Description
The following course description is excerpted from the Graduate Course Catalog:
“Engineering practices of formalized models as the basis for analyzing and specifying software artifacts. Topics include key software engineering skills required for formal modeling, techniques for model building and analysis, and applications of formal modeling techniques in the requirements, design, and implementation phases of software development.”

Objectives
Model Driven Development (MDD) is an emerging but controversial topic both in academic software engineering research and in industrial practice. It shifts the focus of software development from writing code to building models, for example, by automatically generating code from models. The key assumption of MDD is the existence of an appropriate model—a representation that is sufficiently general to capture the semantics of many different domains, yet precise enough to support eventual transformation into code. This course will provide an overview of MDD and show how to apply MDD to software development in practice using UML and Java. The students are expected to gain a hands-on experience on building precise models that can be used as a basis of MDD, validating them, and transforming them to implementations by exploring recent advances in MDD and related areas, including

- Model-Driven Architecture (MDA)
- Unified Modeling Language (UML)
- Object Constraint Language (OCL)
- Model specification, validation and transformation
- Design techniques for MDD (e.g., design patterns)
- Web application development using MDD

To this end, the specific learning objectives of this course are:

- Understanding the concepts, principles, and theories of MDD and MDA
- Detailed knowledge of UML and OCL, and ability to apply them to precisely model and specify systems of moderate size
- Understanding correctness properties of models and knowledge of proof techniques which are used to check these properties
- Being able to use various UML models and other design techniques to define designs of moderate-sized systems
- Understanding different kinds of model transformations and being able to apply them to systems of moderate size
- Understanding how to generate Java implementations from models and being able to carry out such implementations for systems of moderate size
- Being able to specify, design and implement medium-sized web applications using MDD and Java

Textbooks
The textbook of this course is:

Note that this textbook is out of print by the publisher and its copies may not be available from the UTEP bookstore, but you can still purchase a copy from online stores such as Amazon.

We will also use research papers, reference manuals, and other on-line documents as course material. The following books are also recommended as supplementary texts:

- Any UML textbook covering UML 2.x features, e.g.,

**Exams**

There will be one mid-term exam and a final exam. The mid-term exam will take place during the regular class session and will be 80 minutes in length.

**Assignments**

There will be two types of assignments: in-class presentation and written homework assignments. You are expected to read and present some research papers related to course topics. The number of presentations will be one or two depending on the class size. A suggested list of papers is found at the end of this syllabus. The list is tentative, as the detailed course topics and specific interest will be decided as the course progresses. There will be occasional written homework or programming assignments. All assignments shall be done individually unless otherwise specified.

**Projects**

You should do a small semester-long project. The purpose of your project is to apply course topics to your own research or project and also to explore the current research problems or issues in the topic’s areas. Sample project topics will be suggested by the instructor. You are expected to write a project proposal, submit a final project report, and present the result in class.

**Grading**

Your grade is independent of anyone else’s grade; that is, you are not graded on a curve. Everyone can get an A in this course. The purpose of grading is not to rank you, but to uphold a standard of quality and to give you feedback. The final letter grade will be based on a combination of assignments, project, exams, and class participation. The approximate percentages are as follows:

- Assignment: 30%
- Project: 35%
- Exams: 35%

There are also up to 5% bonus points for class attendance and participation. To earn this, you must arrive at lecture on time and participate in class discussion in a constructive and prepared manner, e.g., by asking or answering questions that demonstrate that you have read and attempted to understand the material.
The nominal percentage-score-to-letter-grade conversion is as follows:

- 90% or higher: A
- 80-89%: B
- 70-79%: C
- 60-69%: D
- below 60%: F

I reserve the right to adjust these criteria downward, e.g., so that 88% or higher represents an A, based on overall class performance. The criteria will not be adjusted upward, however.

**Attendance**
Class attendance is not mandatory but is recommended. You should understand that your success in the course will improve greatly by attending class regularly. It is your responsibility to keep up to date with notes, assignments and projects.

**Standards of Conduct**
You are expected to conduct yourself in a professional and courteous manner, as prescribed by the UTEP Standards of Conduct. Graded work (homework, projects, exams) is to be completed independently and should be unmistakably your own work, although you may discuss your work with others in a general way. You may not represent as your own work material that is transcribed or copied from another source, including persons, books, or Web pages. Instructors are required to—and will—report academic dishonesty and any other violation of the Standards of Conduct to the Dean of Students.

**Disabilities**
If you have a disability and need classroom accommodations, please contact The Center for Accommodations and Support Services (CASS) at 747-5148, or by email to cass@utep.edu, or visit their office located in UTEP Union East, Room 106. For additional information, please visit the CASS website at www.sa.utep.edu/cass.
## Tentative Schedule

The following table shows a tentative schedule of the course; refer to the course website for an up-to-date schedule.

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<td>Handout</td>
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<td>Week 2</td>
<td>Jan. 25, 27 MDD and MDA</td>
<td>Chap 1 [Meservy-Fenstermacher05]</td>
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<td>[Brown04]</td>
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<td>Week 3</td>
<td>Feb. 1, 3 UML</td>
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<td>Week 4</td>
<td>Feb. 8, 10 UML</td>
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<td>Week 5</td>
<td>Feb. 15, 17 Paper presentations: UML/MDD</td>
<td>Model constraints [Fuentes-Vallecillo04]</td>
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<td>[France-etal06]</td>
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<td>Chap 3</td>
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<td>Week 7</td>
<td>Feb 29, Mar. 2 Specifying using UML</td>
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<td>Week 8</td>
<td>Mar. 7, 9 Spring break (no class)</td>
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<td>Week 9</td>
<td>Mar 14, 16 Project proposal presentations</td>
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<td>Week 10</td>
<td>Mar 21, 23 Model validation</td>
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<td>Week 11</td>
<td>Mar. 28, 30 Design technique</td>
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<td>Week 12</td>
<td>Apr. 4, 6 Model transformation</td>
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<td>Week 13</td>
<td>Apr. 11, 13 Papers: model transformation Implementation</td>
<td>[Czarnecki-Hensen03, 06] [Mens-Gorp06]</td>
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<td>Week 14</td>
<td>Apr. 18, 20 Papers: S/W languages. Web application development</td>
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<td>Chap 10</td>
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<td>Week 15</td>
<td>Apr. 25, 27 Web application development Papers: MDD app &amp; tools</td>
<td>[Bezivin-etal04] [Aho-etal09] [Langegger-Paikoska-Wagner06]</td>
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<td>Week 16</td>
<td>May 2, 4 Project work and presentation</td>
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<td>Week 17</td>
<td>May. 11 Final exam at 4:00 – 6:45 pm</td>
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### Important Dates

- **January 18:** Martin Luther King, Jr. day (university closed)
- **January 19:** Classes begin
- **February 3:** Census day
- **March 7-11:** Spring break (no class)
- **March 16:** Exam 1
- **March 25:** Cesar Chavez birthday - observance (no class)
- **March 25:** Spring study day (no class)
- **April 1:** Course drop deadline
- **May 6:** Dead day
- **May 11:** Final on Wednesday at 4:00–6:45 pm
Readings
The following is a tentative list of readings. The list is subject to change, and an up-to-date list will be available from the course website.


