CMSI 644 ADVANCED MODELING OF SOFTWARE SYSTEMS
3.0 units
Dr. Stephanie E. August -- saugust@lmu.edu
Course Description

Objectives
The primary objective of this course is to study model-driven engineering and its ability to alleviate platform complexity and effectively express domain concepts. The course explores techniques for designing, implementing, and maintaining robust software systems; established modeling tools such as the unified modeling language (UML), entity relationship modeling (ERD), and object-role modeling (ORM); cognitive models for representing human thought process; languages that reduce the complexity of developing modern platforms; automation of change evolution in models; and definition of standards that enable tools and models to work together. Students will examine software models as a basis for system simulation and automated checking of models. The secondary objective of the course is to gain hands-on experience with Embarcadero's ER/Studio database design tool, UML, and ORM, and to consider modeling requirements for virtual worlds.

Learning Outcomes
At the completion of this course, the student will know how to create a data model for an enterprise using an entity relationship diagram; a system model using the Unified Modeling Language; a conceptual using object-role modeling; a cognitive model of human thought process; and know how to express these in executable code.

Prerequisites
Experience with the software development process. Willingness to participate actively in class discussions.

Expected Work
Four major written assignments and associated presentations to reinforce lectures and readings, plus frequent minor oral presentations and class discussions.

Course materials include weekly readings from a variety of sources. All readings should be completed prior to lecture.

Term project related to the course topic that incorporates working knowledge of the modeling techniques studied (models and report) and an annotated bibliography of course readings, and a formal oral presentation of the project to the class.

This is an interactive class. Students are expected to actively participate in class discussions and activities, to contribute to the quality of class discussions and activities, and to make both formal and informal oral presentations.

Oral presentations should use PowerPoint slides or similar technology. A paper copy of each presentation, four slides per page in landscape orientation, should be given to the instructor prior to each oral presentation.

ADVANCED MODELING OF SOFTWARE SYSTEMS: COURSE DESCRIPTION

MyLMU|Connect will be used to distribute course updates, assignments, and documents. Students are expected to check the course MyLMU|Connect Blackboard twice a week and make certain they receive email from the email address listed for them on Blackboard.

Exams

The final exam consists of the term project and final presentation.

Reading List

France, R. and Rumpe, B. 2007. Model-driven Development of Complex Software: A Research Roadmap. *2007 Future of Software Engineering* (May 23 - 25, 2007). International Conference on Software Engineering. IEEE Computer Society, Washington, DC, 37-54. DOI= http://dx.doi.org/10.1109/FOSE.2007.14

Margaria, Tiziana and Steffen, Bernhard. Continuous model-driven engineering. *Computer*.42:10, Oct. 2009, pp. 106 - 109.

Pham, H. N., Mahmoud, Q. H., Ferworn, A., and Sadeghian, A. 2007. Applying Model-Driven Development to Pervasive System Engineering. *Proceedings of the 1st international Workshop on Software Engineering For Pervasive Computing Applications, Systems, and Environments* (May 20 - 26, 2007). International Conference on Software Engineering. IEEE Computer Society, Washington, DC, 7. DOI= http://dx.doi.org/10.1109/SEPCASE.2007.2

Schmidt, Douglas C. Guest Editor's Introduction: Model-Driven Engineering. *Computer*, vol. 39, no. 2, pp. 25-31, Feb. 2006, doi:10.1109/MC.2006.58

Steffen, Bernhard. Continuous model-driven engineering. *14th IEEE International conference on Engineering of Complex Computer Systems*. 2-4 June 2009, pp. xi-xi.

Dr. William Swartout's video on Immersive Environments; available on video.google.com

Zobel, Justin. *Writing for Computer Science.* 2nd edition. Springer, 2004. ISBN 978-1852338022

Additional assigned readings will be distributed in class or made available online.

Additional References

The Chicago Manual of Style. 15th edition. University of Chicago Press, 2003. 978-0226104034

Connolly, Thomas; Begg, Carolyn E.; and Begg, Carolyn. *Database Systems: A practical approach to design, implementation and management.* 4th ed. Addison-Wesley, Harlow, England, 2004. ISBN 978-0321210258

Elmasri, Ramez and Navathe, Shamkant B. *Fundamentals of Database Systems.* 5th ed. Addison-Wesley, Reading MA, 2006.

Halpin, Terry and Morgan, Tony. *Information Modeling and Relational Databases.* 2nd ed. Morgan Kaufman, 2008. ISBN 978-0123735683

Pilone, Dan and Pitman, Neil. UML 2.0 in a Nutshell. 2nd ed. O'Reilly Media, Inc. 2005. ISBN 978-0596007959

Grading

Your final grade will be weighted as follows:

Participation	20%
Assignments	40%
Project Report and presentation	40%

Refer to the *Teaching Philosophy and Course Policies* handout for additional information.

Office Hours/Contact Points

Office Hours: Wednesday, 10:30 a.m. - 2:45 p.m. (except on department meeting days)

Tuesday and Wednesday, 5:20 - 6:20 p.m.

and *by appointment.*

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