

## **EEL 6617, Multivariable Linear Control**

**Credits and Contact Hours:** 3 crs; 3 classes per week of 50 minutes each

**Textbook** None.

### **a. Supplemental Material:**

T. Kailath, "Linear systems", Prentice-Hall, NJ, 1980 (Chapters 6, 7, 8).

C.C. MacDuffee, "The theory of matrices", Chelsea Publishing Company, NY.

H.H. Rosenbrock, "State space and multivariable theory", John Wiley and Sons, NY.

### **Specific Course Information**

- **Catalog Description:** Transfer matrix theory of systems, emphasis on feedback, internal stability, model matching and the assignment of invariant factors.
- **Prerequisites:** Prereq: EEL 5182, MAS 4105.
- **Required, Elective, or Selected Elective:** Elective

### **Specific Goals for the Course**

- **Specific Outcomes of Instruction:** A course on the transfer matrix theory of linear multivariable systems. The course will cover the theory of linear feedback control systems, using transfer matrices as the basic description of a system. The main control theoretic topics will be stabilization and pole assignment for multivariable systems.
- **Brief List of Topics to Be Covered**
- The algebraic theory of transfer matrices; Canonical forms (5 weeks).
- Integer invariants (Controllability and Observability indices) (2 weeks).
- Internal stability of composite systems (1 week).
- Model matching and stabilization of linear systems (2 weeks).
- State feedback and the Rosenbrock Theorem (2 weeks).
- Input/output assignment of invariant factors (2 weeks).

1. Instructor: Dr. Jacob Hammer
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  - e. Office hours: MWF 3:50-4:40PM
2. Teaching Assistant None
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3. Meeting Times M W F 8
4. Meeting Location BEN 328

5. Grading – methods of evaluation Homework 10%; midterm exam 35%; final exam 35%.
  6. Grading Scale: The grade scale for this course is A, A-, B+, B, B-, C+, C, C-, D+, D, D-, F. More information about the grading scale can be found at <http://www.registrar.ufl.edu/catalog/policies/regulationgrades.html>
  7. “A C- will not be a qualifying grade for critical tracking courses. In order to graduate, students must have an overall GPA and an upper-division GPA of 2.0 or better (C or better). Note: a C- average is equivalent to a GPA of 1.67, and therefore, it does not satisfy this graduation requirement. For more information on grades and grading policies, please visit: <http://www.registrar.ufl.edu/catalog/policies/regulationgrades.html>”
  8. Make-up Exam Policy: Approval required from UF counselor or physician.
  9. Honesty Policy – All students admitted to the University of Florida have signed a statement of academic honesty committing themselves to be honest in all academic work and understanding that failure to comply with this commitment will result in disciplinary action. This statement is a reminder to uphold your obligation as a UF student and to be honest in all work submitted and exams taken in this course and all others.
  10. Accommodation for Students with Disabilities – Students Requesting classroom accommodation must first register with the Dean of Students Office. That office will provide the student with documentation that he/she must provide to the course instructor when requesting accommodation.
- UF Counseling Services –Resources are available on-campus for students having personal problems or lacking clear career and academic goals. The resources include:
- UF Counseling & Wellness Center, 3190 Radio Rd, 392-1575, psychological and psychiatric services.
  - Career Resource Center, Reitz Union, 392-1601, career and job search services.
11. Software Use – All faculty, staff and student of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.