

**Instrumentation and Control Polymeric Processes**  
**Undergraduate 3 credit course in Polymer Engineering curriculum**  
**Amirkabir University of Technology**

Co-requisite: Modelling of polymeric systems

Number of units: 3

**Syllabus:**

1. Basic concepts of process control
2. Review of Laplace transform method
3. Open loop systems: The first order and second order systems
4. Instrumentation in polymeric systems
5. Closed loop systems: Block diagram
6. Root locus method
7. Frequency response method

References:

1. M. Rafizadeh, "Process Dynamics and Control", Amirkabir University Press
2. Coughanower D. R. and S. E. LeBlanc, "Process Systems Analysis and Control", 3<sup>rd</sup> Edition, McGraw-Hill Co., 2009
3. Seborg, D. E., T. F. Edgar, D. A. Mellichamp and F. J. Doyle, "Process Dynamics and Control", 3<sup>rd</sup> Edition, John Wiley & Sons, Inc., 2011
4. J. Stephanopoulos, "Chemical Process Control, An Introduction to Theory and Practice", Prentice hall, 1984
5. B. A. Ogunnaike, W. H. Ray, "Process Dynamics, Modeling and Control", 1994
6. Dorf R. C., R. H. Bishop, "Modern Control Systems", 9<sup>th</sup> edition, Prentice Hall, 2001
7. Ogata K., "Modern Control Engineering", 3<sup>th</sup> edition, Prentice-Hall Inc., 1997
8. Luyben, W. L., "Process Modeling, Simulation, and Control for Chemical Engineers", 2<sup>nd</sup> Edition, McGraw-Hill Inc., 1990
9. Luyben, W. L., and M. L. Luyben, "Essential of Process Control", McGraw-Hill Co., 1997
10. Franklin, G. F., J. D. Powell, A. Emami-Naeini, "Feedback Control of Dynamic Systems", Prentice Hall, 5<sup>th</sup> Edition, 2010
11. Tan W., J. Liu, T. Chen, and H. J. Marquez, " Comparison of some well-known PID tuning formulas", Computers and Chemical Engineering, 30, p. 1416–1423, 2006