CIS360.002 Systems Analysis & Design

Fall2022

Professor: Dr. Jon D. Clark
Email: jon.clark@colostate.edu
Office: Rockwell 151
Class Meeting Time & Location: Mon./Wed. 2:00-3:15 p.m., Rockwell 139
Office Hours: by appointment
Course Teaching Assistant email: TBA
Prerequisites: CIS240 (or equivalent)

Course Description & Objectives

There is considerable overlap between the Information Systems (IS), Computer Science, and Software Engineering disciplines. What makes IS unique is the emphasis on the development, implementation, and evolution of information technology (IT) systems and infrastructures to support *organizational goals*, such as reduced operating costs, improved productivity, innovation, and speed to market. The successful development and implementation of these systems and infrastructures depends, in large part, on the quality of analysis and design activities. CIS360 introduces the systems development life cycle and methodologies, with an emphasis on analysis and design activities, such as business process analysis, system requirements determination and specification, user interface design, and implementation alternative evaluation (e.g., custom in-house development, outsourcing, and cloud-based solutions). The overall goal of the course is for you to develop the *knowledge and skills expected of an IT consultant, systems analyst, or business analyst*. Systems analysis and design skills are also important for many other IT careers, such as information security analyst, project manager, software developer, user experience designer, web content manager, and data scientist.

Course Materials & Resources

Canvas. It is your responsibility to monitor Canvas (http://info.canvas.colostate.edu/login.aspx) on a daily basis. I use Canvas heavily for posting due dates, assignments, grades, class notes, etc. Class slides will generally be posted one or two days before class. The purpose of class slides is to outline key points and set up examples that will be discussed in class (i.e., they are not a substitute for taking good notes!). Changes to the syllabus, the course schedule, lecture topics, etc., will be posted to Canvas as/if needed.

Required Readings. There is no textbook for this course. A list of required readings or other materials (e.g., videos) will be posted on Canvas.

Software Tools. *Microsoft Visio* to create Unified Modeling Language (UML) diagrams and *PowerPoint storyboarding tools* for user interface design. This software is available in the Rockwell Hall computer labs (rooms 37-38) and via College of Business eLab Remote Desktop (browse to https://secure.colostate.edu). You are not required to use these specific tools for modeling and user interface design, but these are the ones that I will use in class.

COVID-19 Resources.

Important information for students: All students are expected and required to report any COVID-19 symptoms to the university immediately, as well as exposures or positive tests from a non-CSU testing location.

If you suspect you have symptoms, or if you know you have been exposed to a positive person or have tested positive for COVID, you are required to fill out the COVID Reporter (https://covid.colostate.edu/reporter/). If you know or believe you have been exposed, including living with someone known to be COVID positive, or are symptomatic, it is important for the health of yourself and others that you complete the online COVID Reporter. Do not ask your instructor to report for you. If you do not have internet access to fill out the online COVID-19 Reporter, please call (970) 491-4600. You may also report concerns in your academic or living spaces regarding COVID exposures through the COVID Reporter. You will not be penalized in any way for reporting. When you complete the COVID Reporter for any reason, the CSU Public Health office is notified. Once notified, that office will contact you and, depending upon each situation, will conduct contact tracing, initiate any necessary public health requirements and notify you if you need to take any steps.

For the latest information about the University's COVID resources and information, please visit the CSU COVID-19 site: https://covid.colostate.edu/.

Assessment

Grade Distribution

Your course grade will be determined from the assessments and weights listed below.

Exams (60%)	Exam 1	100
	Exam 2	100
	Exam 3 (comprehensive)	100
Team Project* (20%)	D1 - Team charter	10
	D2 - Progress report and meeting	15
	D3 - Software requirements	35
	D4 - User interface demonstration	40
Assignments (20%)	Reflection paper 1	15
	Reflection paper 2	15
	Others (exercises, discussions, etc.)	70
Total		**500**

*Peer evaluation will be used to determine each student's individual Team Project grade (more on this below).

Grading Scale

I use the following modified +/- system for final course grades.

93%	≤	A	=	100%
90%	≤	A-	<	93%
87%	≤	B+	<	90%
83%	≤	B	<	87%
80%	≤	B-	<	83%
77%	≤	C+	<	80%

70%	≤	C	<	77%
60%	≤	D	<	70%
0%	≤	F	<	60%

Rounding Grades

The cutoff points for determining the final grade are strictly enforced. I will calculate the final grades to 2 significant digits and then add one rounding point to your grade. If, after your grade is calculated, your final points sum up to 88.99, I will then add the one rounding point to your score. Your grade (89.99) would be B+ for the course. If after your grade is calculated your final points sum up to 89.00, I will add one rounding point to your score. Your grade (90.00) would be A- for the course. (This is actually preferable to rounding since it gives you the opportunity for 1 point as opposed to the 0.5 points maximum that you would get if grades were rounded in a more traditional manner).

Assessment Categories

Exams. Exams are designed to test your individual mastery of the course material in a controlled setting. Exams consist of closed- and open-ended questions and problems. The final exam is comprehensive. Exam dates are listed in the class schedule and are not expected to change.

If you miss an exam for a valid and documented reason, the points from the missed exam will be allocated to the final exam (i.e., I generally do not write make-up exams). In the case of a missed final exam, a special makeup exam might be given or other arrangements decided by the professor might be made no later than one week after the exam. Even with a valid and documented reason, failure to provide a **timely** notification may lead to a zero grade:

- If you must miss an exam for a valid and documented reason (e.g., jury duty, a universitysanctioned excuse), let me know at least 72 hours *prior to* the exam.
- In the case of a documented emergency causing a student to miss an exam, let me know as soon as possible.

Permission to take a make-up exam will be given only for documented, extreme circumstances. Parking problems, alarm malfunctions, or vacation travel conflicts are not valid reasons. In fairness to all students, valid absences need to be documented. This means that, for example, if you are sick with the flu on exam day, you need to go to a doctor because you will need a note from him/her to justify your absence.

Exercises. Exercises are short, individual or group assignments that are completed during a class session or before class. For example, an exercise may ask you to summarize key points from a guest speaker presentation, or to work in a small group on a modeling problem. There will be about 6-10 exercises over the course of the semester. Because the purpose of some exercises is to encourage class attendance and provide quick feedback, late submissions will not be accepted.

Other Assignments. There are other written assignments due throughout the semester (see the class schedule). These assignments encourage you to keep up with the assigned readings or practice skills that are not explicitly covered in the team project (described below). They also provide quick feedback on the material and prepare you for the exams. Assignment details will be posted on Canvas, generally a week before they are due. Submit your assignments on Canvas by the deadline. A 10% penalty will be assessed for each calendar day that the submission is late.

Team Project. In practice, systems development is a team effort. In CIS360, you will work in a team on a real-world business case assigned by the professor. You will take on the role of consultants who have been hired by a client to do the front-end work on a systems development project. This includes analyzing the business problem, identifying opportunities to address the problem with a new or improved information system, determining and specifying the requirements for the information system, creating a user interface mock-up for the new system, and presenting your mock-up to the class. You will NOT build or implement the new system.

You may self-select your team of 4-5 members. If you want us to assign you to a team, submit the Team Membership Request form (on Canvas) by the date specified in the Course Schedule. The project will start in the 3rd week of class. Choose your team members carefully, as you will be working together for most of the semester.

The project grade is based on two major client deliverables (i.e., a software requirements document and a user interface mock-up & demonstration) and two minor deliverables (i.e., a project charter and a progress report/meeting). The minor deliverables exist to discourage procrastination and encourage high quality major deliverables. See the class schedule and Canvas for due dates. A 10% penalty will be assessed for each calendar day that a deliverable is late. There are no make-ups for missed demonstrations or progress report meetings.

At the end of the project, you will evaluate your team members' contributions to the project. Individual project grades will be adjusted based on these peer evaluations, so that your individual grade may be lower than, the same as, or higher than the overall group grade. The deliverables and the peer evaluation process are described below. Relevant forms and due dates are posted on Canvas. All written deliverables should be submitted on Canvas.

Minor Deliverable (D1): Team Charter. Each team submits a team charter, using the form posted on Canvas. The charter specifies, among other things, team goals and the criteria you will use to evaluate each other at the end of the project. All members must sign and date the charter and submit it on Canvas.

Minor Deliverable (D2): Progress Report & Meeting. Each team submits a progress report and signs up for a 15-minute meeting with me to review and get feedback on your work-in-progress. The progress report must be submitted on Canvas prior to your meeting on the date specified on Canvas (regardless of your actual meeting date). The progress report provides a mechanism for me to give your team feedback about your work-in-progress (toward the major Software Requirements Document deliverable) and an opportunity to address group performance issues, if applicable. Obviously, the more work you provide in your progress report, the more helpful the feedback you will receive. The work-in-progress must include, at a minimum:

- Overall team assessment (use the form posted on Canvas)
- Draft of stakeholder analysis (see the "Stakeholders" section of the Requirements Document template)
- Use Case Diagram, along with a brief description of each use case and actor (see the "Statement of Scope & Requirements Overview" section of the Requirements Document template)
- Activity Diagram (see the "Statement of Scope & Requirements Overview" section of the Requirements Document template)

One week has been set aside for me to meet with each team and review your work-in-progress. Each team signs up for one 15-minute meeting that week (in lieu of holding our regular class).

Major Deliverable (D3): Software Requirements Document. The software requirements document is the culmination of the requirements-determination and modeling portion of the course and includes: the business case, statement of scope, non-functional requirements, detailed use case descriptions, UML diagrams, and glossary for the project. Each team submits a Requirements Document, using the template provided, on Canvas. I will use the grading rubric posted on Canvas to evaluate your reports.

The requirements document must be presented in a professional manner. Remember that you are assuming the role of (highly paid) consultants and the deliverable may be scrutinized by the client. A professional report should, at a minimum:

- Include a cover page for the report.
- Include a table of contents with accurate page numbers.
- Include a glossary of terms/acronyms used in the report, if needed.
- Include diagrams that are embedded into the body of the document, with diagram titles/labels.
- Be spell checked and proofread.
- Use consistent and clear formatting.
- Use a professional tone.

Major Deliverable (D4): User Interface Prototype and Demo. The user interface prototype shows how you would design the user interface to support the use cases specified in your Software Requirements Document. The prototype should be an animated mock-up that illustrates the interactions between a user and the web site. I recommend using PowerPoint's storyboarding features for designing and animating your user interface, but you may use whatever tool you choose, so long as the file will work when you present it.

Two class periods will be set aside for teams to present their user interface designs to the class (see the syllabus for dates). Use the sign-up sheet posted on Canvas to choose your team's slot. The requirements for the presentation are:

- All teams submit their demo file on Canvas on the date specified in the syllabus (regardless of your actual presentation date).
- Demonstrations are 9-12 minutes long. You will need to rehearse/practice to get the timing right.
- All team members contribute to the demo in some manner, but it does not have to be in the same manner (e.g., have one member be the navigator on the computer while other members talk).
- The demo covers all of the detailed use case descriptions in your Software Requirements Document (unless otherwise specified) and should adhere to the user interface design guidelines discussed in class and assigned readings.

Teams will be evaluated both on the quality of their user interface and on their presentation skills. The grading rubric posted on Canvas will be used to evaluate your presentations.

Class Expectations

Academic Integrity & CSU Honor Pledge: This course will adhere to the CSU Academic Integrity/Misconduct policy as found in the General Catalog and the Student Conduct Code. All the work that you do in this class should be your own work with originality and without sharing academic work unless a group assignment has been given. Examples of academic dishonesty include (but are not limited to) paraphrasing/quoting content without referencing the source, unauthorized sharing of exams,

receiving unauthorized assistance or working as a group on a take-home exam, or lying to extend the due date. For more information on academic integrity, check out CSU's Academic Honesty and Integrity.

Academic integrity lies at the core of our common goal: to create an intellectually honest and rigorous community. Because academic integrity, and the personal and social integrity of which academic integrity is an integral part, is so central to our mission as students, teachers, scholars, and citizens, I will ask that you affirm the CSU Honor Pledge as part of completing your work in this course.

> ***The use of online "homework helper" sites including, but not limited to, Chegg, NoteHall, Quizlet, and Koofers is not permitted in this course. Use of these types of resources will be considered receiving unauthorized assistance and, therefore, a violation of the student conduct code.***

Although I do not expect it to happen in this class, students engaged in academic misconduct will be penalized. Depending on the degree of misconduct, penalties range from failure on an individual assignment to failure of the course to expulsion from the University. Refer to the CIS Department's Academic Integrity Policy (posted on Canvas under the "Syllabus" section) for more details. Questions related to course assignments and the academic integrity policy should be directed to the professor.

Attendance: I do not take attendance in class, and attendance, per se, is not part of your grade. However, note that there are assessments based on in-class activities that cannot be made up or turned in late. Also, keep in mind that absence in class (except those with documented legitimate reasons) is not a reasonable explanation for missing the content, including announcement, which were covered that day. If you are absent, you are responsible for obtaining the information you missed***.***

Changes to Due Dates: I will do my best to stick to the scheduled due dates for assignments, exams, etc. Such dates are in Mountain Time, unless otherwise specified. I particularly try not to change the dates for exams so that you can plan your schedules accordingly. Any changes that are made will be announced in class and posted to Canvas. It is your responsibility to ensure that you are aware of any such changes.

Technology Issues: It is your responsibility to make sure that your computer-based work is regularly saved and your online submission by deadline is successful. You should keep backup copies of your work (you are required to own media on which you backup your work). If technical problems make a duly submitted copy unreadable, you will be required to submit a backup with proper time stamp to have the work graded. Additionally, penalties in grading may also be taken depending on the nature of the problem. If you have no backup copy or your backup copy is unusable, you earn a grade of zero (0) for that assignment.

Professionalism: I expect you to participate in class activities in a mature and appropriate manner. Behaviors that are disruptive or distracting to the class will not be tolerated. This policy is not meant to stifle honest and frank academic discussions; it is meant to foster a respectful and productive learning environment.

Grade Discussion: Grades will be posted to the course Canvas site. It is the student's responsibility to check the Canvas web site to monitor his or her own grades. IMPORTANT: Notification of intent to discuss any grade must be received in email within two weeks of the grade postings. After two weeks, I will assume that you agree with our assessment and consider the grade final. To appeal, prepare a written statement detailing why you think the grade is unfair. Be sure to document your reasons. Stating simply that you feel you "deserve" a higher grade is not sufficient grounds for appeal. Submit the written

statement along with the graded material (if appropriate). I will consider your complaint and make a decision. Re-evaluation will entail re-examining the entire report, assignment, or exam, and could result in score changes (i.e., increase or decrease) for each component of the assigned deliverable. You will be notified in writing of our decision. Grade litigation must be done in person via an office appointment scheduled through email.

Documented Disability: Ensuring equal access to educational opportunities for all students is important to me. If you experience a disability or chronic illness (or even suspect that you do) and would like information about support services, please contact Resources for Disabled Students (http://www.rds.colostate.edu). If you are a student who will need accommodations in this class, please make an appointment to see me to discuss your individual needs. Any accommodation must be discussed in a timely manner prior to implementation. A verifying letter from Resources for Disabled Students may be required before any accommodation is provided.

Disclaimer: I reserve the right to deviate from the schedule, and any changes to the schedule will be posted on Canvas and/or communicated by email. It is your responsibility to remain up-to-date. The scheduled dates for exams and other assessments are subject to change, but changes first will be discussed in class. Students are expected to attend classes and are responsible for obtaining information from missed classes from other students (including changes to due dates and assignments) and Canvas.

Detailed Course Objectives

As stated earlier, the overall goal of the course is for you to develop the *knowledge and skills expected of an IT consultant, systems analyst, or business analyst*. The specific learning objectives for the course are listed below.

Part 1: Introduction to Systems Analysis & Design

1. Explain systems analysis and systems design, and understand the importance of systems analysis and design.
2. Explain what systems analysts do, what knowledge and skills they need and why, Define the job scope of systems analysts, identify the three sets of knowledge and skills that systems analysts need, and explain how a systems analyst should apply ethics to their work.
3. Describe the systems development life cycle (SDLC) and the main activities and deliverables of each phase.
4. Explain, and compare and contrast, traditional (waterfall) and agile systems development approaches.
5. Explain two specific systems development approaches — Unified Process (UP) and Scrum.
6. Explain systems development concepts such as iterative and incremental development, “walking skeleton”, and minimal viable product (MVP).

Part 2: Systems Analysis

7. Analyze an existing business process to identify opportunities for IT-enabled improvements to the process and stakeholder needs, and determine project risk and feasibility.
8. Explain UML Activity Diagram concepts and notation, and interpret a given Activity Diagram.
9. Create a UML Activity Diagram for a given business workflow and analyze it to identify areas for ITenabled improvements.

10. Use stakeholder needs to determine and document the system requirements for a new/improved information system.
11. Explain what system requirements are, where they come from, why they are important to system development/implementation projects, and the difference between functional and non-functional requirements.
12. Identify major categories of non-functional requirements.
13. Explain UML Use Case Diagram concepts and notation, and interpret and evaluate a given Use Case Diagram.
14. Create a UML Use Case Diagram to define the scope of a system.
15. Explain the components of a use case description (e.g., actors, brief description, basic flow, alternate flows).
16. Write brief and detailed use case descriptions for each use case in a given Use Case Diagram (for detailed descriptions, including fully specified primary pathway, alternate pathways, non-functional requirements, preconditions, and post conditions).
17. Create supporting documentation for requirements models (e.g., glossary).
18. Explain advanced UML Use Case Diagram concepts (includes and extends) and how they relate to use case descriptions, and modify/extend a given Use Case Diagram incorporating these concepts as needed.
19. Explain UML Class Diagram concepts and notation, and interpret a given Class Diagram.
20. Create a UML Class Diagram to support a set of use cases.
21. Evaluate a given set of requirements models (including a Use Case Diagram, detailed use case descriptions, and a Class Diagram), individually and across these models, to identify and correct inconsistencies and errors as needed.
22. Use the CRUD matrix technique to assess the completeness of use case modeling.

Part 3: Systems Design

23. Explain basic concepts and principles of user interface (UI) design (e.g., affordance, visibility, feedback, consistency, discoverability, closure, readability), and why UI design is important.
24. Evaluate a given user interface by applying the principles of user-interface design and recommend improvements.
25. Design a user interface that follows user interface design principles and guidelines to support a set of use cases.
26. Translate analysis Class Diagrams (e.g., UML Domain Class Diagram) into design Class Diagrams (e.g., a relational database schema).
27. Explain UML Sequence Diagram concepts and notations, and interpret and evaluate a given Sequence Diagram.
28. Create a UML Sequence Diagram, given the appropriate requirements models, and the corresponding design Class Diagram.
29. Generate test cases, given a set of use cases and corresponding Class Diagram.
30. Compare and contrast sourcing strategies, such as in-house development vs. packaged software, outsourcing, and cloud computing.
31. Identify and evaluate alternative sourcing strategies for a given business situation, make appropriate recommendations, and be able to defend those recommendations.

In addition to the above content-specific objectives, you should be able to:

32. Communicate your work professionally and effectively, both orally and in writing, via high-quality work products.
33. Demonstrate teamwork, integrity, modeling skills, and creativity.

Tentative Class Schedule

The following schedule reflects my best estimate, but is subject to change. Check Canvas often!

Date	Topic	What's Due (Due dates posted on Canvas)
Week 1 8/22/22	Course Overview Systems Analyst	
Week 2 8/29/22	Systems Development Life Cycle Systems Development Approaches	☐ Reflection Paper 1 ☐ Team Membership Request (*optional*)
Week 3 9/5/22	Project Initiation & Planning Investigating System Requirements	☐ Reflection Paper 2 ☐ Team Project D1
Week 4 9/12/22	Process Modeling: Activity Diagram	
Week 5 9/19/22	Use Case Modeling: Use Case Diagram Review for Exam 1	
Week 6 9/26/22	**No class:** Team Meetings with professor	☐ Team Project D2 and Meetings
Week 7 10/3/22	**Exam 1** Use Case Modeling: Use Case Description	
Week 8 10/10/22	Use Case Modeling: Use Case Description Domain Modeling: Class Diagrams	
Week 9 10/17/22	Domain Modeling: Class Diagrams Review for Exam 2	
Week 10 10/24/22	Transition to Design Models **Exam 2**	
Week 11 10/31/22	User Interface Design	
Week 12 11/7/22	User Interface Design Sourcing and Testing	Team Project D3
Week 13 11/14/22	Test Case Design Review for Exam 3	
Week 14 11/21/22	**Fall Break**	

Week 15 11/28/22	**Exam 3**	
Week 16 12/5/22	User Interface Demonstrations	Team Project D4 and Demo Peer Evaluation