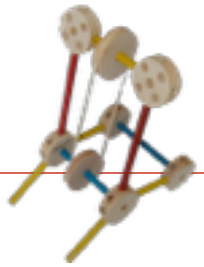
CS630 Syllabus



Course Title: **Object-Oriented Systems Analysis and Design**

Course Description:

This course prepares the student for systems development in the object-oriented paradigm. Students learn the theory and methods of the object-oriented modeling and the fundamentals of object-oriented development process models. The focus is on requirements analysis, systems analysis and domain analysis, and their documentation with standard object-oriented specification tools (particularly the Unified Modeling Language). Hands-on projects give the students an opportunity to practice their modeling skills and illustrate an effective integration of various modeling techniques throughout an iterative, object-oriented software project life cycle.

Prerequisites: CS 603 and CS 605

Class Meeting Time & Place: 5:00-7:20 PM Wednesday, Room: Smith 212

UPDATE

Texts:

UML Distilled, 3rd, Fowler, Addison Wesley; ISBN 0-321-19368-7

All Course Materials will be accessed at **CIS.Bentley.EDU/LWaguespack**

Optional Resource Books:

Requirements Engineering, Kotonya & Sommerville, Wiley, Chichester, West Sussex, England, ISBN 0-471-97208-8

UML 2 and the Unified Process (2nd ed), Arlow and Neustadt, Addison-Wesley, ISBN 0-321-32127-8.

Object-Oriented Analysis 2ed, Coad, Yourdan Press; ISBN 0-13-629981-4

Applying UML and Patterns 3rd Edition, Prentice-Hall: ISBN 0-13-148906-2

Software Reuse, Jacobson, Griss, Jonsson, Addison Wesley, ISBN 0-201-92476-5

Metaphors We Live By, Lakoff & Johnson, U of Chicago Press, ISBN 0-226-46801-1

Object-Oriented Information Systems, David A. Taylor, ISBN 0471543640

Object Models: Strategies, Patterns and Applications, Peter Coad, Prentice-Hall, ISBN 0-13-84-117-9

Design Patterns, Gamma et. al., Addison Wesley, ISBN 0201633612

Object Solutions, Booch, Addison-Wesley. ISBN 0-8053-0594-7

Thriving Systems Theory and Metaphor-Driven Modeling, Waguespack, Springer. ISBN: 978-1-84996-301-5

Software Tools:

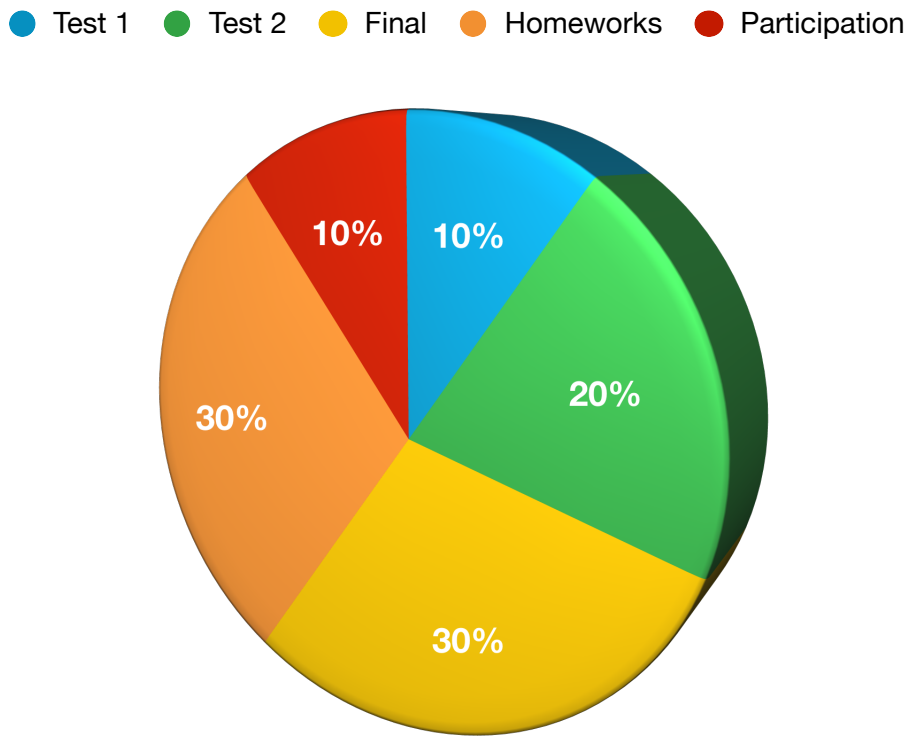
SmartDraw, PowerPoint, Word, Visio (The drawing tool with which you are most facile!)

Contact Information: Smith 412, Office: (781) 891-2584, Home: (978) 779-5322 (before 9:00 pm)

	Week of	Lecture Focus	Reading Material	notes/handouts/slides
1	1/21	Object Oriented Analysis UML Introduction	**Fowler Ch. 1-4** Lakoff&Johnson (optional)	OO Ontology OO Green Card UML - Slides One
2	1/27	Object Oriented Analysis UML Exposed	**Fowler Ch. 5-6** Arlow...[Part One] (optional)	UML - Slides Two ..;
3	2/3	UML Expanded "UML-2 Modeling Guidelines"	Arlow... [Part Three] (optional)	UML Critique Form
4	2/10	Software Development, Requirements Eng., Analysis & Design	Kotonya & Sommerville [Part One] (optional)	RE Slides One RE Slides Two
5	2/17	Requirements Engineering and Management	Kotonya & Sommerville [Part Two] (optional)	RE Slides Three RE Slides Four
6	2/24	Test #1 moved to **28 February Makeup Day**		Modeling Practice Checkbook Phase 1 Due!
7	3/3	UML Rounded out "Use Case Template (Cockburn)"	**Fowler Ch. 9,11**	UML - Slides Two . . . Checkbook Ph. 1 Return!
	3/10	Spring Break		
8	3/17	Object Oriented Database "OODBMS Fundamentals"	Object-Oriented Information Systems, Taylor (optional)	Modeling Practice Checkbook Phase 2 Due!
9	3/24	Object Oriented Management "OO Systems Engineering"	Object-Oriented Information Systems, Taylor (optional)	Modeling Practice Checkbook Ph. 2 Return DRS/DAS Phase 1 due!
10	3/31	Test #2		Modeling Practice DRS/DAS Phase 1 Return
11	4/7	Components Component "OO & Components"	**Components White paper** **What is Design?**	DRS/DAS Phase 2 due!
12	4/14	Object Oriented Design "Design Principle Origins"	**"Hammers, Nails, . . . "** Arlow... [Part Four] (optional) Useful Modeling in OO.pdf	Modeling Actions Strengthening Life.pdf DRS/DAS Phase 2 Return
13	4/21	Living Information Systems "Design Principles to Systems"	"Thriving System Properties Mapped to OO"	Phase II Feedback Q&A
14	4/28	Thriving Systems Theory and Metaphor-Driven Modeling	The Foxboro Case	DRS/DAS Final Due!
15	5/7	Final Examination (???)		DRS/DAS Final Return?

Grading Scale: 100-95:A, 90-94:A-, 87-89:B+, 83-86:B, 80-82:B-, 77-79:C+, <77:F

Grade Component Weights:
Test 1:10%, Test 2:20%, Final: 30%, Homeworks: 30%, Attendance & Participation: 10%



Ethical Conduct: Every Student is expected to be familiar with the Bentley College's Code of Academic Conduct concerning cheating and plagiarism.

This course contains group project work. Each student is required to author his/her own homework or take-home quiz materials aside from group project work. Students are expected to contribute equitably to the product(s) of the group. This does not mean that everyone will do the same work or the same amount of work. But, each student assumes responsibility for those tasks assigned to him/her through the group's cooperative structure and actively contributes to the project's products. Students are responsible for accounting for their individual contribution to the project and students are responsible for honestly and fairly assessing the relative merits of their own and their teammates' contribution if requested to do so by the instructor as in peer evaluations. If the pressures of the semester lead you to believe that cheating or plagiarism is a necessary option, please contact the instructor!

This course contains individual homework. Each student is required to author his/her own homework or take-home quiz materials. Students may assist one another only in the clarification of requirements or in the interpretation of the behavior of already authored program material. The authoring of material (programming, modeling or quiz related) for a student by anyone other than themselves is expressly prohibited and is a violation of the Bentley code of academic conduct by any and all parties involved.

Plagiarism defeats the purpose of education for the student and violates the trust between faculty member and student as well as the trust that should coexist between students. If the pressures of the semester lead you to believe that group project "absenteeism" is a necessary option, please contact the instructor! There must be a better arrangement to defuse the situation that can be worked out without violating the Bentley code of academic conduct and risking academic sanctions.

Course Overview:

As is usually the case in any graduate topic area, there is far more material worth study than can be condensed and delivered in a single course. But, we're going to give it a big league try! Object orientation as a paradigm is impacting virtually every aspect of information system formation and construction.

At its core, object orientation is grounded in modeling, the precise specification and documentation of concrete and abstract characteristics and relationships in systems. We begin our journey through OO with the object-oriented ontology, the theory, vocabulary and principles that define OO.

Once we have the core concepts defined the course will begin to address the approach that has been adopted as the standard for documenting object-oriented models, UML. As OO modeling is our pedagogical imperative in this phase of the course we shall defer the much broader swath of process and data modeling features that UML encompasses until the object modeling concepts have enjoyed center stage and the student has developed some skill in object modeling some basic IS cases. UML has emerged as the de facto standard of IS modeling related to object orientation. Using Fowler's text we will survey UML focusing on the object modeling experience. UML formally defined consumes more than 1000 pages of description. Hence, our "distilled" survey provides the foundation (not the achievement) of eventual expertise in UML based modeling in this course.

To consider the engineering of information systems based upon OO concepts we must explore the emerging architectural philosophy of components. Using a concise white paper prepared for developers who are constructing components for commercial distribution we will examine the potential and challenges of components as a basic premise for designing, implementing and deploying web based, enterprise wide, organizational and inter-organizational information systems.

Several optional texts are noted that can provide greater depth and breadth for the student interested in “expanding their object-mind.” At the core of object modeling and the promise of organizational knowledge reuse are the concepts of inheritance and polymorphism. The ability to construct mechanisms that may be reused to perform similar but different tasks effectively depends on modeling business rules and features by focusing on abstract similarities. This is sometimes called "object think." Achieving "object think" is the one, greatest obstacle on the object modeling learning curve. Lakoff and Johnson, a linguist and philosopher, have crafted a masterful discourse describing the role of metaphor not only in language, but in learning, knowledge and reasoning. As the primary role of modeling is the capture and then communication of knowledge, their book is a remarkably effective lesson in "object think."

CS630 is an aggressive and wide ranging treatment of object orientation as a foundation for 21st century component based, enterprise wide, web enabled information systems architecture. This course is not a tutorial. Large amounts of material, particularly through the required texts and assigned readings, will be left to the student to absorb and synthesize outside of the available lecture time. We will use the lectures to hone concepts and explore the breadth and depth of impact that the OO paradigm is having on information systems and organizations.

Project Overview:

Drawing tool(s) and OO development environment come into play in the project dimension of the course. I will assign students to "task groups" of 3 to 5 students to work on the course projects. My assignment will be based on what I know of your background and MSIT orientation. To improve what I know of these you are asked to complete a questionnaire which is attached to this syllabus. I will attempt to balance each group with experience both professionally and in terms of systems development. As you can see from the distribution of credit in grade components these projects are quite important and individual contribution to the team's work is necessary.

The first two projects should require about two weeks of work to complete once the initial learning curve with the UML has been overcome. The first is an OO Analysis project where the team will be required to perform a systems analysis on designated problem, document the analysis diagrammatically and in prose using whatever desktop publishing or CASE tools you may wish. A detailed description of the required content of the project report is forthcoming.

The second project is one of the following two (at the instructor's option): a full object oriented development prototype of the chosen problem or a technical report on some aspect of object orientation's impact on the software industry (e.g. is object orientation compatible with relational database or not?!).

This project discussion is provided here to give the incoming student some perspective on the course work required and the effort investment that will ensue. However, in the spirit of “agile development processes” the actual structure and composition of the projects may well change during the course ot the semester, but the effort investment will be consistent with the outlines herein. Detailed descriptions of the projects and their required output will be distributed well in advance of their due dates.

Dr. Waguespack's Office Schedule SMI 412

Office Schedule	monday	tuesday	wednesday	thursday	friday
"A" 8:30-9:45					
"B" 9:55-11:10	appointment only / meeting				
"C" 11:20-12:35		Valente Seminar	Faculty Senate		
"D" 12:45-2:00					
"E" 2:10-3:25	CS605_1DA Smith 212	appointment only / meeting	CIS Meetings		
"F" 3:35-4:50					
5:00-6:15					
5:00-7:20			CS630_100 Smith 212		
6:30-9:00					
7:30-9:50					

Professional Day

scheduled class	scheduled meeting	Dr. Waguespack may be in his office preparing classes or pursuing private research; please arrange appointments during these times in advance!

CIS Learning Team Skills/Assignment Questionnaire

This course requires team and out of class laboratory work. In order to broaden the experience of the class members and allow for a collaborative learning environment each student will be assigned to a learning team. That team will accomplish the required laboratory assignments as a group and receive an evaluation for the completed work that will be attributed to each of the learning team members. The following questionnaire elicits academic and professional experience information that will be used to formulate the learning teams with balanced skills and experience. Please respond accurately and frankly.

Name (print): _____

Student Number: _____ Course Number: _____ Section: _____

Bentley E-Mail Address: doe_matt@bentley.edu

Please volunteer your grades for all CIS courses taken or satisfied by other academic work:

CS603:_____ CS605:_____ CS607:_____ CS610:_____ CS612: _____ CS650: _____

CS180:_____ CS280:_____ CS240:_____ CS360:_____ CS350: _____ CS402: _____

CS440:_____ CS460:_____ CS480:_____

Mark all computing tools listed that you are fluent using:

Word Processer: ___ Spreadsheet: ___ Schedule Manager: ___ Multi-Media Editor: ___

Mark all programming languages listed that you have written programs using:

C:___ C#:___ C++:___ Java:___ ASP:___ SQL:___

MSAccess:___ JavaScript:___ Visual Basic:___

SmallTalk:___ Eiffel:___ x.Net:___ Other: _____

Have you written a program that is regularly used by others? ___

How would you rate your skill in programming? Self-Sufficient: __ Could Contribute: __ Need help: __

Do you have project experience? Yes/No:____

Have you been a manager? Yes/No:____

Please note any additional information below that would help the task group assignor in best placing you on a learning team:

_____

_____

_____

_____