Universidad de los Andes
Facultad de Ingeniería

APPENDIX A
Prepared by:
Date:

IBIO3112 – Biomechatronics

Credits and contact hours

	Credits	Contact hours (per week)	Sessions per week	Offer frequency
Course	3	3	2	
Complementary class	-	-	-	
Laboratory	0	1.5	1	1 yr

Instructor's or course coordinator´s name: Jaebum Son (ML-437, j.son@uniandes.edu.co)

Textbook, title, author, and year

Lecture material by instructor

Specific course information

a. Brief description of the content of the course (catalog description)

Many modern biomedical devices use complex mechatronic technology, now which is called biomechatronics. In this course, we will learn the fundamentals of biomechatronics. Students will have review of basic circuit theories, and learn abbreviated theories of digital circuits and computer architecture, sensors and actuators, and the theories on mechanism and control. Laboratory activities and projects are emphasized.

b. Prerequisites

IBIO2560- Signal processing
IBIO3160- Biomechanics

c. Co-requisites

d. Indicate whether a required, elective or selective elective course in the program

Required	Elective	Selective
	×	

Specific goals for the course

a. Specific outcomes of instruction

At the end of this course, students will be able to:

- Utilize basic theories of biomechatronics for biomedical applications
- Use various sensors and actuators
- Design of control system in biomedical applications

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

Brief list of topics to be covered

Topic	Suggested duration (weeks)
1. Basic Electronic Components and Analog Circuits	2
2. Digital Circuits	3
3. Computer Architecture	2
4. Sensors and Actuators	2
5. Mechanism Design	4
6. Control and Term Projects	3

Evaluation

Three exams (including the final exam)	30% (10% each, open sheet)
In-class presentation	10%
(You are required to give presentation of at least 10 minutes about the selected state-or-art biomechatronics topic.)	
Laboratory	20%
Projects	40%

Final grading: your final grade will be approximated to comply with the department policy. Las notas finales del curso se aproximarán de 0.25 y 0.75 (inclusive) hacia arriba y de 0.25 y 0.75 (no inclusive) hacia abajo.

References

[E-BOOKS IN UNIANDES]
Bishop O, The Robot Builder's Cookbook, 2007
Khalil W, Dombre E, Modeling, Identificiation & Control of Robots, 2004
Mario F, Giulio F, Building Robots with Lego Mindstorms: The Ultimate Tool for Mindstorms Maniacs, 2002
Siciliano B, Sciavico L, Villani L, Oriolo G. Robotics: Modelling, Planing and Control. 2009

[PRINTED BOOKS IN UNIANDES]
Craig JJ. Introduction to Robotics. 2005

Ogata K, Modern Control Engineering, 5th Ed. Prentice-Hall/Pearson. 2010 [Ramón de Zubiria]

[FREE E-BOOKS AVAILABLE THROUGH INTERNET]
Spong MW, Hutchinson S, Vidyasagar M. Robot Modeling and Control. 1st Ed. John Wiley & Sons, Inc. [http://www.ualberta.ca/~yousefim/bfiles/Ebooks/Spong – Robot modeling and Control.pdf]
Murray RM, Li Z, Sastry SS. A Mathematical Introduction to Robotic Manipulation. 1994. CRC Press [http://www.cds.caltech.edu/~murray/mlswiki]

Class Policies

- This course is taught in English. If you encounter any word or sentence that you cannot understand clearly for home works or during exams, you should ask the professor to explain.
- Any student identified to disturb the class will be asked to evacuate from classroom.
- At the start of the semester, one laboratory kit is given to each student. He/she will have the responsibility to return the kit as the original shape at the end of the semester.