



# Master of Science in Biomedical Engineering

## University of Illinois at Chicago & Politecnico di Milano

### Introduction

This master is a coordinated project between the Politecnico di Milano (POLIMI) and the University of Illinois at Chicago (UIC) to allow students enrolled in Politecnico's **Laurea Specialistica in Ingegneria Biomedica** to obtain the degree of **Master of Science in Bioengineering** or **Master of Science in Bioinformatics** from UIC while working towards their degree in Italy.

The students attend courses at the Politecnico for the first semester of the program ("Spring", March-June), corresponding to the second semester of the Italian academic year of the Laurea Specialistica, and then **they spend the second semester of the program ("Fall", August-December) at UIC**, attending courses and starting their UIC Thesis project activity, being assigned to a Lab at UIC. **Residence at UIC is mandatory during the Fall semester.**

Moreover, the permanence at UIC also for the following Spring semester is strongly recommended, in order to complete the Master Thesis and have the opportunity to defend it at UIC already in May.

### 1° year

1° semester  
@ POLIMI  
POLIMI Courses

2° semester  
@ POLIMI  
3 UIC Courses  
(15 CFU)  
within  
POLIMI Courses

Assegnazione  
del tutor di tesi  
@UIC

### 2° year

1° semester  
@ UIC  
UIC Courses (20 CFU)

2° semester  
@ UIC  
THESIS+DEFENSE

### Extra year

1° semester  
@ POLIMI  
POLIMI Courses

2° semester  
@ POLIMI:THESIS  
DEFENSE

Different timing for enrollment in the program (one year shift) could be considered under strict conditions on a personal basis.

**At POLIMI, ONLY during the Spring semester while enrolled in the program, students must attend 15 CFU chosen among the following courses, that will be considered also for the UIC program (list subject to variation, to be confirmed every year):**

- Technologies for sensors and clinical instrumentation (Prof. Andrea Aliverti), 5 CFU (half of the class)
- Bioartificial systems at the micro and nano scale (Proff. Vesentini, Rasponi), 5+5 CFU
- Computational biology of the heart (Prof. Rodriguez Matas) (5 CFU)
- Biomachines (WITH LABORATORY) (Prof. Costantino) (5 CFU)
- Methods for biomedical imaging and computer aided surgery (Proff. Baroni, Baselli) 5+5 CFU

The exam relevant to the attended courses must be passed with success at the first useful date, and evaluation will count for both POLIMI and UIC. **It will be not possible to repeat the exam: the evaluation score will be mandatorily registered.**

**At UIC, students must attend 3 courses** at 500 level (15 CFU will be granted in correspondence for these courses at POLIMI), at least 2 of which offered by the Department of Bioengineering, **plus performing laboratory activity** mandatory for the fulfillment of the thesis (5 CFU for a Lab course at POLIMI will be additionally granted).

The corresponding courses must be chosen at the Politecnico di Milano, to make sure that the necessary equivalences ("equipollenze") with the Italian courses can be properly established, and therefore the marks transferred to the student's Italian academic career.

As an indicative example (subject to revision every year), the table below shows the correspondence already determined between some courses at POLIMI and UIC:

UIC	POLIMI
BIOE 594 Quantitative Human Physiology Computational Biomechanics	096055- BIOENGINEERING OF PHYSIOLOGICAL CONTROL SYSTEMS COMPUTATIONAL BIOMECHANICS LABORATORY
BIOE 494 Wearables Technology Lab	eHealth: Applications
Fundamental of Optical Imaging	Ottica Biomedica
BIOE 594 Elastography	096236 Mechanics of Biological structures
Haptics I	097617 Haptics 6 CFU Prof. Ferrise
BIOE 523 Haptics	097596 - HAPTICS Virtual Prototyping (C.I. Haptics -Ferrise)
Virtual and Augmented reality	097597 Virtual Prototyping (C.I. Virtual Prototyping methods -Bordegoni)
Sensory prosteses Engineering	Bioengineering of Neurosensory system
BIOE 575 – Neural Engineering II	Neuroengineering Pedrocchi 056457
ECE 559 – Neural Networks	Neuroengineering Cerveri 056456
materials in bioengineering (400)	introduzione alla scienza dei materiali
594 MECHANICAL WAVES IN MEDICAL IMAGING I AND II	056431 - Methods for biomedical imaging and computer aided surgery [1]
BIOE 494 – Wearables Technology Lab	56453 E-Health applications
Biomolecular modeling in bioinformatics	Biomolecular modelling laboratory
518 (Advanced drug delivery systems)	Nanomedicine
BIOE 594 “engineering numerical analysis”	mathematical and numerical methods in engineering (12 cfu) - parte prof. Zunino (7 CFU)
BIOE 410 Medical Device requirements	CREDITI GENERICI
BIOE 594 Adv Stats and Machine Learning	CREDITI DI BIOINGEGNERIA
BIOE422 Magnetic Resonance Imaging	056431 - Methods for biomedical imaging and computer aided surgery [1]
BIOE594 Mec waves in Bio Imaging II (2 CREDITS)	056431 - Methods for biomedical imaging and computer aided surgery [1] (solo se fatto anche 594 MECHANICAL WAVES IN MEDICAL IMAGING I (2 CREDITS)
BIOE455 Introduction to cell and tissue engineering	098454 Strutture bioartificiali e biomimetiche
411-ARTIFICIAL INTELLIGENCE I	089214 - ARTIFICIAL INTELLIGENCE

**Attendance to the UIC courses is mandatory.** The overall final mark of a course must be at least C. The overall average of the grades must be at least B.

In order to properly develop the thesis at UIC, which is mainly based on Lab activity dealing with experiments (from cells to animals or human subjects), **staying for an additional semester at UIC is strongly recommended.** In this case, the student might benefit from economical support from his/her UIC supervisor, if available. In addition, during this extra semester one additional course might be attended at UIC (5 CFU granted at POLIMI).

The UIC Master of Science will be granted upon **defending a thesis** (usually in May or December), which has the main advisor from UIC and a secondary advisor from Politecnico, assigned based on the research topic performed at UIC. The defense could result in an immediate pass, in the need to make minor changes to the thesis, or in the need to perform additional work before the defence could be repeated.

## Calendar and Deadlines

**Starting May 2022:** fill out the form at <https://tinyurl.com/uicpolimi2023> to be added to the mailing list of UIC prospective students. This will allow us to send you any update regarding to the program. Also, you can send an email to Prof. Caiani, responsible of the program for the CCS of Biomedical Engineering, to express your future interest.

- **Starting September 2022:** contact our Secretary office ([masteruic-bio@polimi.it](mailto:masteruic-bio@polimi.it)) to know which documents are needed, and submit the pre-application. The Secretary office will check the documents and help you preparing the final documents that will be mailed to UIC.
- **End of October 2022:** this is orientatively the **final deadline for applying**, as documents must reach UIC!!!
- **December 2022:** you will know from UIC if your application has been accepted, and you will be asked to communicate which courses you select for the Spring Semester (to be attended at POLIMI). Accordingly, your study plan needs to be modified, if needed, to include these exams, corresponding to the 15 CFU to be taken at POLIMI during the Spring semester.
- **March 2023 - Spring semester:** UIC courses at the Politecnico start.
- **May 2023:** you will be asked in which area you would like to do your Master thesis at UIC, so that possible coupling with an UIC supervisor and his/her Lab will be initiated.
- **Mid-August 2023 – Fall semester:** Students go to Chicago and courses at UIC start.
- **December 2023:** Final exams at UIC for the fall semester completed.
- **May 2024:** indicatively, you will have your UIC thesis completed, and you will defend it to get your Master in Biomedical Engineering.

During the year, an **introductory meeting** was given, also with a representative of the UIC, in order to give extensive explanation of the program. Here you can find the recordings:

<https://www.dropbox.com/sh/71jkubvy6xzy4zb/AABG09Ecxw7AIJ97ZY-oD8a?dl=0>

## Cost

Students enrolled in the program will have to **pay to UIC the tuition fees for two semesters (taxes at POLIMI will be exempted during this period)**. The tuition fees are approximately \$20000 (to be confirmed) for the two semesters. This corresponds roughly to the instate rate and it is actually the lowest possible rate for Biomedical Engineering Master students at UIC.

In addition, **students will have also to consider travel, accomodation and living expenses** during the semesters in Chicago.

**One fee waiver per year** will be given by UIC (pending confirmation by UIC every year, depending on the minimum number of students enrolled) to the best student with the highest scores in the 15 CFU obtained at POLIMI during the Spring semester. This waiver covers approximately half of the total tuition fee.

## Admission Requirements

To join the program, students must be **enrolled in the Laurea Specialistica in Ingegneria Biomedica at the Politecnico di Milano** at the beginning of the Master (II semester of every academic year).

Students must also have an **average mark above 24/30** in their Laurea Triennale, and a valid **TOEFL** score higher than 80 with these minimum scores: writing 21, speaking 20, listening 17, reading 19. Alternatively, students can present a **IELTS** with a score of at least 6.5 with these minimum scores: writing 6, speaking 6, listening 6, reading 6. Additional accepted score tests are going to be communicated by UIC every year.

The requirement about TOEFL/IELTS must be fulfilled before the actual application to UIC is filed at the end of October.

Students that got their Laurea Triennale in a different University, or in a subject different than Biomedical Engineering, still could apply, pending an additional internal review of their career by Prof. Caiani before the application.

**Admission will be granted directly by UIC**, after examining the grades and the application material submitted.

### Further Information

- <http://uic.ws.dei.polimi.it/index.html>
- <http://www.uic.edu>
- Polimi DEIB Secretary office ([masteruic-bio@polimi.it](mailto:masteruic-bio@polimi.it))
- Prof. Enrico Caiani ([enrico.caiani@polimi.it](mailto:enrico.caiani@polimi.it))



### Why should I join the Program?

- Being an American student and living in USA for a period is a life experience
- Access to extended Laboratory technologies
- Master of Science from a US University
- Opens up other carrier opportunities