Software Knowledge Gained

Systems Engineering has and is still rapidly moving to a model-based environment. General modeling languages exist for various fields such as the Universal Modeling Language (UML) and Systems Modeling Language (SysML). Numerous implementation environments have been developed across various industries and governmental agencies, such as UAF, DoDAF and NAF. You will be taught how to implement SysML projects in Magic Systems of Systems Architect (MSSA). Analogous to the industry-leading Cameo Systems Modeler, MSSA is developed and commercialized by Dassault Systèmes and is part of the Catia suite of digital modeling tools.

The Department of Mechanical Engineering has licensed MSSA across the Price College of Engineering computer laboratories. Across courses in the program, you will create SysML diagrams and organize containment trees in MSSA's SysML Project framework. You have the option to use the software and build your models on campus at the CADE laboratories or by remotely logging into the Price College's virtual desktop infrastructure. Thus, you do not need to purchase expensive academic licenses or deal with the hassle of installing software on your own computer. To date, the department has experienced very minimal issues with students accessing MSSA remotely through the CADE Computer Lab.

The core ME EN 6170 "Systems Engineering and Integration" course covers about 3-4 weeks of SysML. The class briefly covers use cases, activity diagrams, block diagrams and requirement diagrams. About a week is spent on more advanced SysML topics like parametric equations and simulation. However, you are not required to implement any of these more advanced topics in your projects or exams. At the very least, you will have created at least 10 SysML diagrams in various containment trees. All students completing the certificate will have a working knowledge of SysML.

Software Knowledge Gained From Elective Courses

ME EN 6165-Requirements Engineering and Management adopts SysML from a requirements engineering perspective. Roughly 6 weeks are spent developing systems models following two distinct SysML-based approaches; one suitable for non-complex systems, and another one suitable for complex systems, known as MagicGrid, and adopted across industries.

ME EN 6183-Discrete Event Simulation teaches discrete event simulation and extensively uses the Arena software from Rockwell Systems. You will use Arena to model various systems to identify bottlenecks and recommend changes to improve the system. You will have a general mastery of the Arena software. Since simulation is by far the most widely used operations research tool, you should be able to model and improve a variety of systems including problems related to manufacturing, healthcare, service, and transportation.

ME EN 6186-Engineering Economic Analysis informally teaches Microsoft Excel. In this class, you will build financial models in Excel. In most instances, these models span several sheets and thousands of cells. Upon completing the class, you will be well-versed in Excel. The instructor can code in Visual Basic and you are welcome to code your projects in Visual Basic if you know how to. However, Visual Basic is not required, nor is it taught in this class.