Course Syllabus

BMT 437

1. Course number and name: BMT **437/ BIOMEDICAL CONTROL SYSTEMS**
2. Credits and contact hours: (2 + 0) credit hours, (2 +0) contact hours
3. Instructor's name: **Dr. Magdy Gamal Elghatwary**
4. Text book, title, author, and year:
   - **Books or notes**: Katsuhijo Ogata, "Modern Control Engineering", 5th edition, Printice Hall, 2013

   a. other supplemental materials:
      - Lecture notes (available on my website and LMS system)
      - Website of text book publisher
5. Specific course information

   a. brief description of the content of the course:
   Students completing this course will be able to analyze the basic components of control systems, the concepts of feedback, closed-loop control versus open-loop control using the Laplace transform to solve linear differential equation, finding transfer function for linear time-invariant electrical and mechanical understanding the concepts of poles and zeros and how to find time response from transfer function and determine the stability of a system.

   b. prerequisites or co-requisites:
   Pre-requisites: NA
   Co-requisites: NA

   c. indicate whether a required, elective, or selected elective (as per Table 5-1) course in the program: **Required**
6. Specific goals for the course

   a. specific outcomes of instruction:
   This course is intended to provide basic knowledge and understanding of the fundamentals of Automatic control. The student should develop the ability to study system stability. and develop the ability to be able

to choose between various approaches. The students should extend their problem solving abilities.

b. explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course.

	Course outcome	abet (a-k)
1	Students will demonstrate an understanding the fundamental basic control system, the concept of feedback, closed-loop control versus open-loop, examples of control systems, transfer function, types of feedback control system characteristics-noise rejection, gain, sensitivity, stability	a
2	Students demonstrate an ability to understand the concept of poles and zeros, to find the time response from a transfer function, to analyze stability of the system. The ability to understand the Laplace transforms to solve linear differential equations, finding transfer function for linear time invariant electrical and mechanical.	b
3	Students are required to design small systems and implement and test their solutions in HW	c

7. Brief list of topics to be covered

Topics
Introduction to control engineering
Models of physical systems
State variable models, system response
Control system characteristics
Stability analysis, root-locus analysis and design
Frequency response design
Biological control systems

Schedule of Assessment Tasks for Students During the Semester			
	Assessment task (e.g. essay, test, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Participation	Continuous	5%
2	Midterm1	7	20%
3	Midterm2	12	20%
4	Presentation	14	15%
5	Final exam	Final Exams Period	40%