

EEL 6871 (formerly 6935): Autonomic computing

Catalog Description: This course introduces beginning graduate students to key concepts and techniques underlying the design and engineering of autonomic computing and networking (AC) systems. AC systems are IT systems capable of self-management, self-healing, self-tuning, self-configuration and self-protection. Course content includes an introduction to the defining characteristics of AC, why it is necessary, foundational AC principles based on control theory, artificial intelligence and systems concepts. Also covered are case studies and technologies used to implement AC systems. Recent papers will be used to discuss integrated systems and methods for AC.

Credits: 3 **Prerequisites:** Undergraduate classes on operating systems and networking.

Goals: To prepare students for graduate work on models, design techniques and technologies for autonomic computing systems.

Outcomes: Students who successfully complete the course will have a basic understanding of autonomic computing and networking, the constraints imposed by the technologies on AC system design, modeling and evaluation of AC systems, and fundamental issues faced in designing AC systems

Textbook: Feedback Control of Computing Systems Joseph L. Hellerstein, Yixin Diao, Sujay Parekh, Dawn M. Tilbury Print ISBN: 9780471266372 Online ISBN: 9780471668800 2004 John Wiley & Sons, Inc.

Grading: Based on homework, midterm exam, final exam and a project.

Topics (number of lectures):

- Introduction to autonomic computing (2)
- IT systems: layers, complexity and distribution (4)
- Modeling and control theory (4)
- Emergent behavior in bio-inspired systems (3)
- Architectures and technologies for AC (4)
- Machine learning in AC systems (3)
- Agent-based systems (3)
- Algorithms and optimization methods for AC (3)
- Autonomic networking and communications (3)
- Advanced topics (6)

Exam and project presentations and discussions (6)

Professor in Charge: Dr. José Fortes