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

- 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:
  - carmelo.demaria@unipi.it
  - g.vozzi@ing.unipi.it
  - dipietrolicia@gmail.com

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	Strum. di anal. num. per ing. biom. SI 3		
12:30/13:30	Lab. tecn. biom. SI 7		Elettron.biomed. I F01	Strum. di anal. num. per ing. biom. SI 3		
13:30/14:30						
14:30/15:30	Strum. di anal. num. per ing. biom. B34	Modelliz. biofis. dei sist. compl. C21	Radiazioni ionizzanti e interaz. biol. C21			
15:30/16:30	Strum. di anal. num. per ing. biom. B34	Modelliz. biofis. dei sist. compl. C21	Radiazioni ionizzanti e interaz. biol. C21			
16:30/17:30	Strum. di anal. num. per ing. biom. B34	Modelliz. biofis. dei sist. compl. C21	Modelliz. biofis. dei sist. compl. C21			
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://platform.ubora-biomedical.org
  - The Biomedical Engineering Handbook - Joseph D. Bronzino, Donald R. Peterson

Course info

- Suggested Software
  - CAD:
    - Fusion 360 (Autodesk),
    - FreeCAD (Open source alternative)
  - CAM:
    - MODELA Player 4 and Virtual MODELA (Roland DG
  - Electronic rapid prototyping:
    - Arduino (with Arduino 2 prototyping board)

Course info

- Final exam:
  - Prototype of a medical device
    - Explanation of physical principles
    - Identification of risk class according to Medical Device Regulation 2017/745 and 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 MDR 2017/745
  - Group work is preferred (max 3)

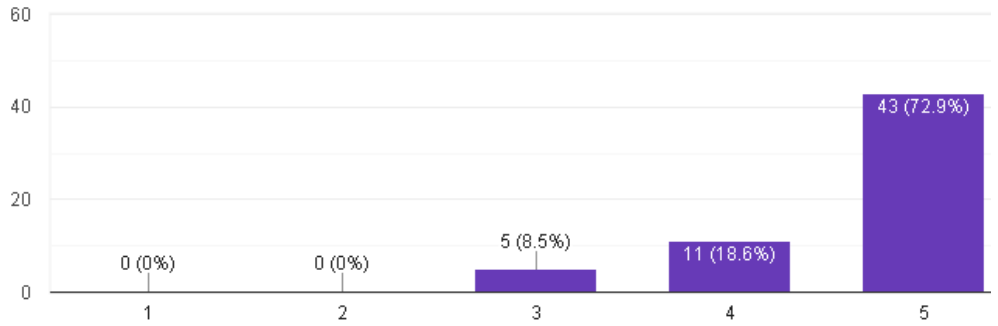
Course info

- Final exam:
  - Identify your device as soon as possible
  - Device list and Mailing List
  - List of the past course (2016-17, 2017-18)
- 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

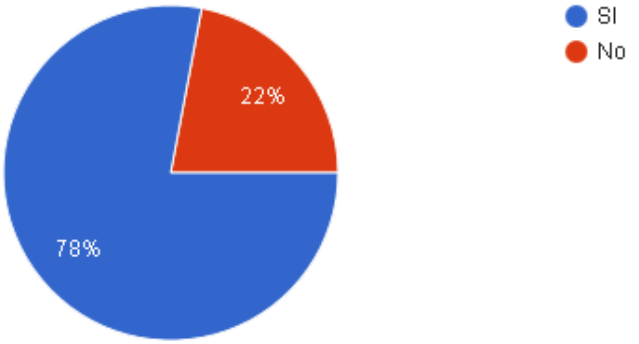
Ritieni un corso di questo tipo utile alla tua formazione

59 responses



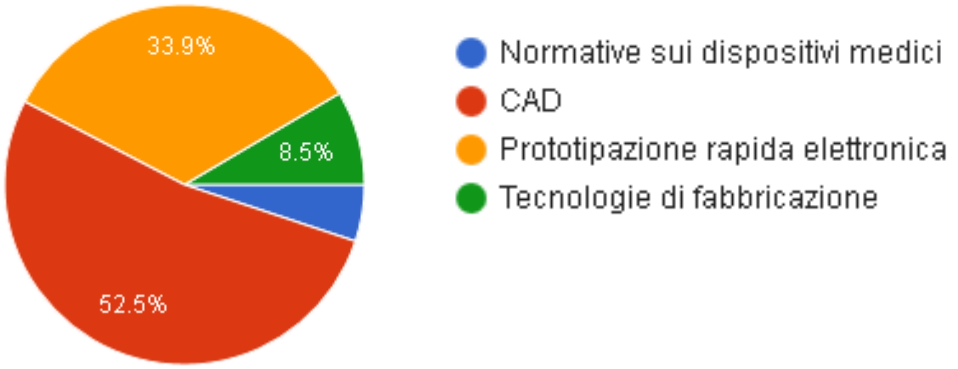
Seguiresti questo corso anche se fosse un "corso a scelta"?

59 responses



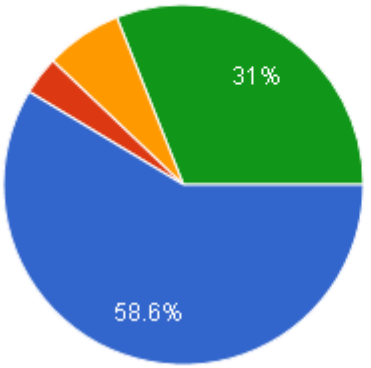
Qual è la parte del corso che reputi più interessante?

59 responses



Quel è la parte che corso che reputi meno interessante

58 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**

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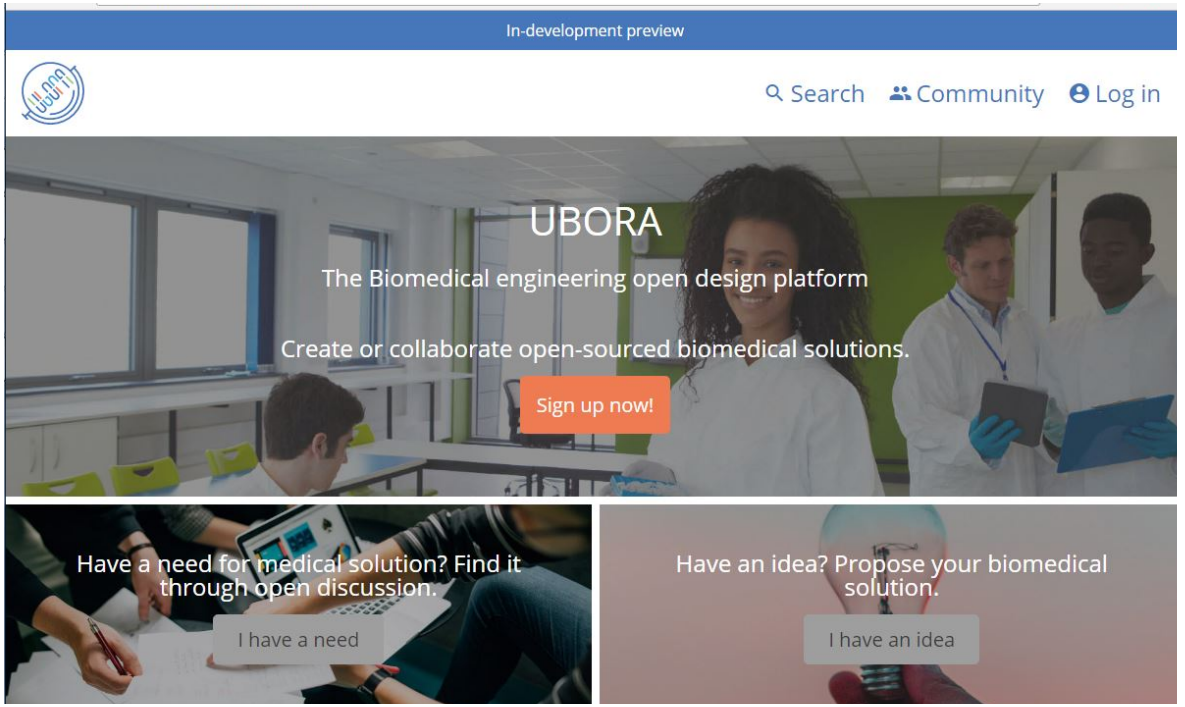
Coordination and Support Action

Opportunity

- **UBORA e-infrastructure**
  - https://platform.ubora-biomedical.org



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Opportunity

- **UBORA e-infrastructure**
  - https://platform.ubora-biomedical.org
  - Create a profile, create your projects,
  - Use it for your exam (not mandatory, but really helpful)

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Coordination and Support Action

Opportunity

African Biomedical Engineering Consortium
Innovation through Education

- **ABEC Design Competition**
  - The ABEC Design Competition 2019 seeks innovative biomedical engineering solutions from students (individuals or teams) focused on **Technology Innovations in Surgery, Obstetrics and Anesthesia**
  - Winning teams will be sponsored to attend the **ABEC Design School** which will be held at the Uganda Industrial Research Institute, in Kampala, Uganda, from 7th to 11th October 2019

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Opportunity

African Biomedical Engineering Consortium
Innovation through Education

- **ABEC Design Competition**
- http://abec-africa.org/abec-design-competition-2019/
  - Project brief submission as per template – due on April 1st 2019 (Midnight EAT)
  - Notification to applicants accepted for full proposal submission – April 16th 2019
  - Submission of full proposals as per template – due on June 13th 2019 (Midnight EAT)
  - Announcement of finalists – June 28th 2019

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Opportunity

African Biomedical Engineering Consortium

Innovation through Education

- **ABEC Design School**
  - Uganda Industrial Research Institute, Kampala, Uganda, from 7th to 11th October 2019

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Opportunity

- **UBORA info**
  - www.ubora-biomedical.org
  - @uborabiomedical
  - UBORA

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