SYLLABUS
SYST 505 - Systems Engineering Principles
Spring 2017

Professor: Dr. Rochelle Jones
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Classroom and Meeting Hours: Engineering Building – Room 2608: Tuesdays 4:30 – 7:10pm

Office Hours: Engineering Building – Room 2229: Tuesdays 2:00 – 4:00pm and by appointment. For distance learning students: By appointment

Course Description: This serves as a foundation for the other courses in the curriculum. During this course, the different components of the systems life cycle will be explored. Basic principles including requirements, design frameworks, functional systems, models, qualification strategy, maintenance and disposal will be covered. Lectures concerning these topics will be given by the instructor and will be supported by the listed texts. Students will be tested to ensure understanding of material contained within the lectures and the texts. Additionally, students will gain practical knowledge concerning this subject by modeling functional, state and object primitives.

Prerequisites: None

Text: A Practical Guide to SysML, 3rd edition by Sanford Friedenthal, Alan Moore and Rick Steiner. MK OMG Press 2013. ISBN-10: 0128002026

Grades:

In class students	**Distance Learning Students**
30% - homework	30% - homework
20% - midterm	20% - midterm
20% - final	20% - final
30% - group activities	20% - group activities
	10% - discussion board posts

Grades will be assigned as follows:

A= 92 – 100
B = 84 – 91.9
C = 76 – 83.9
D = 68 – 75.9
F = 0 – 67.9

Late Policy: Assignments submitted late will receive reduced credit. If an assignment is submitted one day pass the due date (without receiving prior approval from the instructor) the submission will receive no credit (grade of zero (0)).

Course Expectations:

1. Proper preparation is expected every week. You are expected to log in to Blackboard each week and complete the assignments and activities on or before the due dates.
2. Students must check the class announcements in Blackboard on a daily basis for course announcements, which may include reminders, revisions, and updates.
3. It is expected that you will familiarize yourself with and adhere to the George Mason University Honor Code. Student members of the Mason community pledge not to cheat, plagiarize, steal, and/or lie in matters related to academic work. Students must adhere to the guidelines of the Honor Code [See http://oai.gmu.edu/].
4. It is essential to communicate any questions or problems to me promptly.

Learning Outcomes

At the end of this course, students will be able to:

1. Explain the tenets of systems engineering including history of systems engineering, development life cycles, system life cycle stages and system thinking
2. Construct low-fidelity models using functional, state and object primitives
3. Compare and contrast requirements-based and architectural-based design
4. Create SySML models including Requirement, Use Case, Activity, State Machine and Block Definition Diagrams

For Distance Learning Students

Online Learning Community

This online course is taught via Blackboard Courses (Log into http://mymason.gmu.edu, select the Courses Tab, and the course can be found in the Course List). This course is offered completely online. Each week begins on Thursday and ends on Tuesday.

In our online learning community, we must be respectful of one another. Please be aware that innocent remarks can be easily misconstrued. Sarcasm and humor can be easily taken out of context. When communicating, please be positive and diplomatic. I encourage you to learn more about Netiquette. The guides for Collaborate may be found at: http://coursessupport.gmu.edu/data/upload/StudentsBb%20CollaborateFull%20Participant%20Guide.pdf

Technology Requirements

For a brief introduction to some of the services the Volgenau School of Engineering offers to our students, please review: http://labs.vse.gmu.edu/uploads/FacultyFAQ/StudentWelcome.pdf
The technology requirements for this online course are listed below:

Hardware: You will need access to a Windows or Macintosh computer with at least 2 GB of RAM and to a fast, reliable broadband Internet connection (e.g., cable, DSL). For optimum visibility of course material, the recommended computer monitor and laptop screen size is 13-inches or larger. You will need computer speakers or headphones to listen to recorded content. A headset microphone is recommended for live audio sessions using course tools like Blackboard Collaborate. For the amount of computer hard disk space required to take an online course, consider and allow for the space needed to: 1) install the required and recommended software and, 2) save your course assignments. For hardware and software purchases, visit Patriot Computers.

Software:
Microsoft downloads: This course uses Microsoft software available at no charge through the Microsoft DreamSpark program. You should have received notification of your access to this program when you first registered for a course in the Volgenau School of Engineering. If you can't find that notification email, please read the DreamSpark FAQ on: http://labs.vse.gmu.edu for instructions on activating your account or resetting your password.

Windows software on Macs:
Microsoft and many other software developers do not make Mac versions of many software titles. If you have a Macintosh computer on which you want to install software written for Windows, you will have to use Boot Camp or a virtual machine product and then install Windows. VMWare Fusion (a virtual machine host for the Mac) and Windows are available at no charge through your enrollment in Volgenau School courses. Instructions for obtaining the software are in the Microsoft DreamSpark & VMWare FAQs on: http://labs.vse.gmu.edu

There are some hints for Mac users on using Microsoft Windows in the FAQs.

Web browser (See Blackboard Support for supported web browsers)
Blackboard Courses (Log into http://mymason.gmu.edu, select the Courses Tab)
Blackboard Collaborate (select from the course menu)
Adobe Acrobat Reader (free download)
Flash Player (free download)
Microsoft Office (purchase)

Note: If you are using an employer-provided computer or corporate office for class attendance, please verify with your systems administrators that you will be able to install the necessary applications and that system or corporate firewalls do not block access to any sites or media types.

Exams

Closed book, closed notes, closed neighbor. In class students will take the test during the designated class period. Distance learning students must have a proctor for their exams. Proctoring materials may be found in Blackboard in "Proctoring Materials" to validate proctors and verify the taking of the exam.

Academic Integrity

The Honor Code will be read and signed by all students the first week of class and submitted in Blackboard. The Honor Code will also be the first page of the exam and must be signed before taking the exam.

GMU is an Honor Code university; please see the University Catalog or http://oai.gmu.edu/ for a full description of the code and the honor committee process. The principle of academic integrity is taken very seriously and violations are treated gravely. What does academic integrity mean in this course? Essentially this: when you are responsible for a task, you will perform that task. When you rely on someone else's work in an aspect of the performance of that task, you will give full credit in the proper, accepted form. Another aspect of academic integrity is the free play of ideas. Vigorous discussion and debate are encouraged in this course, with the firm expectation that all aspects of the class will be conducted with civility and respect for differing ideas, perspectives, and traditions. When in doubt (of any kind) please ask for guidance and clarification. Students must be responsible for their own work, and students and faculty must take on the responsibility of dealing explicitly with violations. The tenet must be a foundation of our university culture. [See http://oai.gmu.edu/students-responding-to-alleged-violations/distance-learners/].

MasonLive/Email (GMU Email)

Students are responsible for the content of university communications sent to their George Mason University email account and are required to activate their account and check it regularly. All communication from the university, college, school, and program will be sent to students solely through their Mason email account. [See https://masonlivelogin.gmu.edu/login].

Patriot Pass

Once you sign up for your Patriot Pass, your passwords will be synchronized, and you will use your Patriot Pass username and password to log in to the following systems: Blackboard, University Libraries, MasonLive, myMason, Patriot Web, Virtual Computing Lab, and WEMS. [See https://password.gmu.edu/index.jsp].

University Policies

Students must follow the university policies. [See http://universitypolicy.gmu.edu]. Responsible Use of Computing Students must follow the university policy for Responsible Use of Computing. [See http://universitypolicy.gmu.edu/policies/responsible-use-of-computing/]. University Calendar Students must follow the university policies. [See http://registrar.gmu.edu/calendars/].

University Libraries University

The Mason library provides resources for both in class [See http://library.gmu.edu/] and distance students. [See http://library.gmu.edu/distance].

Writing Center

The George Mason University Writing Center staff provides a variety of resources and services (e.g., tutoring, workshops, writing guides, handbooks) intended to support students as they work to construct and share knowledge through writing. [See http://writingcenter.gmu.edu]. You can now sign up for an Online Writing Lab (OWL) session or for a face-to-face session in the Writing Center, which means you set the date and time of the appointment! Learn more about the Online Writing Lab (OWL) (found under Online Tutoring).

Counseling and Psychological Services

The George Mason University Counseling and Psychological Services (CAPS) staff consists of professional counseling and clinical psychologists, social workers, and counselors who offer a wide range of services (e.g., individual and group counseling, workshops and outreach programs) to enhance students' personal experience and academic performance [See http://caps.gmu.edu]. Family Educational Rights and Privacy Act (FERPA) The Family Educational Rights and Privacy Act of 1974 (FERPA), also known as the "Buckley Amendment," is a federal law that gives protection to student educational records and provides students with certain rights. [See http://registrar.gmu.edu/privacy].

Disabilities Statement

If you have a documented learning disability or other condition that may affect academic performance you should: 1) make sure this documentation is on file with Office of Disability Services (SUB I, Rm. 4205; 993-2474;http://ods.gmu.edu) to determine the accommodations you need; and 2) talk with me to discuss your accommodation needs.

Mason Diversity Statement

George Mason University promotes a living and learning environment for outstanding growth and productivity among its students, faculty and staff. Through its curriculum, programs, policies, procedures, services and resources, Mason strives to maintain a quality environment for work, study and personal growth.

An emphasis upon diversity and inclusion throughout the campus community is essential to achieve these goals. Diversity is broadly defined to include such characteristics as, but not limited to, race, ethnicity, gender, religion, age, disability, and sexual orientation. Diversity also entails different viewpoints, philosophies, and perspectives. Attention to these aspects of diversity will help promote a culture of inclusion and belonging, and an environment where diverse opinions, backgrounds and practices have the opportunity to be voiced, heard and respected.

The reflection of Mason's commitment to diversity and inclusion goes beyond policies and procedures to focus on behavior at the individual, group and organizational level. The implementation of this commitment to diversity and inclusion is found in all settings, including individual work units and groups, student organizations and groups, and classroom settings; it is also found with the delivery of services and activities, including, but not limited to, curriculum, teaching, events, advising, research, service, and community outreach.

Acknowledging that the attainment of diversity and inclusion are dynamic and continuous processes, and that the larger societal setting has an evolving socio-cultural understanding of diversity and inclusion, Mason seeks to continuously improve its environment. To this end, the University promotes continuous monitoring and self-assessment regarding diversity. The aim is to incorporate diversity and inclusion within the philosophies and actions of the individual, group and organization, and to make improvements as needed.

CLASS SCHEDULE

Week 1>	24 January	• Review Blackboard, Syllabus, Course Expectations • Student Introductions/Group Formation • Introduction to Systems Engineering • Systems Engineering History • **Group: CA/T vs Pyramid of Giza** • **Homework: Natural, Social, Engineered System**
Week 2>	31 January	• Safety Critical Systems and the Economic Value of Systems Engineering • **Group: Piper Alpha Disaster** • **Homework: Tragically Engineered System**
Week 3>	7 February	• Systems Fundamentals and Systems Thinking • **Homework: Challenger Disaster and Systems Thinking**
Week 4>	14 February	• Representing Systems with Models – Functional and State Primitives • **Homework: IDEF0 and Activity Diagrams**
Week 5>	21 February	• Systems with Models – Object Primitives • **Homework: System Models – Use Cases**
Week 6>	28 February	• System Life Cycles • **Homework: System Life Cycles**
Week 7>	7 March	• **MIDTERM**
Week 8>	14 March	• **SPRING BREAK**
Week 9>	21 March	• Concept Definition • System Definition • **Group: Concept and System Definition**
Week 10>	28 March	• System Realization • Systems Integration, Verification, Validation and Test • **Group: System Realization** • **Homework: Systems Integration and Test**
Week 11>	4 April	• System Deployment and Use • Product Systems Engineering • **Homework: Product Systems Engineering**
Week 12>	11 April	• Systems Engineering Management • **Homework: Systems Engineering Management**
Week 13>	18 April	• SysML Overview
Week 14>	25 April	• Human Systems Engineering • **Homework: Human Systems Engineering**
Week 15>	2 May	• Open Seminar Topic • **Group: SysML Assignment DUE**
Week 16>	16 May	• **FINAL**