

Laboratorio di Tecnologie Biomediche

Introduzione

Carmelo De Maria
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Course info

- Laboratorio di Tecnologie Biomediche (6 CFU)
- Part of the course Tecnologie Biomediche (12 CFU)
- Objective:
 - Learning how to prototype medical devices, following international quality standards and using advanced fabrication technologies

Teachers



Centro E. Piaggio
bioengineering and robotics research center



- Carmelo De Maria and Giovanni Vozzi
 - Research Center E. Piaggio at University of Pisa
 - www.unipi.it. and www.centropiaggio.unipi.it
 - Research interests: Biofabrication, Additive Manufacturing, open source technologies in Biomedical Engineering
- Teaching assistant: Licia Di Pietro
 - PhD student in Information Engineering
 - Research on open source medical technologies
- Contact:
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Course info

- Prerequisites
 - Fundamentals in Math, Statistics, Physics, Chemistry, Material Science, Mechanics, Electronics, Computer Science
 - Computer skills: use of spreadsheets, slide show preparation

Course info

- Topics:
 - Medical devices: standards, regulations and design principles
 - Fundamentals of Manufacturing Engineering and Technology
 - Fundamentals of Computer Aided Design
 - Electronic and electromechanical rapid prototyping
 - Case studies

Course info

1M Biomedica						
	Lu	Ma	Me	Gi	Ve	Sa
8:30/9:30		Lab. tecn. biom. SI 7	Analisi mod. segn. biomed. II SI 3	Radiazioni ionizzanti e interaz. biol. B32	Elettron.biomed. I F07	
9:30/10:30	Analisi mod. segn. biomed. II PN8	Lab. tecn. biom. SI 7	Analisi mod. segn. biomed. II SI 3	Radiazioni ionizzanti e interaz. biol. B32	Elettron.biomed. I F07	
10:30/11:30	Analisi mod. segn. biomed. II PN8	Lab. tecn. biom. SI 7	Analisi mod. segn. biomed. II SI 3	Radiazioni ionizzanti e interaz. biol. B32	Elettron.biomed. I F07	
11:30/12:30	Lab. tecn. biom. SI 7		Elettron.biomed. I F01	Cibernetica fisiologica F07	Radioprotezione F07	
12:30/13:30	Lab. tecn. biom. SI 7		Elettron.biomed. I F01	Cibernetica fisiologica F07	Radioprotezione F07	
13:30/14:30						
14:30/15:30	Cibernetica fisiologica PN8	Modelliz. biofis. dei sist. compl. C21	Radiazioni ionizzanti e interaz. biol. C21	Radioprotezione A26		
15:30/16:30	Cibernetica fisiologica PN8	Modelliz. biofis. dei sist. compl. C21	Radiazioni ionizzanti e interaz. biol. C21	Radioprotezione A26		
16:30/17:30	Cibernetica fisiologica PN8	Modelliz. biofis. dei sist. compl. C21	Modelliz. biofis. dei sist. compl. C21	Radioprotezione A26		
17:30/18:30			Modelliz. biofis. dei sist. compl. C21			

Course info

- Teaching material:
 - Slides and notes, with free web resources provided by the lecturer:
 - <http://www.centropiaggio.unipi.it/course/laboratorio-di-tecnologie-biomediche>
 - <http://dionisio.centropiaggio.unipi.it/cdemaria/>
 - The Biomedical Engineering Handbook - Joseph D. Bronzino, Donald R. Peterson

Course info

- Suggested Software
 - CAD:
 - Solidworks (Dassault System),
 - FreeCAD (Open source alternative)
 - CAM:
 - MODELA Player 4 and Virtual MODELA (Roland DG)
 - Electronic rapid prototyping:
 - Arduino (with Arduino 2 prototyping board)



Open Source parametric 3D CAD modeler



Course info

- Final exam:
 - Prototype of a medical device
 - Explanation of physical principles
 - Identification of appropriate standards
 - Basic blueprints (mechanical, electronic, software)
 - Identification of fabrication technologies for prototyping and manufacturing
 - It will be a sort of “Device Dossier”
 - Technical document required by authorities to prove compliance to Safety and Performance Requirements of Medical Device Regulation
 - Group work is preferred (max 3)

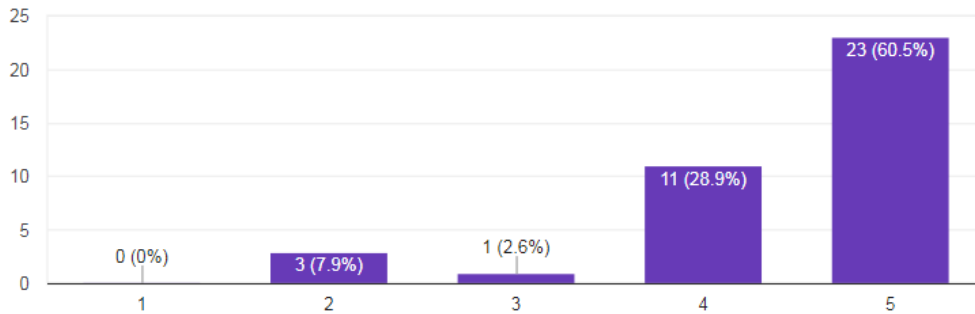
Course info

- Final exam:
 - Identify your device as soon as possible
 - Device list and mailing list
 - List of the past course
- Revision(s) of the project before the exam:
 - (usually) it takes at 1 hour
 - (usually) more than 1 revision is needed
 - You can ask to use teaching material to verify your project
 - There is not a fixed day
 - Take an appointment by email (consider that we will have at least 30 groups, and time is limited)

Course info

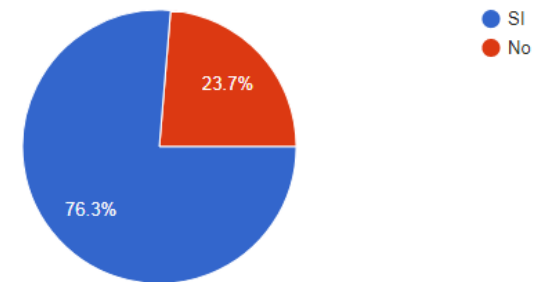
Ritieni un corso di questo tipo utile alla tua formazione

38 responses



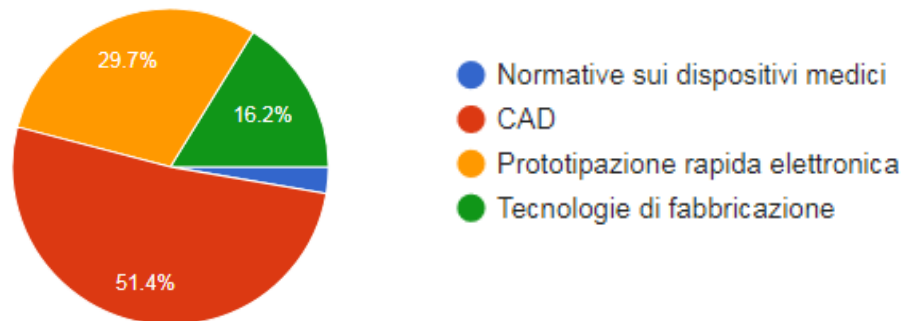
Seguiresti questo corso anche se fosse un "corso a scelta"?

38 responses



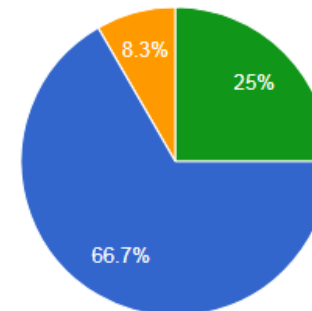
Qual è la parte del corso che reperi più interessante?

37 responses



Quel è la parte che corso che reperi meno interessante

36 responses



Opportunity



- **UBORA Eu Project**

- **Open** source co-design of new solutions to face the current and future healthcare challenges of Europe and Africa
- Networking, knowledge on rapid prototyping of new ideas and sharing of **safety criteria** and performance
- A new EU-Africa e-Infrastructure, **UBORA**



Grant Agreement no. 731053
Coordination and Support Action

Opportunity



- **UBORA e-infrastructure**

- <http://ubora-kahawa.azurewebsites.net/>

In-development preview

UBORA

The Biomedical engineering open design platform

Create or collaborate open-sourced biomedical solutions.

Sign up now!

Have a need for medical solution? Find it through open discussion.

I have a need

Have an idea? Propose your biomedical solution.

I have an idea



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Opportunity



- **UBORA e-infrastructure**

- <http://ubora-kahawa.azurewebsites.net/>
- Create a profile, create your projects,
- Use it for your exam (not mandatory, but really helpful)



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Opportunity



- **UBORA Design Competition**

- The UBORA Design Competition 2018 seeks innovative biomedical engineering solutions from students (individuals or teams) addressing **healthcare problems faced by the ageing society**
- Finalists of the Design Competition will be fully sponsored to attend the **UBORA Design School** which will be held at University of Pisa, from 3rd to 7th September 2018



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Opportunity



- **UBORA Design Competition**
- <http://ubora-biomedical.org/design-competition-2018/>
 1. Project brief submission as per template – due on 10th March, 2018 (23:59 CET)
 2. Notification to applicants accepted for full proposal submission – 20th March, 2018
 3. Submission of full proposals as per template – due on 13th May, 2018 (23:59 CET)
 4. Announcement of finalists –20th May, 2018



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Opportunity



- **UBORA Design School**

- Università di Pisa, Polo Le Benedettine, 3rd to 7th September 2018



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Opportunity



- **UBORA info**

- www.ubora-biomedical.org

- @uborabiomedical 

- UBORA 



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