

Topics for contest for the Position no. 9 – Associate Professor

Department of Electrical Engineering and Computers, 2015-2016

**1. Discipline: Systems Theory I**

**Topics:**

1. The concepts of signal and system
2. Systems representation using input-output models. Transfer function. Connections between systems and transfer function algebra.
3. Time domain and frequency domain responses of a system
4. Stability analysis of the dynamic input-output systems

**References:**

1. Oltean SE, Teoria Sistemelor I, Ed. Univ. Petru Maior din Tîrgu Mureș, 2009.
2. Dobra P, Dobra M, Teoria Sistemelor, Ed. Mediamira, Cluj-Napoca, 2014.
3. Voicu M, Introducere în automatică, Ed. Polirom Iași, 2002.
4. Dragomir TL, Elemente de Teoria Sistemelor, Ed. Politehnica, 2004.
5. Preitl Ș și Precup RE, Introducere în ingineria reglării automate, Ed. Politehnica Timișoara, 2001.
6. Franklin GF, Powell JD, Emami-Naeini A, Feedback Control of Dynamical Systems, Addison-Wesley, 1994.

**2. Discipline: Systems Theory II**

**Topics:**

1. State space representation of dynamic systems. Input-state-output models
2. State-space representation from the transfer function. Block diagrams
3. Stability analysis of the dynamic input-state-output systems
4. Structural properties of the dynamic input-state-output systems. Controllability and observability.

**References:**

1. Oltean SE, Teoria Sistemelor II, Ed. Univ. Petru Maior din Tîrgu Mureș, 2009.
2. Oltean SE, Teoria sistemelor. Studiul sistemelor reprezentate prin modele matematice intrare-stare-ieșire, Ed. Univ. Petru Maior din Tîrgu Mureș, 2013.
3. Dobra P, Dobra M, Teoria Sistemelor, Ed. Mediamira, Cluj-Napoca, 2014.

4. Voicu M, Introducere în automatică, Ed. Polirom Iași, 2002.
5. Preitl Ș și Precup RE, Introducere în ingineria reglării automate, Ed. Politehnica Timișoara, 2001.
6. Franklin GF, Powell JD, Emami-Naeini A, Feedback Control of Dynamical Systems, Addison-Wesley, 1994.

### 3. Discipline: Intelligent and adaptive control of the industrial processes

#### Topics:

1. Conventional feedback control systems, adaptive control systems and intelligent control systems.
2. Adaptive control systems. Classifications and block diagrams. Self tuning control and model reference adaptive control.
3. Fuzzy control systems: structure and design.

#### Reference:

1. Oltean SE, Control inteligent și adaptiv al proceselor industriale, Ed. Univ. Petru Maior din Tîrgu Mureș, 2013.
2. Preitl Ș, Precup RE, Introducere în conducerea fuzzy a proceselor, Ed. Tehnică București, 1997.
3. Passino KM, Yurkovich S, Fuzzy control, Addison Wesley Longman, Inc., California, 1998.
4. Nașcu I, Control adaptiv, Ed. Mediamira, Cluj Napoca, 2002.
5. Landau ID, Lozano R, M'Saad M, Karimi A, Adaptive Control, Springer, 2011.
6. Jantzen J, Verbruggen H, Ostergaard JJ, Fuzzy control in the process industry, 1998.
7. Ioannou P, Robust adaptive control, University of Southern California, Los Angeles, 2003.

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HEAD OF DEPARTMENT  
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