentations. A grading rubric for presentations will be distributed and discussed in class.

***iLearn Discussion Forums***

The 4th credit of this course will be satisfied by students participating in a weekly discussion forum held on iLearn. Students will utilize the forum tool on iLearn and work in small groups to answer and discuss posted forum questions. Please refer to the weekly schedule for the required (and graded) forums.

Discussion forum participation will be based on your contribution to the online discussion of the topics covered. Discussions will be open for 2 weeks starting on designated Mondays at 12:00pm (see schedule). I will not review late forum posts. Please see the weekly schedule at the end of this syllabus for the forum schedule.

Online learning requires a focused attitude, a high level of motivation and responsibility, and good communication skills. I will follow your discussions and moderate the discussions when necessary, but I may not actively participate. Forum grades are a subjective evaluation of your contribution to the discussion questions and responses to your peers. Domination of conversation is not good participation, nor is flooding the forum with a disproportionate number of comments. Contribution is evaluated in terms of your ability to effectively and concisely share ideas, and to question and learn from others. Discussion is more than sending a one-sentence comment; participation includes the ability to synthesize ideas and concepts related to issues being discussed and to clearly articulate those ideas in discussion with classmates. Successful students strive to support arguments with specific readings.

A minimum of 3 high-quality posts, including a thorough response to the question and responses to peers in the group, is required (not all on the same day and not at the very end of the forum period!). Someone could make many more submissions and receive lower grades if the quality is weak (see discussion forum activity guidelines above). On the other hand, one or two high quality submissions are not enough to earn an “A”.

Discussion group activity is graded as follows:

A Student asks good questions, makes valuable observations, answers questions effectively on an ongoing basis; Able to synthesize ideas and bring discussion into focus; “E-Listens” well to others and includes their ideas in follow up; References text and journal articles to support points; Does not wait until the last minute to submit comments; Evidence of a) dialogue among students; b) synthesis of material; c) timely, well documented answers; Makes multiple, meaningful contributions to the forum throughout the week on an ongoing basis; Thoughtfully responds to the posts of others throughout the week.

A- Student is a frequent participant, but questions, observations, and/or answers are sometimes not as effective as they could be, or not on an ongoing basis, or tend to discourage effectiveness; Does not use as many references as he/she could; Does not participate as regularly/frequently throughout the week

B Students’ posts are less frequent and/or somewhat lower quality in content; Some or no references; Most or all posts are made on one day

C Student is a rare participant; Questions, observations, and answers reflect little or no preparation; Makes short, ineffective comments on the posts of other(s) but does not offer own substantial contribution.

F Very rare (or no) participation; Displays little or no interest, or is disruptive to class discussions. Note: Sarcasm or any type of rudeness leads toward F.

***NOTE:*** I examine forum posts in many different ways to determine an appropriate forum grade for each student each week. I am looking for evidence of consistent, substantial, thoughtful participation in the discussion forums. I am looking at the number of times you post each week (quantity), how many different days you check in and contribute (making many posts on one day is a bad approach, as is waiting until the end of the forum period to start posting), the effectiveness, accuracy, and thoughtfulness of your posts (quality), your ability to grasp the material and contribute to an ongoing discussion based on the questions posed to you each week by your peers and me (knowledge, comprehension, and synthesis of materials), and evidence that you completed the required readings. If you do not understand something, or do not have experience in a particular area, say so! Everyone brings different strengths and experiences to this course. I expect that we will all learn from one another this semester. Sarcasm and jokes, although generally amusing depending on your sense of humor, are not acceptable in the forum.

***A note about grading…***

A minimum of two team members must work on each homework assignment, including revisions for the final project. It is the responsibility of each team to bring to my attention if one or more members are not regularly participating in team meetings and/or contributing the appropriate amount and quality of work to team assignments. I will not pass social loafers. If your team tells me you are not participating in the assignments or that they are unable to get in touch with you for meetings, I will dock grades as I deem fair. For team assignments and projects, it is very important that everyone work together throughout the semester. Some of the assignments will require a lot of brainstorming, collaborating, and discussions among the groups. It is imperative that everyone participate.

**PREPARING WRITTEN DOCUMENTS**

* All written documents must be double-space and use Times New Roman 12-point font.
* When you use a quote or a major thought from an outside source, cite the source in the body of the paper as an in-text reference, then include a reference list at the end. I am most familiar with APA, but you can use whichever citation style you prefer as long as you are consistent (please refrain from foot notes).
* Spelling and grammar *do* count. If writing is a problem for you, please take advantage of the English Learning Center. They can help proofread your paper and help with organization. Papers can be submitted for proofreading over the Web but you must allow sufficient turn-around time.
* An ”A” paper is a well-organized, well-written paper that can be read easily and has accurate information. A “B” paper has a few grammar and/or organizational problems, but is basically solid. A “C” paper has major grammar or organizational problems, but the material you are trying to convey is still present. A “D” paper has major problems in all aspects (grammar, organization, and content) but shows that some research was done and an effort made. An “F” paper is totally unacceptable in terms of grammar, organization, and content.
* Copying from a Web site or print source without quoting it and citing the source is plagiarism. *Don’t do it*. Plagiarism earns an “F” for a grade. It is your responsibility to read and abide by the Marist College academic honesty policy.

**ACADEMIC INTEGRITY**

There is no room for plagiarism whatsoever in a college course. Plagiarism rules applies to homework, term papers, discussion forums, tests, quizzes and anything in which a student must submit any type of work. A first instance of plagiarism will receive 0 on that activity and any subsequent instance of plagiarism will yield an "F" for this course, dismissal from this course, and a report to the Graduate Director of this program.

If you are unfamiliar with what constitutes plagiarism, then it is your responsibility to familiarize yourself with the rules. Copying and pasting forum posts from online sources is plagiarism and unacceptable. Copying work or ideas from sources without referencing them, which translates to passing the work/ideas off as your own, is plagiarism and unacceptable. *I regularly screen forum posts for plagiarism.*

**Weekly Schedule: CMPT330 Spring 2017**

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| --- | --- | --- | --- |
| **Date** | **Topic and Reading** | **Class Activities** | **Assignments Due** |
|  |  |  |  |
| 1/19 |  | Introduction/Syllabus |  |
| 1/23 | Online iLearn forum | Online iLearn forum | Graded forum |
| 1/26 | Review: chapters 1-3 | Overview of SAD |  |
| 1/30 | Review chapters 1-3 | Class activity 1; sign up for Lightning Talk |  |
| 2/2 | UML documents in iLearn Resources folder | Review project; Create teams; select systems | Quiz 1 (Ch. 1, 3) |
| 2/6 | UML documents in iLearn Resources folder | Introduction to Lucidcharts; Create accounts |  |
| 2/9 | Chapter 4: Process and functional modeling | Class activity 2 |  |
| 2/13 | Chapter 4: Process and functional modeling | Class activity 3 | Quiz 2 (Ch. 4); Graded forum |
| 2/16 | Chapter 6: Behavioral modeling |  |  |
| 2/20 | Chapter 6: Behavioral modeling | Class activity 4 |  |
| 2/23 |  | Peer Review of diagram(s) for Homework 1 | Quiz 3 (Ch. 6) |
| 2/27 | Chapter 5: Structural modeling | Class Activity 5: E-R Diagrams | Homework 1 due |
| 3/2 | Bad design ideas: Lightning talks 1 |  | Lightning talk 1; Homework 2 due |
| 3/6 |  | iLearn: online forum | Graded forum |
| 3/9 |  | iLearn: online forum |  |
| 3/13 | **No class: Spring Break** | **No class: Spring Break** |  |
| 3/16 | **No class: Spring Break** | **No class: Spring Break** |  |
| 3/20 | Ch. 10: HCI |  | Graded forum |
| 3/23 | Ch. 10: HCI and design principles | Class activity 6 | Quiz 4 (Ch. 10) |
| 3/27 | UI and user experiences/assigned articles | Class activity 7 |  |
| 3/30 | UI and user experiences/assigned articles | Class activity 7 |  |
| 4/3 |  | Critical analysis presentations | Critical analysis presentations |
| 4/6 | Exam review; open lab |  |  |
| 4/10 | **Exam 1** | **Exam 1** | **Exam 1** |
| 4/13 | **Exam 2** | **Exam 2** | **Exam 2** |
| 4/17 | **No class: Easter break** | **No class: Easter break** | Graded forum |
| 4/20 | Bad design ideas: Lightning talks 2 |  | Lightning talk 2 |
| 4/24 | Ch. 11: Architecture | Class activity 8 |  |
| 4/27 | Review for final project/presentation | Review for final project/presentation |  |
| 5/1 |  | Final Presentations |  |
| 5/4 |  | Final Presentations | Final projects due |
| 5/8 | Final Exam week: check slot grid |  |  |
|  |  |  |  |

**DEPARTMENT AND COURSE GOALS, OBJECTIVES, AND ASSESSMENT**

***Department Goals***

1. Prepare students for employment in a technology field or for graduate study in a technology field.
   1. At the time of graduation, 100% of those students who seek employment in a technology-related job will be employed. *Measurement tool*: Survey completed by graduating seniors.
   2. At the time of graduation, 100% of those students who seek admission to graduate school will be admitted to at least one graduate program. *Measurement tool*: Survey completed by graduating seniors.
2. Provide students with both theoretical knowledge and skills-based proficiencies in the five core technology competencies: programming, hardware, data communications, data management, and systems/software analysis and design.
   1. Programming
      1. At least 80% of courses in the CS major will require programming.
      2. At least 35% of courses in the ITS major will require programming.
      3. At graduation, 100% of students will demonstrate programming skills with a grade of B or better. *Measurement tool*: Capping course project evaluation.
   2. Hardware
      1. Each major will include one hardware architecture course appropriate to the major.
      2. Students in each major will complete the appropriate hardware architecture course with a grade of at least C. *Measurement tool*: Course grade.
   3. Data Communications
      1. Students will be required to complete at least one theoretical course in Data Communications and one practical (applied) course in Data Communications.
      2. At graduation, 100% of students will have demonstrated competency in the design and development of networks. *Measurement tool*: Course grade in applied networking course.
   4. Data Management
      1. Students will be required to complete at least one course in Database Management.
      2. At graduation, 100% of students will have demonstrated competency in the design and implementation of a database system as part of a software system. *Measurement tool*: Capping course project.
   5. Systems/Software analysis and Design
      1. At least 20% of courses required for CS majors will include material and experience with the analysis and design of software systems.
      2. At least 50% of courses required for ITS majors will include material and experience with the analysis and design of information systems.
      3. At graduation, 100% of students will be able to complete a software/systems design and development project with a grade of B or better. *Measurement tool*: Faculty evaluation of capping course projects.
3. Provide students with fundamental knowledge of business administration and management so that graduates will be able to work effectively within businesses and other organizations.
   1. All students will take at least one general business course.
   2. Students with an IS concentration will also study basic principles of accounting and economics.
   3. At graduation, 100% of students will be able to complete a software/systems design and development project with a grade of B or better. *Measurement tool*: Faculty evaluation of capping course projects.
4. Develop interpersonal skills for working effectively on teams.
   1. At least 35% of courses will require projects that are prepared by a team of students.
   2. At least 20% of courses will have at least 25% of course time devoted to small group work.
   3. At graduation, 100% of students will be able to contribute effectively to a team project. *Measurement tool*: Student evaluations of team members in the capping course project.
5. Develop effective written and oral communication skills.
   1. At least 35% of courses will require oral presentations, either by individuals or a team of individuals.
   2. At graduation, 100% of students will score 5 or better (out of 7) on evaluations of oral presentations. *Measurement tool*: Faculty evaluations of capping course project presentations.
   3. At least 35% of courses will require written documentation of project work.
   4. At graduation, 100% of students will be able to prepare the documentation of a project with a grade of B or better. *Measurement tool*: Faculty evaluations of capping course project documentation*.*
6. Educate students about the behavioral, social, and ethical aspects of technology.
   1. All courses that include a team project will include a discussion of appropriate ethical behavior when working with colleagues.
   2. All courses that involve programming will include a discussion of appropriate ethical behavior when developing software.
   3. All students will complete a 300-level ethics course as part of their core course requirements with a grade of B or better. This course will focus on the social and ethical impacts of technology on global society. *Measurement tool*: Course grades.

***Course Goals, Objectives and Assessment***

In this course, students will learn to:

* Manage information systems projects using formal project management methods.
* *Assessment:* Labs, exam, reading, project
* Relates to Program Goals # 2, 3, 4
* Articulate various systems acquisition alternatives, including the use of packaged systems (such as ERP, CRM, SCM, etc.) and outsourced design and development resources.
* *Assessment:* Reading, class discussions
* Relates to Program Goals # 2, 3
* Use contemporary CASE tools for the use in process and data modeling; Design, implement and evaluate effective computer interfaces.
* *Assessment:* Labs, homework, exam, reading, class discussions, forums, project
* Relates to Program Goals # 2, 3, 4, 5
* Understand the concepts of user differences, experience and collaboration as well as how to design contextually.
* *Assessment:* Reading, class discussions, labs, exam, project
* Relates to Program Goals # 2, 3, 4, 5
* Understand the basic cognitive psychology issues involved in HCI.
* *Assessment:* Reading, labs, class discussions, forums
* Relates to Program Goals # 2, 3, 4, 5
* Understand the different devices used for input/output and the issues associated with these devices.
* *Assessment:* Reading, class discussions
* Relates to Program Goals # 2, 3, 4
* Interact with the software design process in order to create computer interfaces.
* *Assessment:* Labs, exam, project
* Relates to Program Goals # 2, 3, 4, 5
* Understand the role of theory and frameworks in HCI.
* *Assessment:* Reading, class discussions, forums
* Relates to Program Goals # 2, 3, 5
* Apply a number of design techniques.
* *Assessment:* Reading, class discussions, forums, project
* Relates to Program Goals # 2, 3, 4, 5
* Apply contemporary techniques to evaluate computer interfaces.
* *Assessment:* Reading, class discussions, forums, project
* Relates to Program Goals # 2, 3, 4, 5
* Compare the acquisition alternatives systematically.
* *Assessment:* Reading, class discussion
* Relates to Program Goals # 2, 3
* Incorporate principles leading to high levels of security and user experience from the beginning of the systems development process.
* *Assessment:* Reading, class discussions, forums
* Relates to Program Goals # 2, 3
* Design high-level logical system characteristics (UI design, of data and information requirements).
* *Assessment:* Reading, class discussions
* Relates to Program Goals # 2, 3, 4, 5
* Analyze and articulate ethical, cultural, and legal issues and their feasibilities among alternative solutions.
* *Assessment:* Reading, class discussion, forums
* Relates to Program Goals # 3, 6