Syllabus
MEEG 867 – Hybrid Dynamic Systems

Lecture:

MWF 2:30–3:20, ISE222

Instructor: Bert Tanner

Office:	SPL 228
Phone:	831-6888
Email:	btanner@udel.edu
Office Hours:	Wed 1:00-15:00

Text: A.J. van der Schaft and H. Schumacher, *An Introduction to Hybrid Dynamical Systems*, Springer 2000.

Description: The course is a mathematical introduction to hybrid dynamical systems, following the monograph noted above.

The course is expected to cover at least partially all chapters of the monograph:

- Modeling of hybrid systems
- Physical & engineering examples
- Variable structure systems
- Complementarity systems
- Analysis (stability, correctness, reachability)
- Control design

Prerequisites: Although formally the course does not have prerequisites, a good foundation on linear (e.g. MEEG621) and nonlinear (e.g. MEEG829) systems will greatly facilitate the study.

Outcomes: At the end of the course, students are expected to be able to understand the formalism of hybrid systems models, apply it to specific engineering applications, and demonstrate knowledge of basic stability and control design methodologies for hybrid systems.

Course format: This course is going to adopt a flipped classroom model. Students will review selected material before each meeting, and during class time the instructor and students (assigned randomly and at the time of the meeting) will take turns presenting portions of the material that is to be covered to the rest of the class, in the form of an open discussion. Presenters will be free to pose open questions, debate on the material, or suggest alternative interpretations. Presentation will be done using the room's document camera, with the presenter handwriting their material on paper under a projection camera—i.e., no. powerpoint, beamer, etc are to be used and have to be completed within the given allocated time. During the presentation, the instructor may intervene to offer corrections and clarifications. The sessions will be recorded through UDCapture, and all course participants will be able to review videos of the presentations, and have access to them for the duration of the course.

Assessment: he presenters' overall performance in terms of preparation, delivery, and response to audience questions, will be assessed by their peers. Assessment of in-class performance will be managed through Canvas' assignment tools. There will also be a (written) final exam, which will be closed book / closed notes, and be testing the students primarily on their understanding of the theory covered in class. (For example, the exam will not be exclusively a computational/derivational problem, but it may contain some very simple toy problems aimed at testing assimilation of theoretical concepts.)

The final exam will count toward 65% of the total grade, and the in-class assessments will cover the remaining 35%.

A note on sexual misconduct: Our school is committed to fostering a safe, productive learning environment. Title IX and our school policy prohibits discrimination on the basis of sex. Sexual misconduct—including harassment, domestic and dating violence, sexual assault, and stalking—is also prohibited at our school. Our school encourages anyone experiencing sexual misconduct to talk to someone about what happened, so they can get the support they need and our school can respond appropriately. If you wish to speak confidentially about an

incident of sexual misconduct, want more information about filing a report, or have questions about school policies and procedures, please contact our Title IX Coordinator, which can be found on our school's website. Our school is legally obligated to investigate reports of sexual misconduct, and therefore it cannot guarantee the confidentiality of a report, but it will consider a request for confidentiality and respect it to the extent possible. As a teacher, I am also required by our school to report incidents of sexual mis- conduct and thus cannot guarantee confidentiality. I must provide our Title IX coordinator with relevant details such as the names of those involved in the incident.