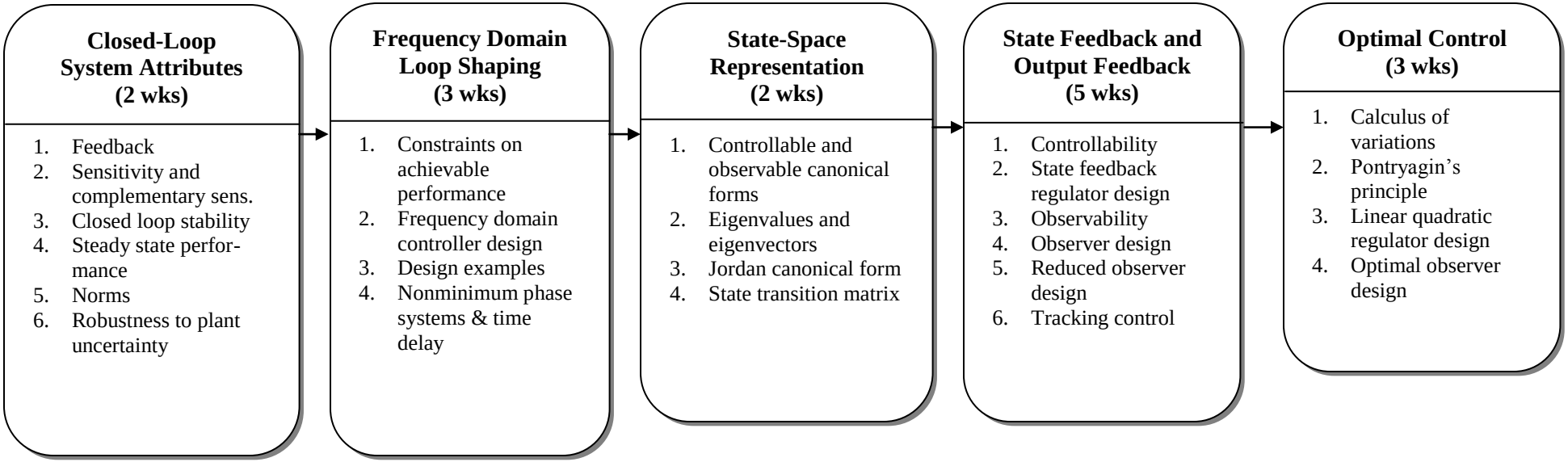
ME 57500
THEORY AND DESIGN OF CONTROL SYSTEMS

Course Outcomes

1. Discuss *feedback control* system characteristics (stability & performance).
2. Provide tools to analyze *robustness* to plant uncertainty.
3. Describe methods for *frequency-domain loop shaping*.
4. Introduce *state-space representation*.
5. Cover state *feedback regulator design*.
6. Cover *state observer design*.
7. Develop *optimal control design methodology*.



1. COURSE NUMBER AND NAME: ME 57500 Theory and Design of Control Systems

2. CREDITS AND CONTACT HOURS: 3 credits

a. Lecture – 3 days per week at 50 minutes for 16 weeks

3. COURSE COORDINATOR OR INSTRUCTOR:

P.H. Meckl

4. TEXTBOOK:

Goodwin, Graebe, Salgado, *Control System Design*, Prentice Hall, 2001.

5. SPECIFIC COURSE INFORMATION:

a. Catalog Description: Course covers the analysis and design of control systems from both a classical and modern viewpoint, with emphasis on design of controllers. Classical control design is reviewed, including both root locus and Bode domain design methodologies. The state space representation is introduced, along with notions of stability, controllability and observability. State feedback controllers for pole placement and state observers are discussed with emphasis on their frequency domain implications. Typically offered in the fall.

b. Prerequisites:

ME 47500 – Automatic Control Systems

c. Status: Elective

6. SPECIFIC GOALS FOR THE COURSE

a. Course Outcomes:

1. Discuss *feedback contro*l system characteristics (stability and performance).
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b. Related ME Program Outcomes:

A1. Engineering Fundamentals;
A2. Analytical Skills;
A3. Experimental Skills;
A4. Modern Engr Tools;
A5. Design Skills;
A6. Impact of Engr Solns;
B1. Communication Skills;
B2. Teamwork Skills
B3. Prof/Ethical Responsibility;
B4. Contemporary Issues;
B5. Life-Long Learning;
C1. Leadership,
C2. Global Engineering Skills;
C3. Innovation;
C4. Entrepreneurship

7. LIST OF TOPICS: See following page.

PREPARED BY: P.H. Meckl

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