

Course Syllabus

Second Semester – 2013/2014

General Information

Course name	Course code	Credits	Contact hours
Biomedical Systems Control	BMTS491	2 lecture+1 lab	2 lecture+2 lab

Instructors/ Coordinators

	Instructor	Coordinator
Name	Dr. Santhanaraj Balakrishnan	Dr. Santhanaraj Balakrishnan
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Text Book

Title	Physiological Control Systems: Analysis, Simulation, and Estimation
Author/Year	Michael C. K. Khoo /2012

Supplemental materials

Recommended Textbooks and Reference Material	
Title	Control Systems Engineering
Author/Year	Norman S. Nise / 2010
Electronic Materials (eg. Web Sites, Social Media, Blackboard, etc.)	
Web sites	https://sites.google.com/site/physiologyforall/home/physiology
	http://www.facstaff.bucknell.edu/mastascu/econtrolhtml/intro/intro1.html

Specific Course Information

a. Brief description of the content of the course (Catalog Description)
This course gives an introduction to physiological control systems for biomedical engineers. The main objective of this course is to expose student to the world of control systems with emphasis on important physiological systems. It starts with a review of the historical and philosophical aspects of physiological control systems. It covers also linear system theory and open- and closed-loop physiological control systems in homeostasis or steady state. It finishes by studying the time- and frequency-response of open- and closed-loop physiological control systems.
b. Prerequisites (P) or Co-requisites (C):
(P) Biomedical Digital signal processing – BMTS476
c. Course type (Mandatory or Elective):
Elective

Specific Goals

a. Specific outcomes of instruction.

By the end of this course, the student should be able to:

- Recognize the basics of physiological control systems (a)
- Analysis Physiological Systems using mathematical models (a)
- Design a physiological control system using simulation software (LABVIEW). (d)
- Calculate the physiological control system parameters. (c)
- Interpret the output waveforms of a physiological control system. (c)

b. Student outcomes addressed by the course.

a	b	c	d	e	f	g	h	i	j	k
✓		✓	✓							

Brief list of topics to be covered

Topics	No of Weeks	Contact hours
Introduction to physiological control systems for biomedical engineers.	2	8
Mathematical Modeling	2	8
Static Analysis of Physiological Systems	1	4
Time-Domain Analysis of Linear Control Systems	1	4
Frequency-Domain Analysis of Linear Control Systems	1	4
Stability Analysis: Linear Approaches	2	8
Identification of Physiological Control Systems	2	8
Optimization in Physiological Control	1	4
Nonlinear Analysis of Physiological Control Systems	2	8
Complex Dynamics in Physiological Control Systems	1	4