UNIVERSITAT DE BARCELONA

UNIVERSITAT POLITÈCNICA DE CATALUNYA BARCELONATECH

MASTER IN BIOMEDICAL ENGINEERING UB-UPC

COORDINATOR UB: OSCAR CASTAÑO OSCAR.CASTANO@UB.EDU

COORDINATOR UPC- JORDI FONOLLOSA JORDI.FONOLLOSA.M@UPC.EDU

MASTER: ENGINYBIOMED@UB.

FIRST ENG BIOMED MASTER IN SPAIN

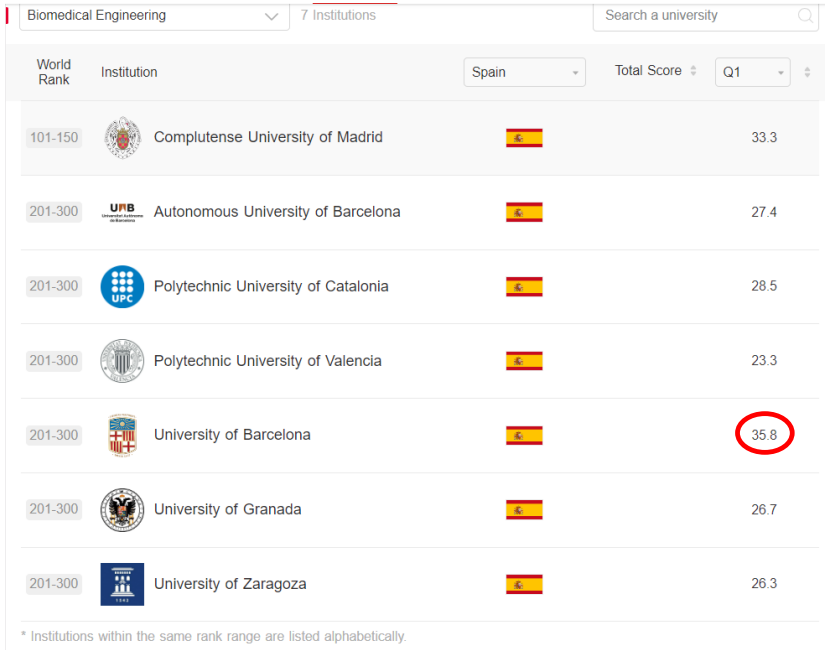
2006 — 2011 — 2016 — 2017

120 ECTS Master in Biomedical Engineering UB-UPC

Degree in Biomedical Engineering UB

60 ECTS Master in Biomedical Engineering UB-UPC

120 ECTS Master in Innovation and Enterpreneurship in Biomedical Engineering UB



Biomedical Engineering | 7 Institutions | Search a university

World Rank	Institution	Spain	Total Score	Q1
101-150	Complutense University of Madrid		33.3	
201-300	Autonomous University of Barcelona		27.4	
201-300	Polytechnic University of Catalonia		28.5	
201-300	Polytechnic University of Valencia		23.3	
201-300	University of Barcelona		35.8	
201-300	University of Granada		26.7	
201-300	University of Zaragoza		26.3	

* Institutions within the same rank range are listed alphabetically.

PROGRAMME DESCRIPTION

Interuniversity Master's Degree in Biomedical Engineering UB-UPC

- Biomedical Engineering is an **interdisciplinary field** where collaboration among engineers, health specialists and scientists unlocks doors to find solutions for medical and biological problems. It applies electrical, mechanical, chemical and other principles to the understanding, modification and control of biological systems. It also applies these same principles to the design and manufacturing of products that monitor biological functions in diagnostics, treatments and therapeutic devices.
- The UB-UPC MSc in Biomedical Engineering is designed to complement and reinforce the prior training of undergraduates in this fast-evolving field. It provides **advanced training in various aspects of the discipline**, laying down the foundations for academic or professional specialization and an introduction to applied research.
- It trains students in a carefully selected range of health technologies and their applications, coupled with **rigorous scientific research, technological development and innovation (R & D & I).** The content of the course follows European guidelines and covers those health technologies and medical products that are included in the EU member states' regulations.
- Our MSc in Biomedical Engineering is a fundamental tool to improve the health, welfare and quality of life of the population. It's an important channel to transform social investment into concrete socio-sanitary technologies.
- **We are open to talented, open-minded, visionary and hard-working students** that expect to develop their potential and confidence, and who are good at "thinking outside the box". The MSc in Biomedical Engineering will offer ways to make your ideas a reality, and allow you to share your creativity with others and learn new approaches.
- We will help you to observe, as well as to broaden the horizons of your imagination. While you're getting your hands dirty in learning how to create physical prototypes from your ideas using all the tools and methods available, we'll also help you connect your ideas with other people's – as well as with other biosystems.

TEACHING PLANS

- 60 ECTS shared with UPC
- 50 slots
- **Profiles:** Biomedical engineer, other engineering (up to 30 ECTS additional training), life-science and health, and other scientific degrees (physics, chemistry, biology, etc)

- Objectives:
  - Training of professionals, at university postgraduate level, in:
    - Activities related to social and health products and services
    - Activities related to preparation for research in a particular field of biomedical engineering.
  - Biomedical engineering must respond to engineering problems in biology and medicine. For this reason, training in Biomedical Engineering includes technical-scientific and practical-technological training, as well as adequate training in the basic disciplines of medicine.

MASTER PATHWAY

FIRST COURSE					
Code	**Subjects**	**Semester**	**ECTS**	**TYPE**	**Subject code (ECTS per branch group)**
571449	Biosystems and Nanobioengineering (UB)	1	5	OB	MD013H Biomedical Equipments and Bioengineering (10 CREDITS)
571448	Biomedical Equipment and Systems (UPC)	1	5	OB	
571450	Innovation and Bussiness in Biomedical Engineering (UB)	1	5	OB	MD013J Innovation and Business in Biomedical Engineering (5 CREDITS)
	OPTIONAL CREDITS	1	15	OPT	MD013K Bioelectronics and Nanobioengineering (12.5 CREDITS) MD013L Biomechanics and Biomaterials (15 CREDITS) MD013M Biomedical Technology (35 CRÈDITS) MD013N Biomedical Signalling and Imaging (35 CREDITS)
		2	20	OPT	
571477	Final Master thesis (UB/UPC)	2	10	TFM	MD013P Final Master thesis (10 CREDITS)
TOTAL CREDITS			**60**		

OPTIONAL SUBJECTS

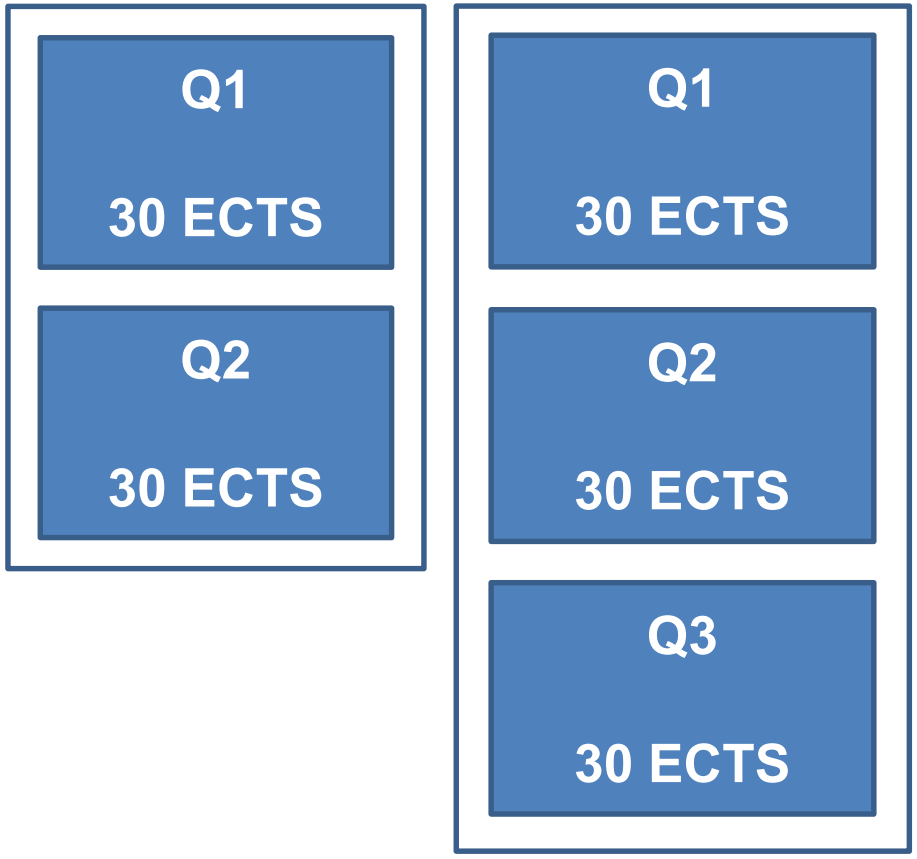
CODI	OPTIONAL BRANCH GROUP	CREDITS
MD013K	Bioelectronics and Nanobioengineering (UB)	12,5
SUBJECTS		
571452	Neuronal Bioengineering (UB)	2,5
571454	Biosensors & Lab on a Chip (UB)	2,5
571451	Micro i Nanobioenginnering (UB)	5
571453	Nanoparticles for Medical Imaging & Durg Delivery (UB)	2,5

CODI	OPTIONAL BRANCH GROUP	CREDITS
MD013L	Biomechanics & Biomaterials (UB/UPC)	15
SUBJECTS		
571455	Biomechanics of Human Motion (UPC)	2,5
574187	3D Biomatrials Engineering for Biomedicine (UB)	2,5
571478	Biological Interactions of Biomaterials (UPC)	2,5
571457	Biofluid mechanics (UB)	2,5
571456	Technologies for Regenerative Medicine (UB)	2,5
575505	Cell biomechanobiology	2,5

CODI	OPTIONAL BRANCH GROUP	CREDITS
MD013M	Biomedical Technology (UB/UPC)	35
SUBJECTS		
571465	Biophotonics (UB)	5
571463	Design of Biomedical Equipment and Systems (UPC)	5
571464	Principles and Techniques of Molecular and Cellular Analysis (UB)	2.5
571466	Organization and Supervision of Clinical Knowledge and Information (UB)	2.5
571468	Radiological Protection in Medical Applications (UPC)	2.5
571461	Radiation and Human Health (UPC)	5
571469	Medical Robotics (UPC)	5
571460	Communication Systems in Hospitals (UB)	5
573781	Comunications Technologies for Autonomous Health Monitoring (UB)	2.5

CODI	OPTIONAL BRANCH GROUP	CREDITS
MD013N	Biomedical Signalling and Imaging (UB/UPC)	35
SUBJECTS		
571473	Statistical Analysis and Computing of Biomedical Data (UPC)	5
571474	Advanced Processing and Analysis of Biomedical Signals (UPC)	5
571476	Bioinformatics and Computational Biology (UPC)	5
574188	Biomedical Informatics (UPC)	2.5
575XXX	Deep Learning Methods for Biomedicine (UPC)	2.5
571677	Processing of 2D and 3D Medical Images (UPC)	2,5
575017	Smart Sensing Systems (UB)	5
571475	Techniques and Analysis for Medical Imaging (UB)	5
571678	Visualization of 2D and 3D Medical Images (UPC)	2,5

MASTER PATHWAY AND BRIDGING COURSES



If Bridging courses are needed

SUBJECT CODE	NAME SUBJECT	ECTS	TEACHING PERIOD (1st or 2nd semester)
571479	Cell and Molecular Biology (UB)	5	1
571480	Physiology (UB)	5	1
571481	Biomaterials (UPC)	5	2
571482	Biomedical Instrumentation (UPC)	5	1
571483	Modelling and Simulation methods of Biosystems (UPC)	5	2
571484	Biomedical Signalling (UPC)	5	1

CALENDAR

CALENDARI 2023-2024 - QUADRIMESTRE DE TARDOR (1r i 3r)
CALENDARIO 2023-2024 - CUATRIMESTRE DE OTOÑO (1º Y 3º)

Mes	Setmana Semana	DILLUNS LUNES	DIMARTS MARTES	DIMECRES MIÉRCOLES	DIJOUS JUEVES	DIVENDRES VIERNES
	0	Matrícula	Q1	Del XXX	al XXX de	setembre
SETEMBRE SEPTIEMBRE	1	11 La diada	12	13	14 Inici Q1/Q3	15
	2	18	19	20	21	22
	3	25 Mercè	26	27	28	29
OCTUBRE OCTUBRE	4	2	3	4	5	6
	5	9	10	11	12 Hispanitat	13 Pont
	6	16	17	18	19	20
	7	23	24	25	26	27
NOVEMBRE NOVIEMBRE	8	30	31	1 Tots Sants	2	3
	9	6	7	8	9	10
	10	13	14	15	16	17 Sant Albert
	11	20	21	22	23	24
DESEMBRE DICIEMBRE	12	27	28	29	30	1
	13	4	5	6 Constitució	7 Pont	8 Sta Immaculada
	14	11	12	13	14	15
	15	18	19	20	21	22 Fi Q1/Q3
	16	25 Inici vacances	26	27	28	29
GENER ENERO	17	1	2	3	4	5 Final vacances
	18	8 Inici avaluació	9	10	11	12
	19	15	16	17	18	19
	20	22	23	24	25	26 Fi avaluació
FEBRER FEBRERO	21	29 Inici Re-avaluació	30	31	1	2 Fi TFM
	22	Matrícula	Q2	Del XXX	al XXX de	febrer
		5	7	8	9	9 Fi Re-avaluació Fi TFMr

CALENDARI 2023-2024 - QUADRIMESTRE DE PRIMAVERA (2n i 4t)
CALENDARIO 2023-2024 - CUATRIMESTRE DE PRIMAVERA (2º Y 4º)

Mes	Setmana Semana	DILLUNS LUNES	DIMARTS MARTES	DIMECRES MIÉRCOLES	DIJOUS JUEVES	DIVENDRES VIERNES
FEBRER FEBRERO	1	12 Inici Q2	13	14	15	16
	2	19	20	21	22	23
MARÇ MARZO	3	26	27	28	29	1
	4	4	5	6	7	8
	5	11	12	13	14	15
	6	18	19	20	21	22
	7	25 Inici Set santa	26	27	28	29
ABRIL ABRIL	8	1 Final Set santa	2	3	4	5
	9	8	9	10	11	12
	10	15	16	17	18	19
	11	22	23 Sant Jordi	24	25	26
MAIG MAYO	12	29	30	1 Treballadors	2	3
	13	6	7	8	9	10
	14	13	14	15	16	17
	15	20 2ª Pasqua	21	22 Fi Q2	23	24
	16	27	28	29	30 Inici avaluació	31
JUNY JUNIO	17	3	4	5	6	7
	18	10	11	12	13	14
	19	17	18	19	20	21 Fi avaluació
	20	24 Sant Joan	25 Inici Re-avaluació	26	27	28 Fi TFM
JULIOL JULIO	21	1	2	3	4	5 Fi Re-avaluació Fi TFMr

SCHEDULES FALL

FALL COURSE 2022-23

From SEPTEMBER 19th 2022 to DECEMBER 23rd 2022

Bridging Course
Core
Optional

Q1+BC	Monday	Tuesday	Wednesday	Thursday	Friday
14:00					
14:30					
15:00			INB		
15:30	BSNB	SB		BMC	P_BMC (G1)
16:00					
16:30			SEB		
17:00					
17:30	FL	P_FL(A)* 17:00-19:00		P_FL(B)* 17:00-19:00	P_BMC (G2)
18:00		P_SB* 17:00-19:30		P_INB* 17:00-19:30	
18:30					
19:00					
19:30					
20:00					
20:30					

Q1	Monday	Tuesday	Wednesday	Thursday	Friday
14:00					
14:30					
15:00			PRAM MBF		
15:30	BSNB	RSH APASB		IEEB	NPIM P_DESBIO
16:00					
16:30			SEB		
17:00					
17:30	IBBM 17:00-19:00 P/VIM 17:00-20:00	P_RSH		IFB	P_APASB* P_NPIM*
18:00					
18:30		DESBIO			
19:00			ACEDB		
19:30					
20:00					
20:30					

SCHEDULES SPRING

Q2+BC	Monday	Tuesday	Wednesday	Thursday	Friday
9:30				3DBIOMED 10:00-12:00	
10:00					
10:30	CTAHM		BN	P_3DBIOMED 9:00-12:00	MBC
11:00					
11:30					
12:00					
12:30		P_BF	BF	SSI	P_SSI 11:45-13:45
13:00					
13:30					
14:00					
14:30	B				
15:00					
15:30		BMH	MNB TAMI	BLOC OGI	MNB P_TAMI
16:00					
16:30	P_B				
17:00		MMSB P_MMSB	CSH-G2 17:00-19:00 P_BBC 17:30-19:30	CSH-G3 17:00-19:00 FTACM 17:00-20:00	RM
17:30					
18:00					
18:30	BBC				
19:00					
19:30					
20:00					

Q2	Monday	Tuesday	Wednesday	Thursday	Friday
9:30				3DBIOMED 10:00-12:00	
10:00					
10:30	CTAHM		BN	P_3DBIOMED 9:00-12:00	MBC
11:00					
11:30					
12:00					
12:30		P_BF	BF	SSI	P_SSI 11:45-13:45
13:00					
13:30					
14:00					
14:30					
15:00					
15:30	TMR	BMH	MNB TAMI	BLOC OGI	MNB P_TAMI
16:00					
16:30					
17:00					
17:30		CSH-G1	CSH-G2 17:00-19:00 P_BBC 17:30-19:30	CSH-G3 17:00-19:00 FTACM 17:00-20:00	RM
17:30					
18:00					
18:30	BBC				
19:00					
19:30					
20:00					

TUTORIAL ACTION PLAN (PAT)

- You will have all the time a tutor who will give you advise in your studies.
- The person who can naturally best perform this role is your supervisor/tutor in the Final Master's Thesis (TFM).
- As long as you don’t have not decided the topic of your TFM, The Coordination will act as temporarily tutor.
- First, the Coordination of the master, and then, your TFM supervisor/tutor will guide you on the choice of subjects and on the services of the Faculty and the UB that may be of interest to you (for example, International Relations, Language Resources, career guidance, etc.).

Màster Enginyeria Biomèdica UB-UPC

TREBALL FINAL DE MÀSTER 2022/23

1. Matrícula

- Juliol/Setembre 2021
  - **C1 i C1-R**
- Febrer 2022
  - **C2 i C2-R**

2. Registre

- **C1 i C1-R**
  - Fins 28 novembre 2022
- **C2 i C2-R**
  - Fins al 15 de maig 2023

3. Dipòsit

- **C1:** Fins 16 gener 2023
- **C1-R**: Fins 23 gener 2023
- **C2:** Fins 12 juny 2023
- **C2-R**: Fins 19 juny 2023

4. Defensa

- **C1:** 23 gener-3 febrer 2023
- **C1-R**:30 gener-10 febrer 2023
- **C2:** 19 - 29 juny 2023
- **C2-R**: 26 juny-7 juliol 2023

- Registre: online (***Registre Ordinari*** / ***Extern***)
- Dipòsit online
  1) Penjar al Campus Virtual: Versió pdf de la memòria (o .zip).
  2) A més penjar:
     - ***Sol·licitud de lectura***
     - ***Autorització del director***
     - Addicional/Opcional:
       - Sol·licitud de rebre informació relativa a inserció laboral (inclòs a la Sol·licitud de lectura)
       - Sol·licitud de publicació al Dipòsit UB (inclòs a la Sol·licitud de lectura)
       - Sol·licitud de confidencialitat – contactar amb enginybiomed@ub.edu per més informació

Documents **Normativa TFM (10 ETCS)** i **Pautes de Confecció** disponibles a la pàgina web del Màster i al Campus Virtual de l'assignatura

Non-curricular training available!!!!

TFM AND FELLOWSHIPS

- IBEC http://www.ibecbarcelona.eu/research-groups/

  Fellowships!!!! http://www.ibecbarcelona.eu/master
- IRB https://www.irbbarcelona.org/en/research
- IBMB-CSIC http://www.ibmb.csic.es/research/departments
- SIC-BIO https://www.ub.edu/portal/web/dp-electronica/grups-de-recerca
- UPC https://www.upc.edu/en/r-d-i/departments-research-centres-and-laboratories
- ICN https://icn2.cat/en/research
- ICMAB http://icmab.es/about/organisation/research-groups
- CNM http://www.imb-cnm.csic.es/index.php/en/research
- UAB https://www.uab.cat/web/research-1345666325304.html
- Companies
- Etc…

ERASMUS AND GLOBAL UB MOBILITY

Destinació	Grau/Màster	Places (màx)	Mesos (total)	Comentaris
Lausanne EPFL (Suïssa)	G (Fis / EET) / M	4	20	Compartit graus de Física i EET
Aachen - RWTH (Alemanya)	G (EET) / M (Nano)	2	10	
Jena (Alemanya)	M (Eng. Bio)	2	10	
Kaiserslautern (Alemanya)	G/M (Astro/Nano/Eng. Bio)	1	5	
Lübeck (Alemanya)	G (Eng. Bio)/ M (Eng. Bio)	2	20	Compartit grau i màster
Munich (Alemanya)	G/M	5 (Fis)/2 (EET)	25 (Fis)/10 (EET)	
Grenoble UJF (França)	G (Fís)	2	10	
Grenoble INP (França)	M (Eng.Bio/Nano)	3	15	
Grenoble (UGA)	M(Innova)		30	
Lyon (França)	G (Fis)	2	10	
Paris (França)	G (Eng. Bio)/ M (Eng. Bio)	3	18	Compartit grau i màster
Sorbonne (França)	M(Innova)		30	
Bologna (Itàlia)	G (Fís)	1	10	
Genoa (Itàlia)	M (Meteo)	1	6	
Milà - Politècnic (Itàlia)	G (Eng. Bio)/ M (Eng. Bio/Meteo)	3	15	Compartit grau i màster
Milà -Bicocca (Itàlia)	G (Fis)	2	10	
Torino - Politècnic (Itàlia)	G (Eng. Bio)/ M (Eng. Bio/Meteo)	3	18	Compartit grau i màster
Trento (Itàlia)	G (Fis) / M (Fis)	1	10	
Trondheim (Noruega)	G/M	4 (Fis)/2(EET)	30 (Fis)/10 (EET)	
Àmsterdam (Països Baixos)	G (Fis) / M (Fis)	2	12	
Delft (Països Baixos)	G (Eng. Bio)/ M (Eng. Bio)	2	10	Compartit grau i màster
Leiden (Països Baixos)	G (Fis)/ M (Astrofis.)	2	10	
Nijmegen (Països Baixos)	G (Fis) / M (Fis)	2	10	
Lisboa (Portugal)	M(Innova)		30	
Goteborg - Chalmers (Suècia)	G (EET) / M (EB) / M	2 (EET) / 1(MEB)	10 (EET) / 5 (MEB)	No es pot fer TFG ni TFM
Lund (Suècia)	G (Fis) / M (Fis)	1	5	
Estocolm KTH (Suècia)	G (Fis) / M (Fis)	2	10	
Estocolm Universitat (Suècia)	G (Fis) / M (Fis)	2	10	
Helsinki (Finlàndia)	G (Fis) / M (Fis)	4	20	

Erasmus màsters

(http://www.ub.edu/uri/estudiantsUB/erasmus.htm)

- Erasmus pràctiques, tercer termini mobilitats pel segon semestre (http://www.ub.edu/uri/estudiantsUB/erasmus.htm)

CAREER OPPORTUNITIES

The three professional areas in which the development of these activities is located are: industrial, healthcare and R & D & I.

- In the industrial field, the main subsectors that act as applicants for this type of specialization are: deep learning and artificial intelligence, electromedicine, *in vitro* diagnosis, nephrology, cardiovascular, neurosurgery, implants for orthopedic surgery and traumatology, disposable health products and dental technology.

- In the health field, it is necessary to have staff with direct responsibility for the management of the equipment, who combine technical knowledge with adequate training on the application of these technologies.

- In the field of R & D & i activities in companies, scientific and technological research centers and groups in both public and private centers. Possibility of doctorate (Biomedical Engineering line in Biomedicine or in the Engineering and Applied Science programs)

	Màster	UB Subàrea
Taxa d'ocupació	94,74%	89,39%
Taxa d'atur	5,26%	5,57%
Taxa d'inactivitat		5,04%
Taxa d'adequació (funcions específiques del màster)	33,33%	68,25%
Taxa d'adequació (funcions universitàries)	72,22%	34,72%
Taxa d'adequació (funcions no universitàries)		5,04%
Grau de satisfacció amb la feina (sobre 7)	5,05	4,88
Mitjana de valoració de la utilitat de la formació teòrica rebuda (sobre 7)	2,58	4,11
Mitjana de valoració de la utilitat de la formació pràctica rebuda (sobre 7)	3	4,3
Nombre de titulats	63	955
Nombre de respostes	19	458
% respostes	30,16%	47,96%

QUESTIONS?

enginybiomed@ub.edu