VRIJE UNIVERSITEIT BRUSSEL

MASTER OF SCIENCE IN

BIO MOLE CULAR SCIENCES

www.vub.ac.be/biomolecular-sciences

120 ECTS

WHY VUB

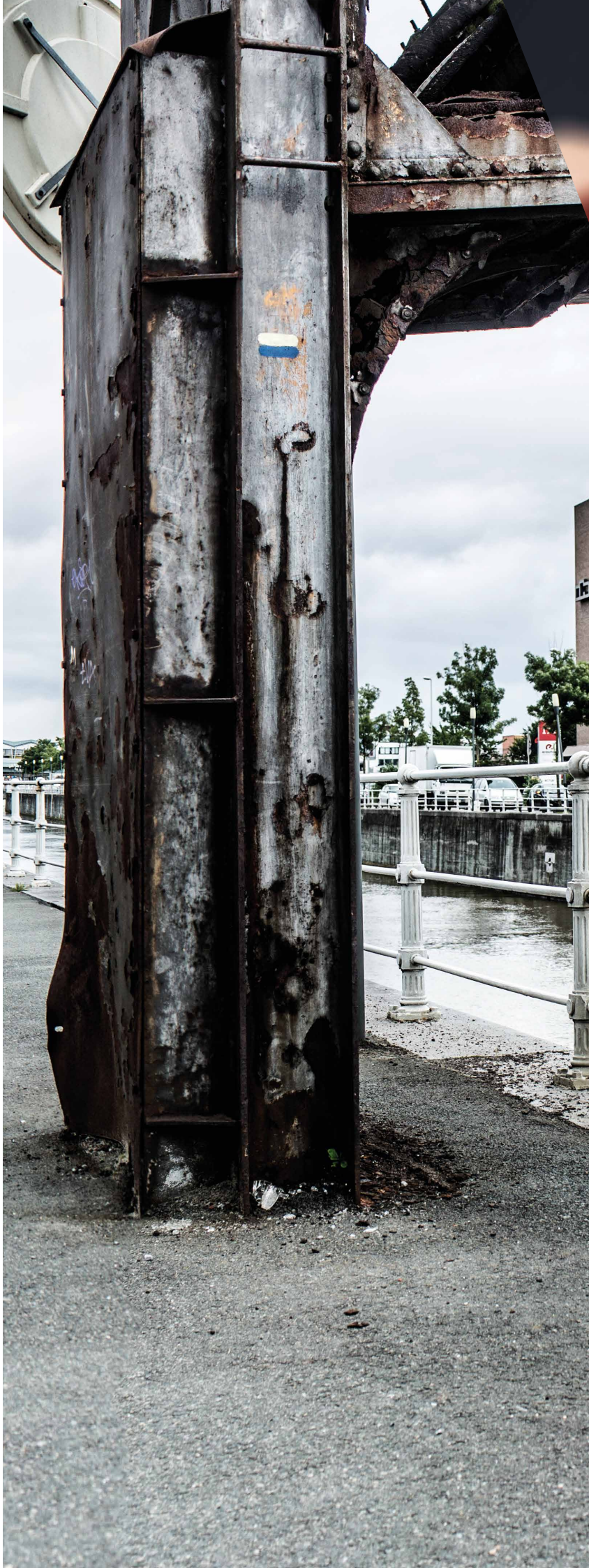
VUB education delivers strong individuals, critical minds & world citizens

The Vrije Universiteit Brussel (VUB) offers high-quality English-taught programmes, supported by outstanding research. Being a student at VUB means learning in an open atmosphere of tolerance and diversity and growing into an independent and critical-thinking individual.

All fields of study are offered on 4 student-friendly campuses in the cosmopolitan city of Brussels. At VUB, students have easy access to their lecturers and assistants. Faculty members are available and open to answer questions; small group workshops are used to ensure close interaction and hands-on experience.
VUB is a dynamic and modern university with almost two centuries of history. There are 15.000 students, 21% of whom are international students from more than 120 different countries.

The basis of our academic success

The Vrije Universiteit Brussel was founded on the principle of 'free inquiry' as formulated by the French mathematician and philosopher of science Henri Poincaré (1854-1912): 'Thinking must never submit itself, neither to a dogma, nor to a party, nor to a passion, nor to an interest, nor to a preconceived idea, nor to anything whatsoever, except to the facts themselves, because for it to submit to anything else would be the end of its existence.'
Personal growth with a positive and critical attitude, a sense of responsibility and open-mindedness, these are characteristics that you will encounter in everyone at the university, from professors and researchers to students and staff. It lies at the heart of our academic success.



From molecules to organisms

Do you have a Bachelor's degree in biology, biotechnology, chemistry, or biomedical science, and are you still fascinated by the biochemical unity that underlies the world's biological diversity? Then the Master in Biomolecular Sciences is the programme you're looking for!

Biomolecular Science is a rapidly developing discipline. It stands at the crossroads of chemical, biological, physical and computational sciences and focuses on the molecular understanding of cellular functions. Anticipating this evolution, this Master's programme will focus on the understanding of cellular processes, biological molecules and their interactions.

The programme also aims to develop the mentality to perform and manage research in a multidisciplinary and international context so our students are trained in various aspects of research communication and research management.



MASTER OF SCIENCE IN BIOMOLECULAR SCIENCES

The programme content was outlined by a number of outstanding and multidisciplinary scientific teams. The embedding of the programme in this high-level scientific environment is our guarantee for a strong multidisciplinary course that intertwines theoretical formation with research-oriented skills. To endorse the research-oriented nature, the advanced courses and the electives are taught by leading researchers with a proven scientific track record.

The two-year programme has a strong emphasis on carrying out research. Its concept requires full-time attendance and active participation in lectures and discovery-based laboratory work to develop the mentality that drives the progress of science.

Students as scientists

During practical training, problem-solving formats are used in which students work together to make observations and analyse experimental results. Students who learn via problem-solving formats demonstrate better problem-solving ability, conceptual understanding and success in subsequent courses than those who learn in traditional, passive ways.

Master's Thesis (30 ECTS)

Under the direction and supervision of a promoter, students carry out an independent research project and prepare a dissertation: a written account of the research and its results. During the experimental part of the thesis, you learn to plan and perform experiments and critically interpret the results. You also learn to report both orally and in written, prepare presentations and summarise literature data. You learn to present your work in public and answer questions from a jury and the audience. Any topic is potentially acceptable as long as it offers a real contribution to Biomolecular Sciences.

Research Communication and Management (10 ECTS)

This part of the programme includes the writing of the results of the dissertation in a publication format, seminars on intellectual property rights, scientific writing, project development and the writing of a research proposal.

The latter can be a proposal for a continuation of the topic of the Master's thesis, a proposal for a PhD project, or a proposal for another research project in Biomolecular Sciences, and is intended to help you to continue your career in biomolecular research.



MASTER YEAR 1	ECTS
Protein Structure and Function	
Molecular Biophysics	5
Protein Structure and Function	5
Mechanisms, Kinetics and Applications of Enzyme Catalysis	5
Applied Immunology	
Cellular Biology and Immunology	5
Recombinant Antibody Engineering	5
Molecular Parasitology	5
Advanced Molecular Biology	
Advanced Molecular Biology	5
Molecular Microbiology	5
Plant Molecular Biology	5
Advanced Developmental Biology	5
Bioinformatics	
Biostatistics	5
Bioinformatics and Omics	5

MASTER YEAR 2	ECTS
Some Electives (4x5 ECTS)	
High Throughput Techniques	5
Vaccine Technology	5
Molecular Phylogenetics and Evolution	5
Microbial Life in Extreme Conditions	5
Stem Cell Biology	5
Micro- and Nanobiotechnology	5
Protein Maturation and Trafficking	5
Advanced Aspects of Molecular Pharmacology	5

*The programme is subject to change. Check **www.vub.ac.be/biomolecular-sciences** for the latest information about the programme.*

ECTS (European Credit Transfer System): 1 credit represents 25-30 hours of study activity.

OUTLINE OF THE PROGRAMME

First year: 4 compulsory modules
The courses are at advanced level and consist of 26 class hours and 6 days of practical training. The practical trainings link up with the advanced courses and will take place in the research labs under the guidance of experienced postdocs.

Second year: 3 modules
- Elective courses (20 ECTS)
- Master's Thesis (30 ECTS)
- Research Communication and Management (10 ECTS)

WORKING AS A BIO-MOLECULAR SCIENTIST

START YOUR SCIENTIFIC CAREER IN BRUSSELS

Scientific research in the Brussels-Capital Region is mainly geared towards highly specialised sectors and advanced technologies. Biomolecular science is a rapidly developing discipline in modern life science, and companies need ambitious scientists who understand cellular processes, biological molecules and their interactions.
The problem-solving formats in the programme and courses such as Research Communication and Management are intended to help you to continue your career in biomolecular research. After graduation, you can embark on a PhD, join any R&D department of a pharmaceutical, food or biotech company, work on environmental protection, develop state-of-the-art equipment in biotechnology or be part of a sales and marketing department.

ONGOING RESEARCH

The Vrije Universiteit Brussel has a sound reputation in training and in basic and applied research in molecular biology and biotechnology. Since the biotech revolution in the 1970s, interest in applied biotechnology has grown steadily. Our major discoveries at the Vrije Universiteit Brussel include:

- the first development of a genetically modified plant
- identification of a unique class of camel antibodies with far- reaching implications in biotechnology and medicine
- development of pioneering technology for analysis of protein structure
- breakthroughs in the knowledge of the role of macrophages in cancer and malaria
- elucidation of the action mechanism of antihypertensive drugs
- innovative techniques in the culture of micro organisms involved in fermented food products

A STEP TOWARDS NOVEL CANCER THERAPY

"During the practical training of the Master in Biomolecular Sciences, I discovered a very attractive specificity/the field of cancer immunology. I did my master dissertation on this research topic. It was a really hard year, with long, tiring experiments. However, carrying out research gave me so much knowledge, experience that I just kept trying until I had interesting results.
After finishing the programme, my only wish was to become a PhD student, which was definitely related to the topic proposed by my promoter: Macrophages, the top regulators of immune responses, induce cancer growth and metastasis. The depletion of these pro-tumoral macrophages could be a novel cancer therapy. My desire to work in this field as a PhD candidate and the support of my promoter and my colleagues led me to my situation: an IWT-granted-PhD student wishing to help research in a four-year-period. What I learned is that if you really want something, struggle for it. Nothing is impossible; all you need is desire and a bit of luck."

Evangelia BOLLI
PhD student

DEVELOPING VALUABLE SKILLS

"I'm from Canada, and having completed my bachelor degree there, I sought international opportunities to broaden both my scientific and cultural views. With this in mind I chose to partake in the Master of Science in Biomolecular Sciences. Combining people of several different cultures to explore several different facets of science not only aroused my curiosity but allowed me to develop valuable skills such as perseverance and new techniques, and to refine my interests. Armed with these assets, on completion of the program I immediately transitioned into life as a PhD candidate. I've spent the last several years investigating various inflammation - associated pathologies in an attempt to develop more effective diagnostic and therapeutic strategies. This is just the beginning of a world of possibilities!"

Amanda Sparkes
PhD student

VRIJE UNIVERSITEIT BRUSSEL

ADMISSION CRITERIA

Admission is based on the review of each application: proof of meeting academic and language requirements, personal motivation, etc.

LANGUAGE REQUIREMENTS

Prospective students can provide proof of sufficient knowledge of English as language of instruction by meeting one of the following criteria:

- having successfully completed one of the following language proficiency tests:
  - TOEFL: minimum level: 213 for the computer-based test (CBT); 72 for the internet-based test (IBT); 550 for paper -based test
  - TOEIC: minimum level: 785
  - IELTS: minimum level academic module 6
  - CAE: minimum grade B
  - CPE: minimum grade C
  - ITACE for Students certificate with ERK/CEFR score B2
  - Cambridge English First (FCE)
  - Cambridge English: Business Vantage (BEC Vantage)
  - Cambridge Michigan ECCE
  - Trinity College London: ISE II, GESE Grade 7-9; or ALTE Q mark
  - The Pearson Test of English General (PTE General): minimum level 3
  - The Pearson Test of English Academic (PTE Academic): minimum level 59
- having successfully completed at least one year of secondary education with English as language of instruction, or having successfully completed secondary school in a Belgian institution;
- having successfully completed programme units in higher education with a minimum of 54 ECTS-credits where English was the language of instruction.

For more details on admission requirements and application: **www.vub.ac.be/en/apply**

For admission in the Master of Science in Biomolecular Sciences, students need a Bachelor degree in the area of biology, chemistry, biomedical science or equivalent.

APPLICATION PROCEDURE

Prospective students must pre-apply by filling out the pre-application form, which can be downloaded at **www.vub.ac.be/biomolecular-sciences**

We only accept pre-application through this form. All correspondence will proceed via email. No reply will be sent to applicants who fail to submit all required information. Based on this information, the programme director will evaluate whether or not the basic requirements for admission have been met. Once you have received a positive answer to your pre-application, you can proceed with the final application.

Application deadline

Prospective students are advised to apply as soon as possible, even if they have not yet obtained their degree. Applications can only be submitted through our website **www.vub.ac.be/en/apply**

- Students who require a visa (non-EU/EEA nationals) need to submit their application before June 1st
- Students who do not require a visa must apply before June 1st
- Note: if the proof of English proficiency or APS certificate is not ready before the deadline, you can always submit it later instead of missing the deadline

Tuition fees

All Flemish universities in Belgium are subsidised by the government, which results in relatively low tuition fees. The general tuition fee for our master programmes is €890/year. Some programmes have higher tuition fee for students with a non EU/EEA nationality. A detailed overview of the tuition fees can be found on:
www.vub.ac.be/en/tuition-fees

Contact

For more info:
www.vub.ac.be/biomolecular-sciences
Misses Greet Devuyst at gjdevuys@vub.ac.be

mt 09-16/600 ex.