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Space science & industry oriented academic degrees and courses in Europe

Polska Agencja Kosmiczna / Polish Space Agency

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CONTENTS

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		Modification reason	Modified by
1	16.02.2021	First draft	POLSA
2	26.02.2021	Layout & minor content update	POLSA

1. INTRODUCTION

Proper pre-orientation is a key for a wise planning and managing one's education, career prospects and interests. This universal assumption becomes the more accurate, the more the world becomes globalized, volume of information and its providers multiply, while society's and economy's complexity grows beyond imagination of previous generations.

Space exploration and technologies are no different, if not even more extreme examples of above mentioned trends. Merely a niche and a matter of interest for few pioneers and visionaries only a couple of decades ago, now grows at a rapid pace and evolves into enormous industry, with multiple branches, thousands of people and billions of euros involved.

The objective is not to cover all the spectrum of higher education programs and academic institutions associated with space, rather to put a spotlight on those most distinguishable and focused exclusively on preparing to work in the sector right after graduation. It is important to be aware that basic and background knowledge and skills potentially useful and desirable by either space most prominent players and promising startups can be gained elsewhere. It applies not only to STEM, but to a much wider range of degrees, including medicine, psychology, project management or logistics.

The catalog provides English-taught only courses' descriptions and basic practical information that is valuable to potential applicants and students. However, please bear in mind that curricula, programs, and policies cannot be static in a changing environment, hence the information in this catalog should be regarded only as a reference and a starting point for further verification. If you actually consider applying for any of the presented degrees or courses, please visit the appropriate website and consult directly with university or institution responsible for the admission process.

ABOUT THE PROJECT

FUTURE SPACE is a transnational cooperation project implemented within the framework of ERASMUS+ Programme, financed by the European Union.

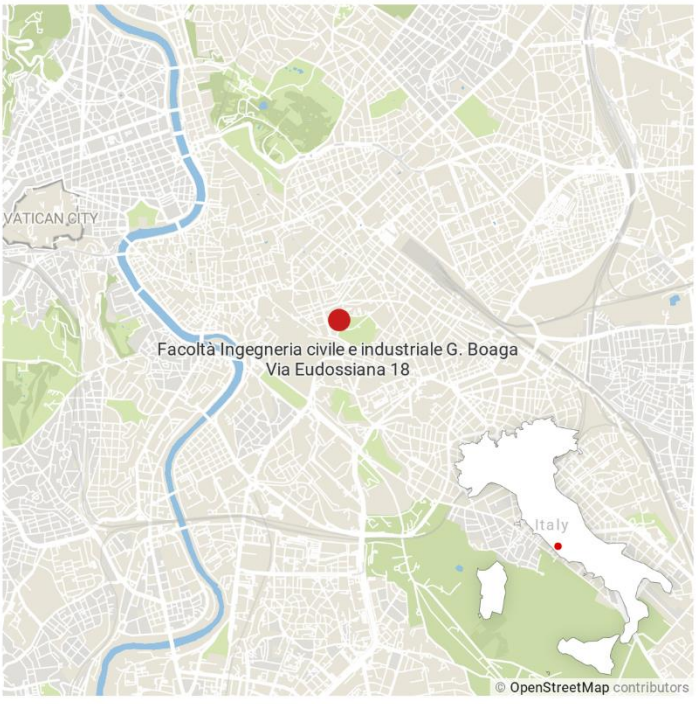
The consortium members are: Space Research Centre of Polish Academy of Sciences (CBK PAN) as the leader, Polish Space Agency (POLSA), Computer Assisted Education and Information Technology Centre in Warsaw (OEIiZK), National Center for Science and Technology in Amsterdam (NCWT) and Thessaloniki Science Center and Technology Museum. For further information on all the institutions please visit https://futurespaceproject.eu/ or email us at futurespace@cbk.waw.pl.

This catalog, along with a series of video interviews with experienced professionals, presented as role models, is a part of the 'Space Career Paths' intellectual output of the project, complementary to its main deliverables: the Space Schools Programme and the Space Programme for science centres and other non-formal education organisations.

2. BACHELOR'S STUDIES

Aerospace Engineering (Rome, Italy)

1. **Field**: Engineering
2. **Type of studies:** Bachelor's studies
3. **Institute of higher education:** Sapienza – University of Rome
4. **Programme description:** The three-year Degree Programme in Aerospace Engineering aims to provide students with a solid knowledge in the fields of mathematics and physics, as well as of the fundamental aspects of the Aeronautical Engineering and the Space and Astronautical Engineering subjects. The experimental and numerical laboratory modules, which are held during the third year of the Programme, also contribute to the development of the transversal and practical skills that are useful for students to enter the job market. The level of skills achieved at the end of the Programme enables graduates to successfully pursue a Master's Degree in Aeronautical Engineering or in Space and Astronautical Engineering, and to perform effectively at work. The general preparation provided by the Study Programme forms graduates that are capable of acquiring, even by themselves, the specific additional skills that are useful for their professional activities and to continue their studies in other fields of Engineering.
5. **Requirements**
6. **Language of instruction:** English
7. **Tuition fee:** Free of charge for EU residents
8. **Duration**: 3 years
9. **Website**



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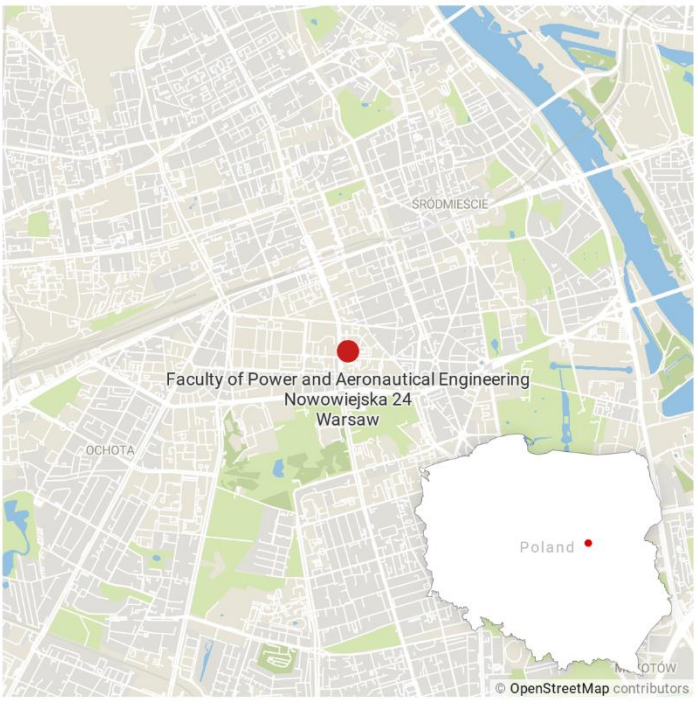
Aerospace Engineering (Warsaw, Poland)

1. **Field**: Engineering
2. **Type of studies:** Bachelor's studies
3. **Institute of higher education:** Warsaw University of Technology
4. **Programme description:** Objectives of the programme are to create solid fundamental engineering knowledge during the first year of studies, then acquaint the students with the topics related to the subject of studies. The graduates are qualified for jobs in industry and ready to solve engineering problems. Graduates from Aerospace Engineering demonstrate expertise required in modern aerospace industry, in the airlines and in other industries applying novel technologies. They are also prepared to respond to the needs of research institutions in the field of research, design, development and maintenance of aircraft and spacecraft. Besides of basic electronics and information sciences including CAD, they possess solid knowledge in mechanics, thermodynamics - together with an understanding of combustion processes, in materials and in manufacturing technologies which are used in aerospace industry.
5. **Requirements**
6. **Language of instruction:** English
7. **Tuition fee:** 1500 € per semester
8. **Duration**:3.5 years
9. **Website**



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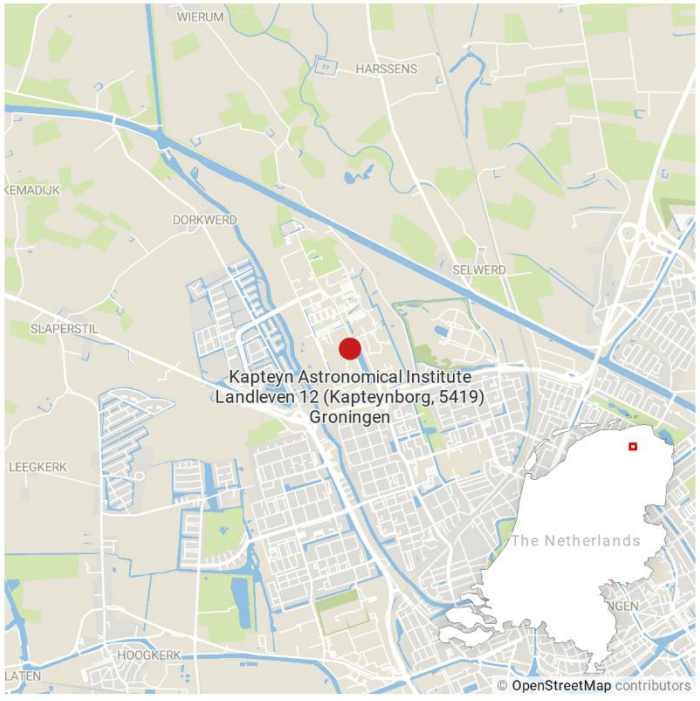
Astronomy (Groningen, Netherlands)

1. **Field**: Space studies
2. **Type of studies:** Bachelor's studies
3. **Institute of higher education:** University of Groningen
4. **Programme description:** If you are interested in the natural sciences, this international program will appeal to you. You will study the physical processes in the universe, which means that physics and mathematics are an important part of the program. Our three-year program ranks as atop-degree in the Netherlands and has a regular intake of 50-60 students, ensuring many contact hours and availability of excellent facilities. You still have the opportunity to switch to (Applied) Mathematics in the first semester and you can still switch to (Applied) Physics in the first year. This means you can never go wrong! Spectacular discoveries have recently been made in the field of astronomy, mainly because technological advances make new things possible. In Groningen, you can concentrate on the universe itself, or on developing and improving instruments. Our broad program even offers a specialization in instrumentation and informatics in the minor phase as an alternative to the general Astronomy minor. The Groningen astronomers are among the best in the world. Research has been carried out at the University since 1883. Groningen astronomers collaborated in the development of the HIFI instrument in the Herschel space telescope, and are involved in the international LOFAR network of radio telescopes.
5. **Requirements**
6. **Language of instruction:** English
7. **Tuition fee:** 2143 €/year (tuition fee for the first year may be halved)
8. **Duration**: 3 years
9. **Website**



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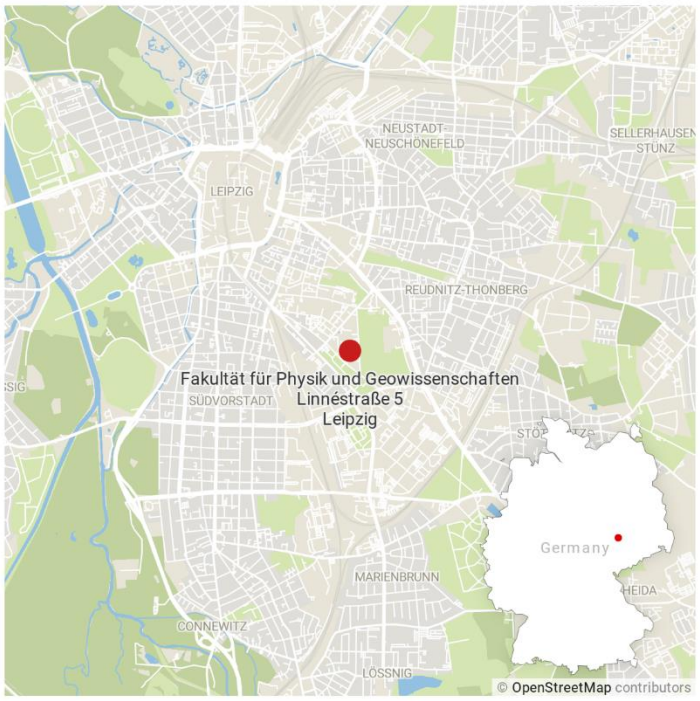
International Physics Studies Programme (Leipzig, Germany)

1. **Field:** Space science
2. **Type of studies:** Bachelor's studies
3. **Institute of higher education:** Leipzig University
4. **Programme description:** This Bachelor's course constitutes a traditional university education in physics. This comprises lectures and exercises in experimental and theoretical physics and in mathematics, as well as laboratory courses that will provide a broad and applicable knowledge in physics and mathematics: Experimental Physics with included Laboratory Courses (Mechanics, Fluid Mechanics, Heat, Electricity, Magnetism, Optics, Atomic Physics, Molecular Physics, Soft Matter and Solid State Physics); Advanced Physics Laboratory Course; Mathematics (Linear Algebra, Advanced Differential and Integral Calculus, Sequences and Series, Ordinary and Partial Differential Equations); Theoretical Physics (Classical Mechanics, Electromagnetic Field Theory, Special Relativity, Thermodynamics, Introductory Quantum Mechanics and Statistical Physics); Numerical Mathematics; Bachelor's thesis. Electives include a choice of a German course or Chemistry and Computational Software. Further specialization is possible by choosing between Advanced Mathematics or specific Physics courses in preparation for the Bachelor's thesis (including Astrophysics, Introduction to Computational Physics, Semiconductor Physics, Photonics and Superconductivity). A compulsory, project-oriented internship concludes the curriculum.
5. **Requirements**
6. **Language of instruction:** English
7. **Tuition fee:** free of charge
8. **Duration**: 3 years
9. **Website**



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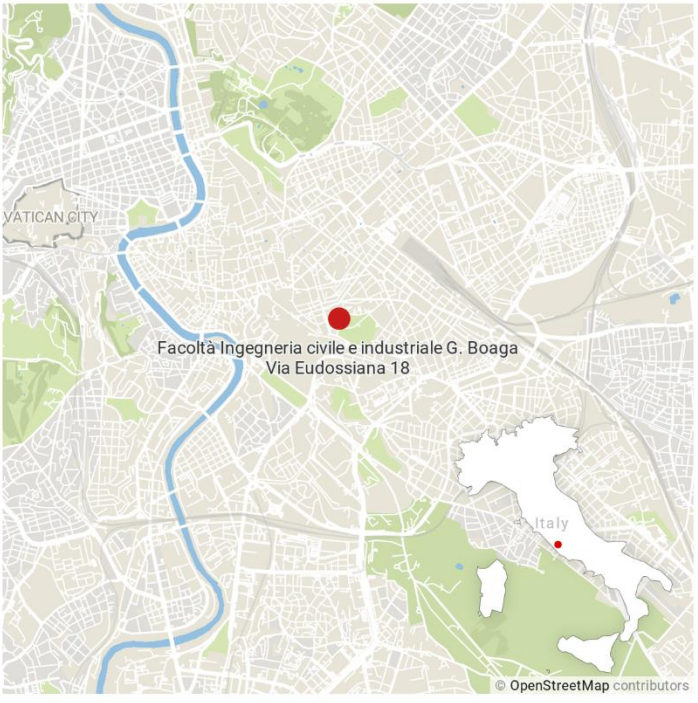
3. MASTER'S STUDIES

Aeronautical Engineering (Rome, Italy)

1. **Field**: Engineering
2. **Type of studies:** Master's studies
3. **Institute of higher education:** Sapienza – University of Rome
4. **Programme description:** The Master's Degree Course in Aeronautical Engineering aims to provide students with advanced scientific and professional training with specific engineering skills that enable them to face complex problems associated with the analysis, development, simulation and optimization of the various components of a fixed wing or rotary wing aircraft. The education it provides is primarily aimed at developing the most advanced research and design tools and innovation in the aeronautics industry, with particular attention to improving efficiency, reducing weight and reducing chemical and noise pollution. These skills are achievable thanks to the further deepening of the solid knowledge already acquired during the Bachelor's Degree that the two-year study programme of the Master's Degree provides, in terms of methodology and practice.
5. **Requirements**
6. **Language of instruction:** English
7. **Tuition fee:** Free of charge for EU residents
8. **Duration**:2 years
9. **Website**



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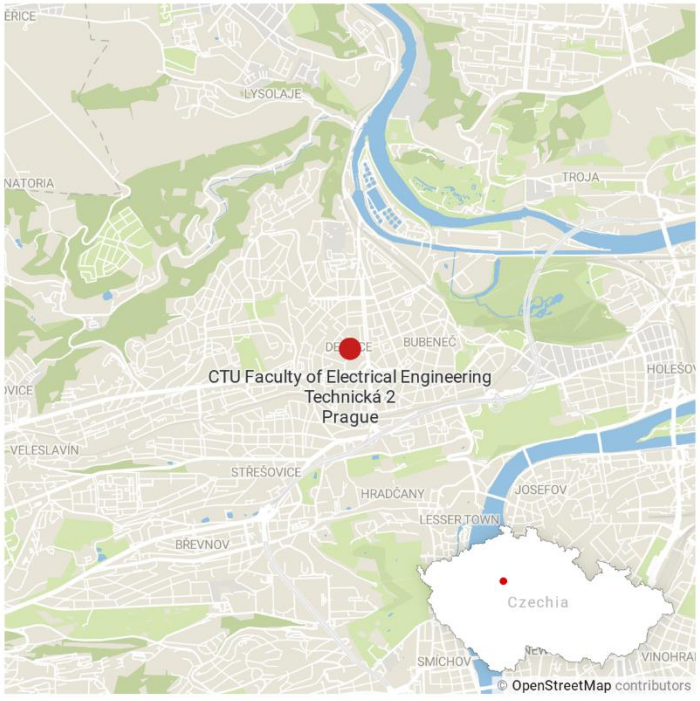
Aerospace Engineering (Prague, Czechia)

1. **Field**: Engineering
2. **Type of studies:** Master's studies
3. **Institute of higher education:** Czech Technical University in Prague
4. **Programme description:** Aerospace Engineering is a Master's degree study program focused on education and training of nowadays and/or future specialists in the field of aeronautical and space systems and technologies. Although the program is taught at the Faculty of Electrical Engineering, it can be considered as a whole-university program, because of a strong link with the Faculty of Mechanical Engineering where several compulsory courses are given. Even if the program puts the emphasis on aerospace fields, the education is supported by a broad knowledge of electronics, embedded systems, and their design, programming and usage. Moreover, the program curriculum is extended by soft skills training. The program content is in accordance with prestigious European aerospace universities and thus provides a good competitive basis for graduates' future employment in a variety of private and state companies and institutions.
5. **Requirements**
6. **Language of instruction:** English
7. **Tuition fee:** 5100 €
8. **Duration**:2 years
9. **Website**



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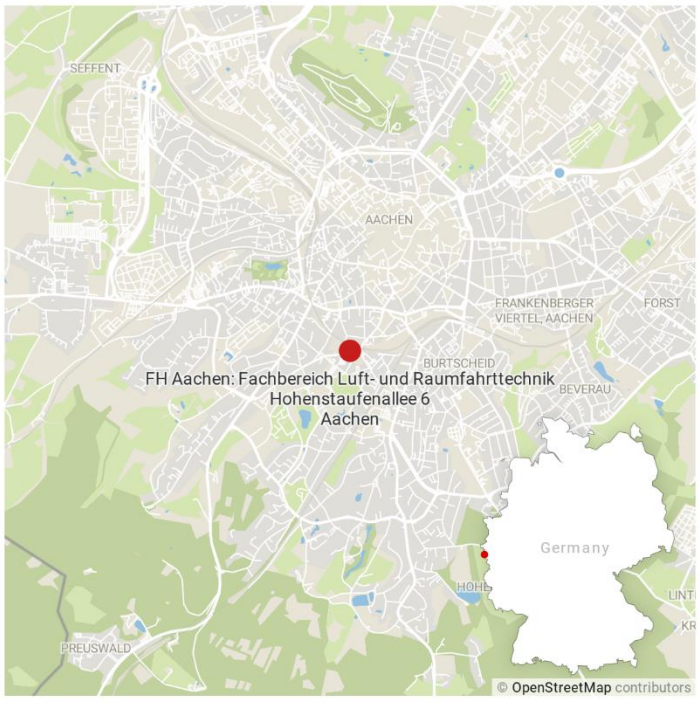
Aerospace Engineering (Aachen, Germany)

1. **Field**: Engineering
2. **Type of studies:** Master's studies
3. **Institute of higher education:** FH Aachen - University of Applied Sciences
4. **Programme description:** Students can choose their subjects of study freely from the fields of "General Aerospace Engineering" and "Advanced Aerospace Engineering". The faculty will, however, suggest exemplary study plans which cover "Aeronautical Engineering", "Astronautical Engineering", "Propulsion Engineering" and "Simulation Engineering". The fundamentals of engineering are consolidated, with the result that graduates will be able to solve subject-specific problems independently, whether it is in the area of product development in the industry or regarding tasks in academic research. In so doing, they also get their qualifications for leading positions. The course of study takes place as an international cooperation and is therefore mainly taught in English. English-language presentations by students are part of the exercises and work placements. The degree programme was designed in cooperation with the industrial faculty's advisory board in a practice-oriented manner. For the most part, the teaching staff has years of experience with relevant industrial and major research.The training is supplemented by interdisciplinary modules, such as foreign languages, formation of a business, project management or patent law for engineers, to name just a few. The course of study is completed by a project-related Master's thesis and a colloquium.
5. **Requirements**
6. **Language of instruction:** English
7. **Tuition fee:** free
8. **Duration**: 3 semesters
9. **Website**



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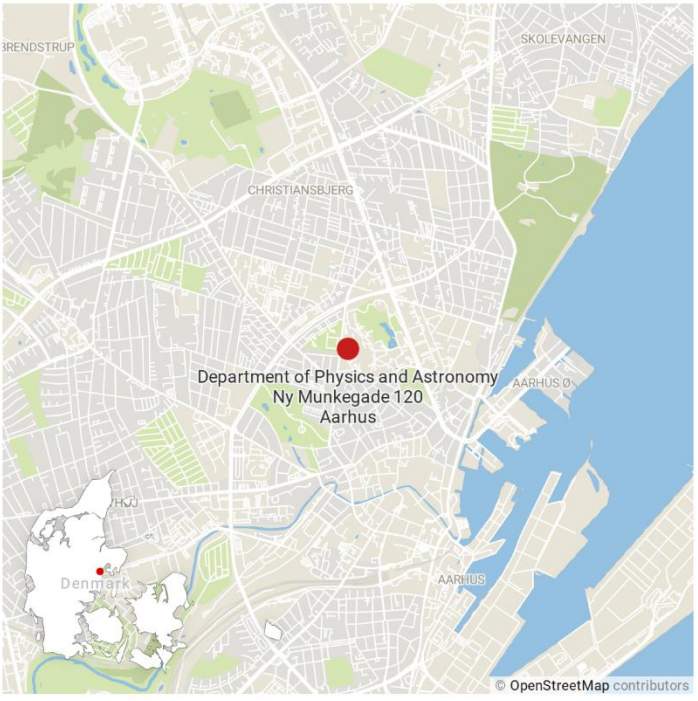
Astronomy (Aarhus, Denmark)

1. **Field**: Space science
2. **Type of studies:** Master's studies
3. **Institute of higher education:** Aarhus University
4. **Programme description:** The programme is both practical and research-oriented, and reflects the interests of the business sector, research institutions and the public sector. It is also flexible, and can accommodate the interests and profile of the individual student. Students can specialize within (for example) cosmology, star development or helioseismology; and they can both work with theory and carry out astronomical observations. The programme also qualifies students for a career in research: students may apply for admission to the university's PhD programme either during the first year of the MSc programme or on completion of the thesis.
5. **Requirements**
6. **Language of instruction:** English
7. **Tuition fee: EU/EEA/Swiss citizens -** free of charge
8. **Duration**: 2 years
9. **Website**



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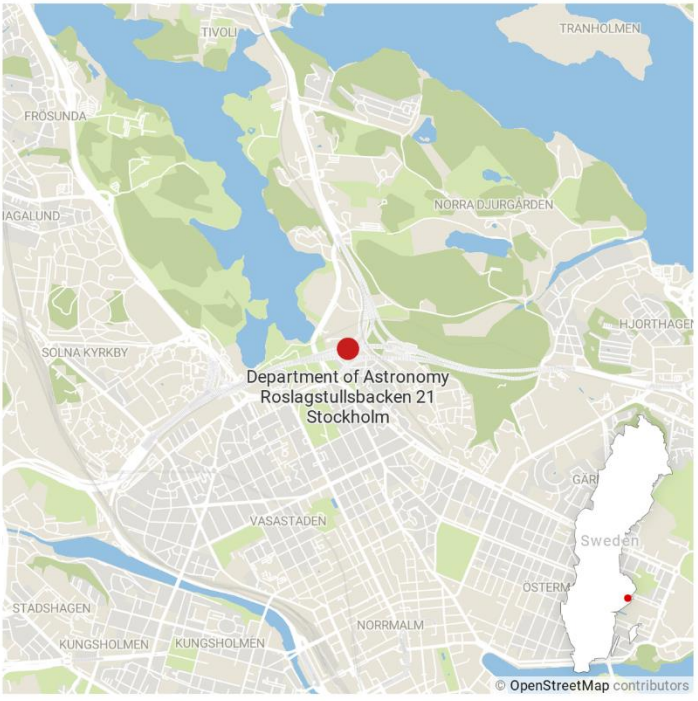
Astronomy (Stockholm, Sweden)

1. **Field**: Space studies
2. **Type of studies:** Master's studies
3. **Institute of higher education:** Stockholm University
4. **Programme description:** The program comprises two years of full-time studies (120 credits). The student will apply his knowledge of physics to key astronomical fields, connected to the research expertise at our department. The elective courses give the possibility to tailor the programme to match the needs and interests of the student, from statistics and machine learning to project management. Students without sufficient knowledge in astronomy from their BSc studies are provided compulsory introduction courses in Cosmology (7.5 credits) and Stellar Structure and Evolution (7.5 credits). The final component of the studies is a thesis project where the student independently plans, performs and reports a research project in one of the research groups or at a company.
5. **Requirements**
6. **Language of instruction:** English
7. **Tuition fee:** free of charge for EU/EEA/Swiss citizens
8. **Duration**: 2 years
9. **Website**



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Astro and Particle Physics (Tuebingen, Germany)

1. **Field**: Space studies
2. **Type of studies:** Master's studies
3. **Institute of higher education:** University Of Tuebingen
4. **Programme description:** The focus of the master programme Astro and Particle Physics is put on a distinct quantitative approach as usual in physics, along with the acquisition of essential practical skills with respect to problem sets in the field of Astro and Particle Physics. The Master Astro and Particle Physics is an international research-oriented two year program established by the Kepler-Center. This programme connects science from the fields of particle physics, astrophysics and cosmology and combines different disciplines in experimental and theoretical physics, astronomy and astrophysics. The education will be in English throughout which prepares the students for the increasing internationalization in industry and modern society.
5. **Requirements**
6. **Language of instruction:** English
7. **Tuition fee:** Free of charge for EU residents
8. **Duration**:2 years
9. **Website**

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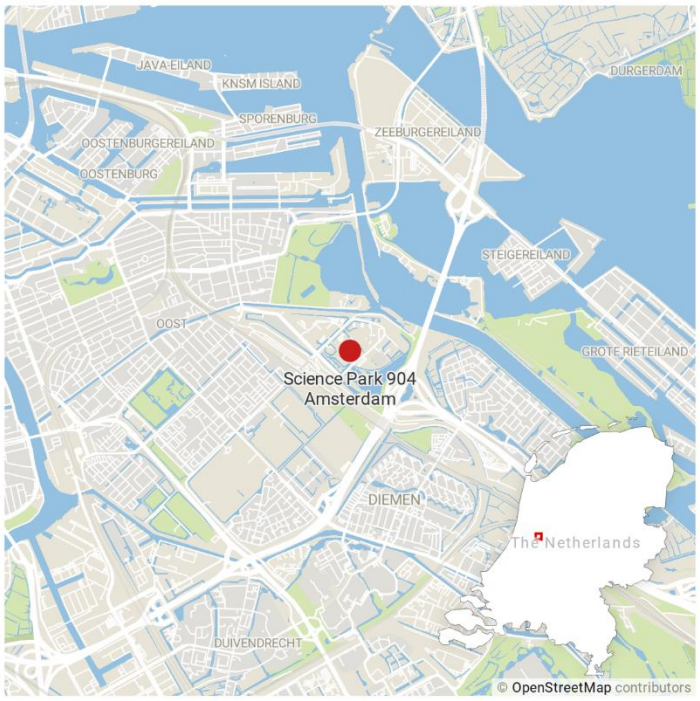
Astronomy & Astrophysics (Amsterdam, Netherlands)

1. **Field**: Space science
2. **Type of studies:** Master's studies
3. **Institute of higher education:** University of Amsterdam
4. **Programme description:** The two-year track Astronomy and Astrophysics in the Master's programme Physics and Astronomy, a joint degree with the Vrije Universiteit Amsterdam, provides you with thorough training in both the observational and theoretical aspects of modern astronomy and astrophysics. The dynamic field of astronomy and astrophysics is currently gaining importance worldwide. New generations of instruments - situated on the earth's surface and in space - enable us to study the origin, structure and evolution of planets, stars, star systems, and the universe in a more profound way than ever before.
5. **Requirements**
6. **Language of instruction:** English
7. **Tuition fee**
8. **Duration**: 2 years
9. **Website**



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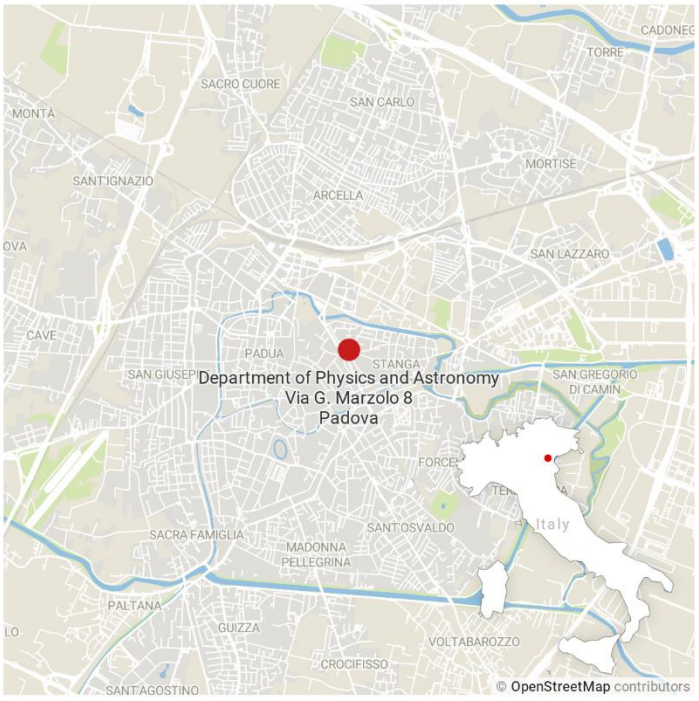
Astrophysics and Cosmology (Padova, Italy)

1. **Field**: Space science
2. **Type of studies:** Master's studies
3. **Institute of higher education:** University of Padova
4. **Programme description:** The master degree in Astrophysics and Cosmology aims at providing students with a comprehensive, up-to-date view of the main fields of modern astrophysics, including astronomical detectors and techniques, black holes and neutron stars, cosmology, gravitational physics, planets, stars and galaxies. Particular emphasis is placed on a solid background in physics and on the growing ties among astrophysics and different branches of physics (theoretical and experimental particle physics, detector physics, nuclear physics) in the coming era of multi-messenger observations. Master graduates in Astrophysics and Cosmology will gain a detailed working knowledge of astrophysics both on the theoretical and observational sides. The final thesis (42 ECTS, approximately six months full time) will put the student in direct contact with an advanced research topic, enhancing his/her ability to carry out autonomous work. This will be key for either a successful continuation to a PhD in Astrophysics or in Physics, or to a job in the industrial or service sectors based on novel technologies.
5. **Requirements**
6. **Language of instruction:** English
7. **Tuition fee:** €2,622 per year
8. **Duration**: 2 years
9. **Website**



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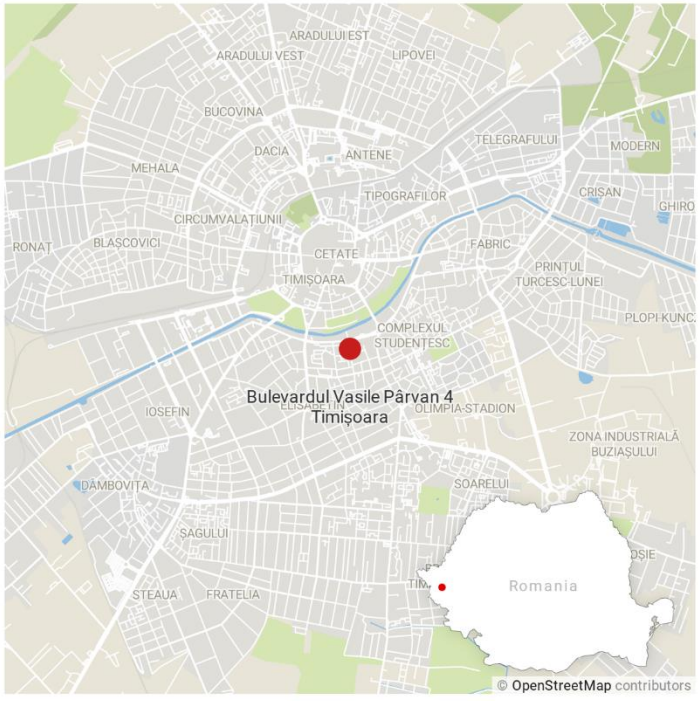
Astrophysics, Elementary Particles and Computational Physics (Timisoara, Romania)

1. **Field**: Space science
2. **Type of studies:** Master's studies
3. **Institute of higher education:** West University of Timisoara
4. **Programme description:** This master program is dedicated to the study of both General Relativity, Quantum Field Theory and in addition the study of advanced computational methods. The courses studied at this program offer the opportunity for combining both analytical and computational skills of the students and help them to develop research careers in many areas of physics and closed related domains. The students that attend the program could improve their knowledge of theoretical physics and computational physics and work further in the research activity. They could continue with a Ph.D. in various fields of physics from which we enumerate: quantum field theory, general relativity, statistical physics, solid state physics, computational physics and mathematical physics. Also, the students will benefit from the expertise of various research groups that will offer them the opportunity to start research activities, scientific conferences and participate in research projects. This will help the students to make the first steps towards a career in physics. The program also offers the opportunity to visit other universities from abroad and to study there one semester or one year. Developing both analytical and computational skills the students could also work in other fields like IT industry, or side by side with the engineers in projects that aims to develop new products and techniques needs in various industries.
5. **Requirements**
6. **Language of instruction:** English
7. **Tuition fee:** €763 per year
8. **Duration**: 2 years
9. **Website**



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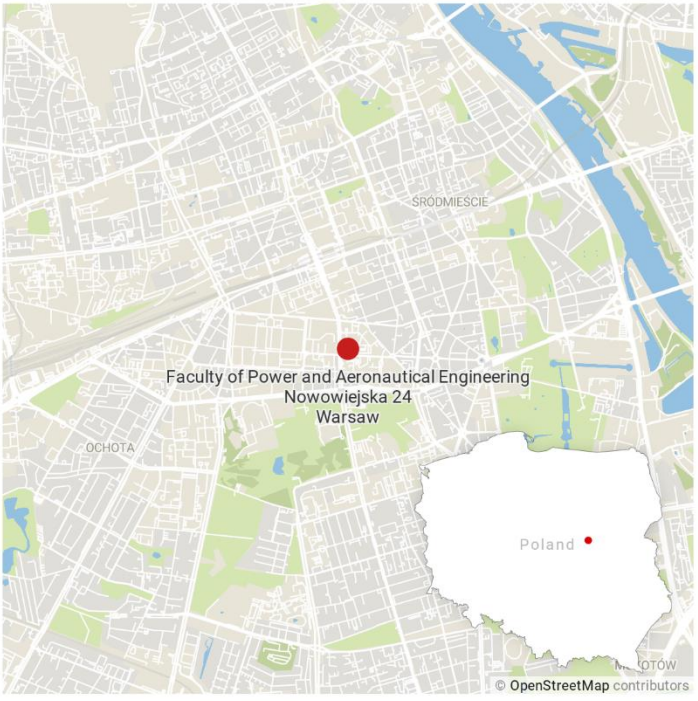
Automatic Control & Robotics (Warsaw, Poland)

1. **Field**: Engineering
2. **Type of studies:** Master's studies
3. **Institute of higher education:** Warsaw University of Technology
4. **Programme description:** The program is designed as a high-quality educational offer in the area of advanced and intelligent robotics. After graduation the students will have mastered the diverse areas of robotics (mathematical modeling, control engineering, computer engineering, mechanical design) to an extent to be able to deal with robotics systems as a whole rather than just to focus on one particular area. The future career prospects for graduates are very good as the proposed courses are relevant to today's advanced technology society and because the current output of universities is insufficient to meet the demand of industry and research programmes. Students may take the master as a professional terminal degree, or join PhD programmes afterwards. The graduate of the Robotics studies will demonstrate both the knowledge and abilities necessary for creative work in design, construction, programming and analysis of automation and control systems, as well as industrial and service robot systems. He/she will be capable of solving complex, interdisciplinary problems dealing with control and robotics. The graduate will have general and engineering knowledge at the level enabling him/her to conduct research in RTD centres. The graduate can be employed as senior management in mechanical, electrotechnical, chemical and related industrial sectors. He/she will be capable of designing and analysing complex robotics systems with the use of modern advanced design and analytical tools. He/she will be provided with the theoretical background enabling the solution of research problems in the field of control and robotics.
5. **Requirements**
6. **Language of instruction:** English
7. **Tuition fee:** 1500 € per semester
8. **Duration**:2 years
9. **Website**



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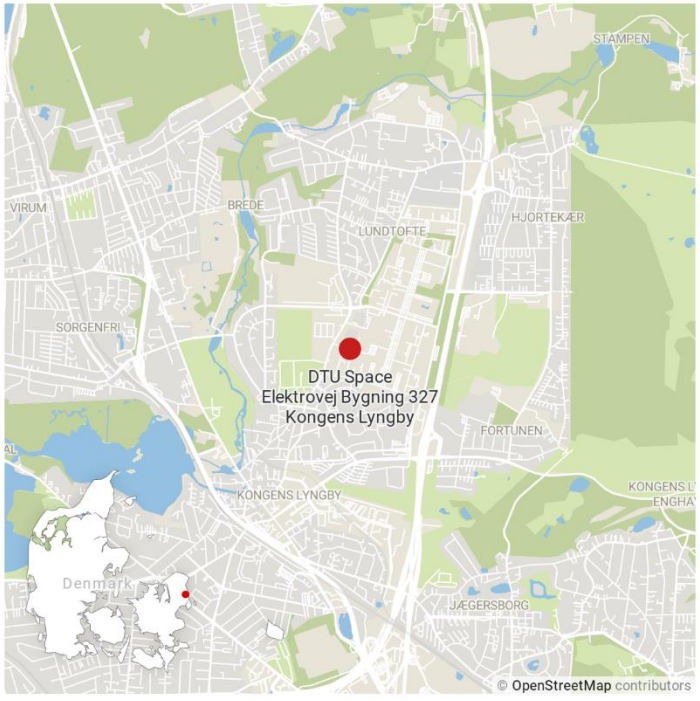
Earth and Space Physics and Engineering (Lyngby, Denmark)

1. **Field**: Space studies
2. **Type of studies:** Master's studies
3. **Institute of higher education:** Technical University of Denmark
4. **Programme description:** The Earth and Space Physics and Engineering program focuses on developing, designing, and applying innovative and advanced technological solutions for monitoring, mapping, modeling, and predicting large-scale physical structures and processes—i.e. on Earth, the solar system, and the universe. On the program, you will learn to combine scientific knowledge with interdisciplinary technological competencies with a view to developing sustainable, advanced solutions—such as instrumentation, modeling, and data processing methods for use in, e.g., climate and environmental monitoring, the search for new resources, space exploration, or mapping and navigation on Earth.
5. **Requirements**
6. **Language of instruction:** English
7. **Tuition fee:** 30000 €
8. **Duration**:2 years (full-time), 4 years (part-time)
9. **Website**



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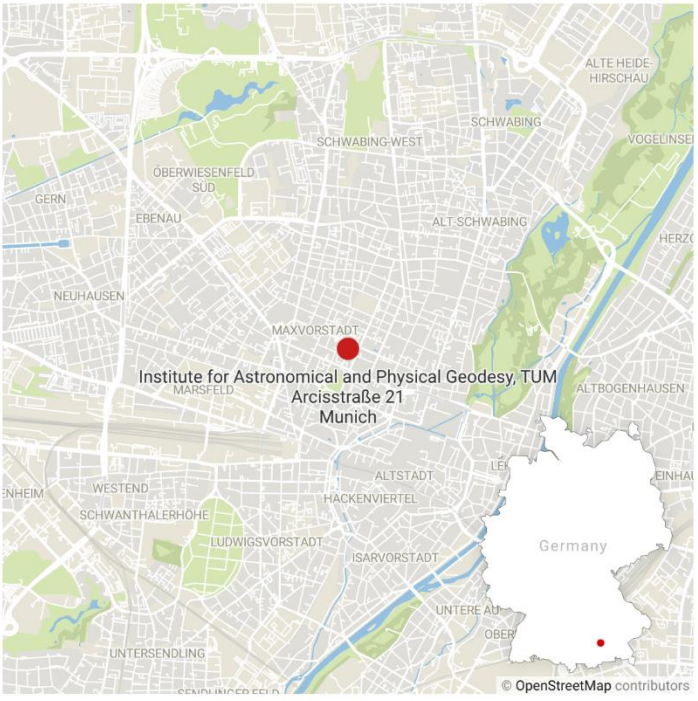
Earth Oriented Space Science and Technology /ESPACE/ (Munich, Germany)

1. **Field**: Space studies
2. **Type of studies:** Master's studies
3. **Institute of higher education:** Technical University of Munich
4. **Programme description:** The Master's degree program in Earth Oriented Space Science and Technology (ESPACE) is an interdisciplinary program positioned at the interface between space technology and the engineering and natural scientific use of satellite data. It is conducted as a two year master's degree program with the option of a Double Degree in cooperation with the Wuhan University, China. ESPACE combines the technical aspects of the satellite and observation systems with scientific and commercial applications. This requires interdisciplinary knowledge beyond the borders of different engineering disciplines such as geodesy, mechanical and electrical engineering, as well as physics, informatics and geosciences. The goal of the ESPACE Master's degree program is to train students to become experts in the use and development of satellites in the three main areas of earth system science, remote sensing and navigation. Students acquire fundamental knowledge and competencies in these three fields as a general basis, as well as the interfaces among them in order to be able to link technological know-how with practical application. They simultaneously learn the necessary basics of signal processing, sensor technology, orbital mechanics and space technology, so that they are in a position to help plan and develop future missions for the above-mentioned areas. By including numerous scientific institutes and the space industry in the teaching concept, ESPACE makes full use of the potential of excellent scientists, offering also the opportunity of dedicated project work and Master's theses in close co-operation with, and in many cases even at the location of these institutions. Thus the students become involved in current projects, state-of -the-art technology and science, and daily practice.
5. **Requirements**
6. **Language of instruction:** English
7. **Tuition fee:** free of charge
8. **Duration**:2 years
9. **Website**



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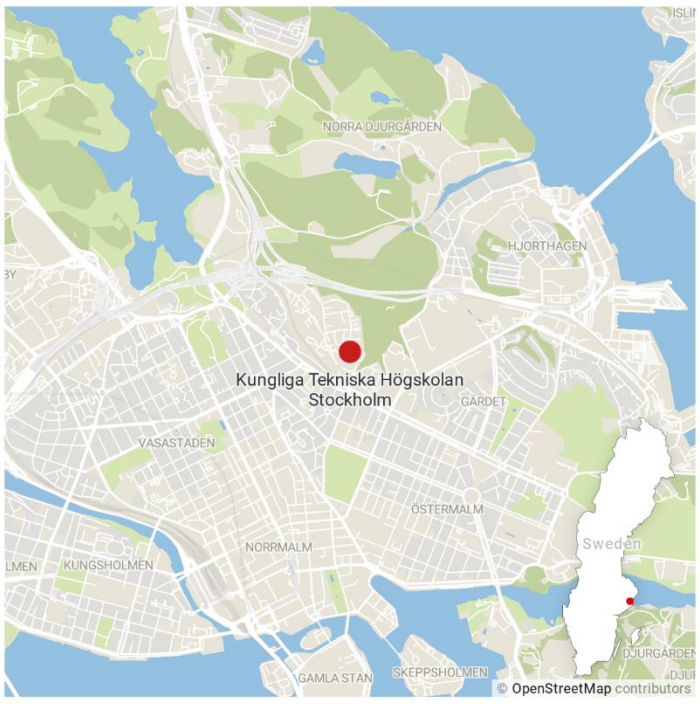
Electromagnetics, Fusion and Space Engineering (Stockholm, Sweden)

1. **Field**: Space studies
2. **Type of studies:** Master's studies
3. **Institute of higher education:** KTH Royal Institute of Technology
4. **Programme description:** The two-year master's programme in Electromagnetics, Fusion and Space Engineering incorporates a strong foundation in electrical engineering with an understanding of electromagnetic fields and how they interact with matter. The studies in the master's programme in Electromagnetics, Fusion and Space Engineering are course-based. The academic year is divided into four study periods, and there are typically 2–3 courses running over a 10-week long study period. Mandatory courses are scheduled in the first two study periods of the programme, with the rest of the courses are offered as electives from a wide range of topics. The programme is set in an international environment, with students from an extensive number of nationalities. World-renowned professors teach all the courses in English. The variety of pedagogical methods offers plentiful opportunities to develop group communication skills and gain experience in working on mixed teams. The research and industrialisation in the fields of communications, space and fusion is developed in international environments. KTH internationally leads a number of projects in space missions within NASA and the European Space Agency (ESA), and the fusion reactor at ITER (International Thermonuclear Experimental Reactor).
5. **Requirements**
6. **Language of instruction:** English
7. **Tuition fee:** free of charge for EU/EEA/Swiss citizens
8. **Duration**: 2 years
9. **Website**



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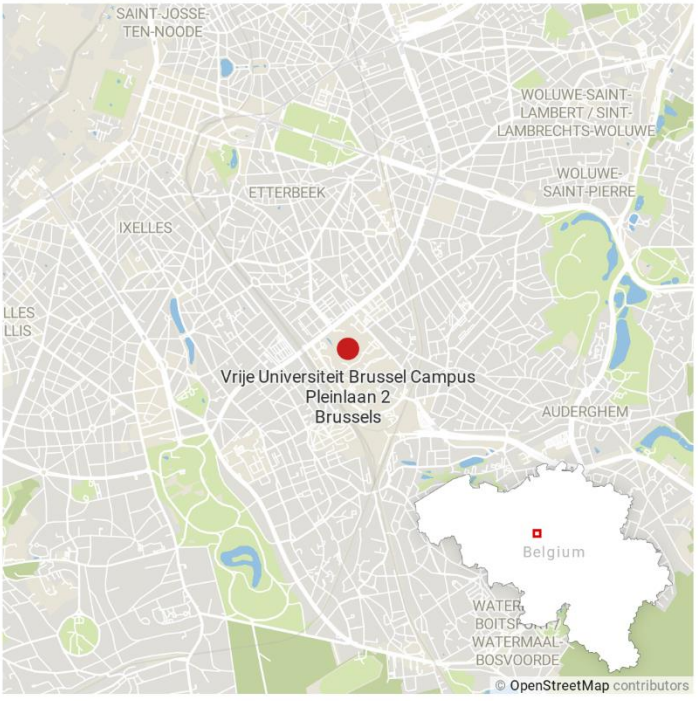
Physics and Astronomy (Brussels, Belgium)

1. **Field**: Space studies
2. **Type of studies:** Master's studies
3. **Institute of higher education:** Vrije Universiteit Brussel
4. **Programme description:** Physics and Astronomy research at Vrije Universiteit Brussel (VUB) covers a wide spectrum: experimental elementary particle research, theoretical research on elementary particles and cosmology, applied research on semiconductor lasers, metamaterials, and also the study of the principles of biological systems; and let us not forget astronomy and astrophysics where we look at binary star systems and how high-energy cosmic rays are produced in supernova explosions and black hole jets. The VUB takes advantage of its unique position in the capital of Belgium and Europe. One of the strong points of the Master's programme at VUB are the close connections to many internationally renowned research groups and the links with other departments both within VUB, like engineering (photonics) bio-engineering and biology, as well as with our alliance partner Universiteit Gent and our sister university Université Libre de Bruxelles and many other universities in Belgium and abroad.
5. **Requirements**
6. **Language of instruction:** English
7. **Tuition fee:** ~1650€ per year
8. **Duration**: 2 years
9. **Website**



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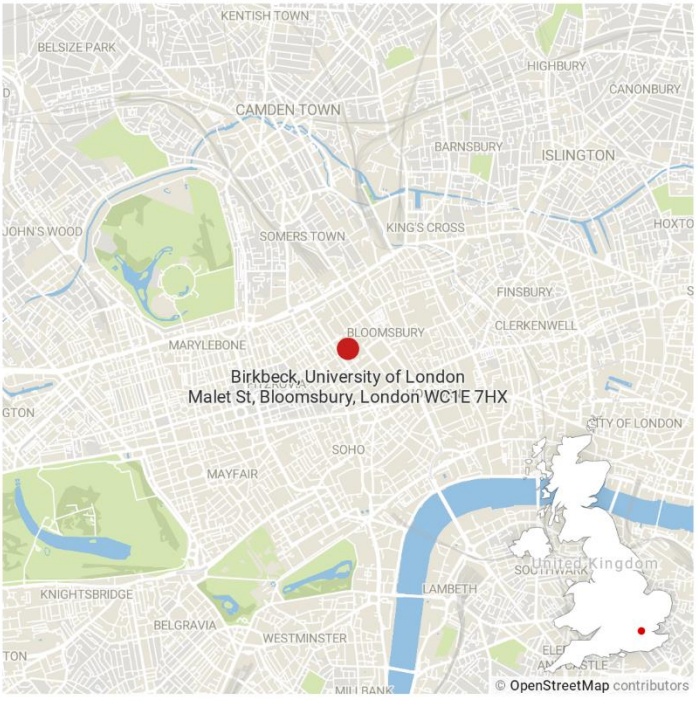
Planetary Sciences (London, United Kingdom)

1. **Field**: Space studies
2. **Type of studies:** Master's studies
3. **Institute of higher education:** Birkbeck, University of London
4. **Programme description:** You will be taught by academics who are actively engaged in cutting-edge planetary research that is expanding the boundaries of knowledge. We cover planetary surfaces and remote sensing, volcanic activity on Earth and other planets, the nature of comets, asteroids and meteorites, and the internal structure and origin of planets. We also offer advanced modules in astronomy, scientific computing and the design of, and participation in, an analogue field mission. You can choose from a range of modules and design a programme that matches, expands and deepens your particular interests.
5. **Requirements**
6. **Language of instruction:** English
7. **Tuition fee:** £**3220 per year**
8. **Duration**: 2 years part-time
9. **Website**



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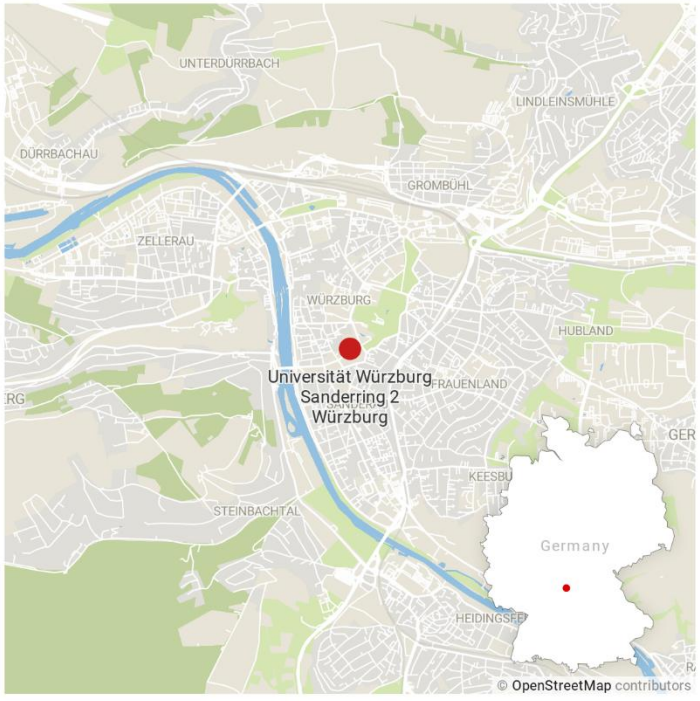
Satellite Technology – Advanced Space Systems /SaTec/ (Würzburg, Germany)

1. **Field**: Engineering (interdisciplinary)
2. **Type of studies:** Master's studies
3. **Institute of higher education:** University of Würzburg
4. **Programme description:** Our programme in Satellite Technology, chosen and supported by the Elite Network of Bavaria, focuses on interdisciplinary space systems engineering skills. The objective of SaTec is training of students for realization of space missions through its interdisciplinary curriculum in close cooperation with nearly all Bavarian space organizations in academia, research and industry. During their studies, students participate in interesting space research projects. Currently the Würzburg space ecosystem, which is composed of university, research institutes and companies, is working on 23 satellites. SaTec emphasizes on electronics and computer science methods compared to traditional mechanical engineering. Related adaptive space systems are very much in demand in research and industry environments. The course contents and research projects focus on space systems engineering skills and include interdisciplinary fields, e.g. space dynamics, attitude and orbit control, computer science, robotics, telecommunication, remote sensing, electrical and mechanical engineering, control engineering and more.
5. **Requirements**
6. **Language of instruction:** English
7. **Tuition fee: free of charge**
8. **Duration**: 2 years
9. **Website**



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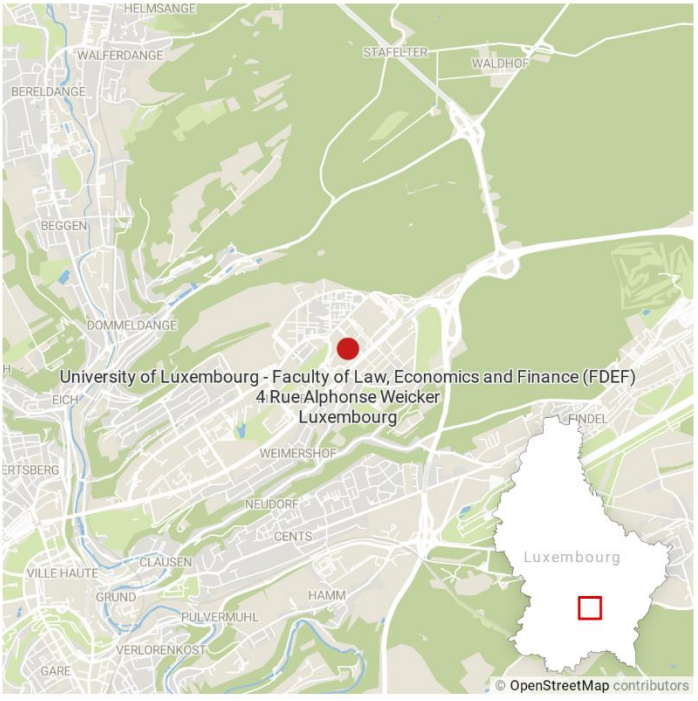
Space, Communication and Media Law (Luxembourg, Luxembourg)

1. **Field**: Space law
2. **Type of studies:** Master's studies
3. **Institute of higher education:** University of Luxembourg
4. **Programme description:** The Master in Space, Communication and Media Law combines a range of courses on space law, international and European satellite communication law, media law, electronic communications, and e-commerce law, intellectual property law, as well as data protection law. It covers these areas on international, European and national level. Over the course of the program, students acquire complete expertise in the regulatory aspects of space, communication, ICT and media law within an exciting and developing field. The program equips students with essential theoretical, practical and analytical skills to excel in the fast-paced legal world of a continuously developing field. It provides ample opportunities for development in the public and private sector, as well as in academia. International academic partnerships, cooperation with partners in the private and public sector and teaching by academics and practitioners, from within and outside of Luxembourg ensure a vibrant exchange, as well as relevant experience for students.
5. **Requirements**
6. **Language of instruction:** English
7. **Tuition fee: 400 €/year**
8. **Duration**: 2 years
9. **Website**



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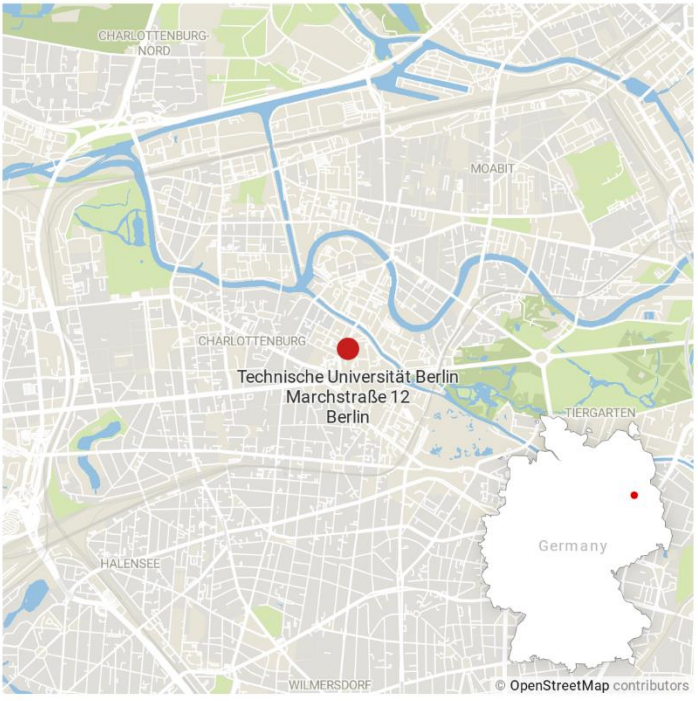
Space Engineering (Berlin, Germany)

1. **Field**: Engineering
2. **Type of studies:** Master's studies
3. **Institute of higher education:** Berlin University of Technology
4. **Programme description:** MSE (Master of Space Engineering) is an international full-time Master's programme in space engineering. The aim of the programme is to educate systems engineers equipped to become leaders in the space industry. The programme is highly project oriented and designed to prepare students for the requirements of the global space industry. Students have the chance to be involved in challenging satellite projects, working within intercultural teams. Especially, they benefit from the worldwide leading expertise and network of TU Berlin in the field of small satellites. Interdisciplinary subjects, such as project management, communications training, entrepreneurship and innovation management complement the curriculum.
5. **Requirements**
6. **Language of instruction:** English
7. **Tuition fee: €21,990 €**
8. **Duration**: 2 years
9. **Website**



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Spacecraft Design (Kiruna, Sweden)

1. **Field**: Engineering
2. **Type of studies:** Master's studies
3. **Institute of higher education:** Luleå University of Technology
4. **Programme description:** This programme is a modern and focused program that aims at the rapid development in the space industry towards smaller spacecrafts with short development times. First year courses are necessary for second-year studies as you develop a spacecraft in a computer environment. A spacecraft, which also is called a satellite if its orbit is bound to a celestial body, is designed around the payload instruments it shall carry and the environment it shall function in. You learn about the various subsystems which make up the spacecraft and how it communicates with the surrounding world. Furthermore, you get an understanding of the specific space electronics and typical space materials that are required and learn how the on-board computers and the propulsion work. Orbit and attitude dynamics, as well as control of these, are necessary for a successful mission. During the first year's spring term, you begin a project work that will continue during the second year's autumn term. In this project, you will in collaboration with other students physically build some instrument that maybe will be launched with a rocket or a high altitude balloon to the stratosphere. You will also work on a computer design of a spacecraft in collaboration with other students during the second year's autumn term. Your master thesis work is performed at a space technology company, space organisation, or academic department, in Kiruna or other parts of the world.
5. **Requirements**
6. **Language of instruction:** English
7. **Tuition fee: free of charge**
8. **Duration**: 2 years
9. **Website**

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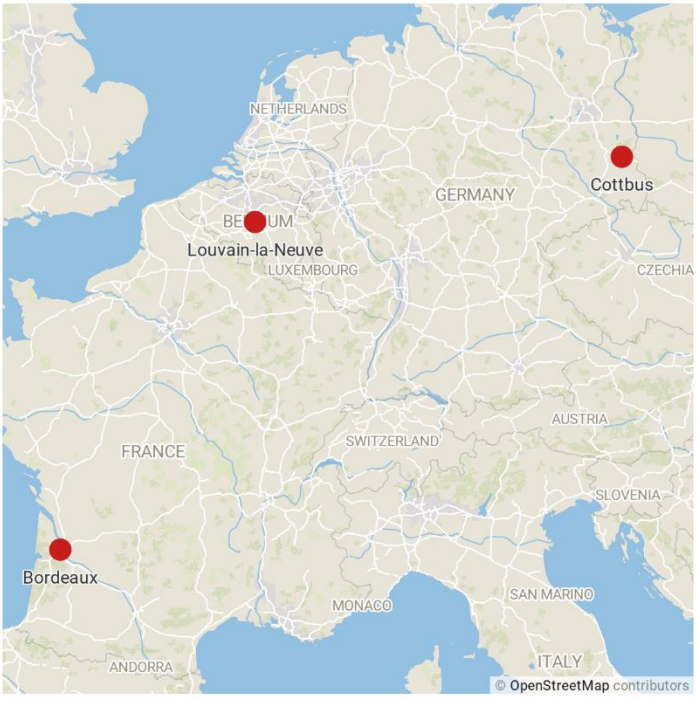
Transfers-Fluids-Materials in Aeronautical and Space Applications /TFM-ASA/ (Bordeaux/Louvain/Cottbus, FRA/BEL/GER)

1. **Field**: Engineering
2. **Type of studies:** Master's studies
3. **Institute of higher education:** University of Bordeaux, Catholic University of Louvain, Brandenburg University of Technology
4. **Programme description:** The TFM-ASA Master Program is a two-year Master of Science Program taught in English by 3 Universities in 3 different countries (Catholic University of Louvain (Belgium) , Brandenburg University of Technology (Germany) and University of Bordeaux (France)).The students will benefit from top quality training in Mechanical and Aerospace Engineering. They will spend an entire semester in each university. Many industrial partners are directly involved through internships for students, conferences and even courses. The TFM-ASA program combines studies and research based on aerodynamics, thermodynamics, compressible flows, turbulence, propulsion, combustion, turbomachinery, material science, to name a few. These themes are all directly connected with technical and fundamental studies as well as with aircraft, spacecraft, drone issues, etc.
5. **Requirements**
6. **Language of instruction:** English
7. **Tuition fee: 1500€ - first year, 2000€ - second year**
8. **Duration**: 2 years
9. **Website**



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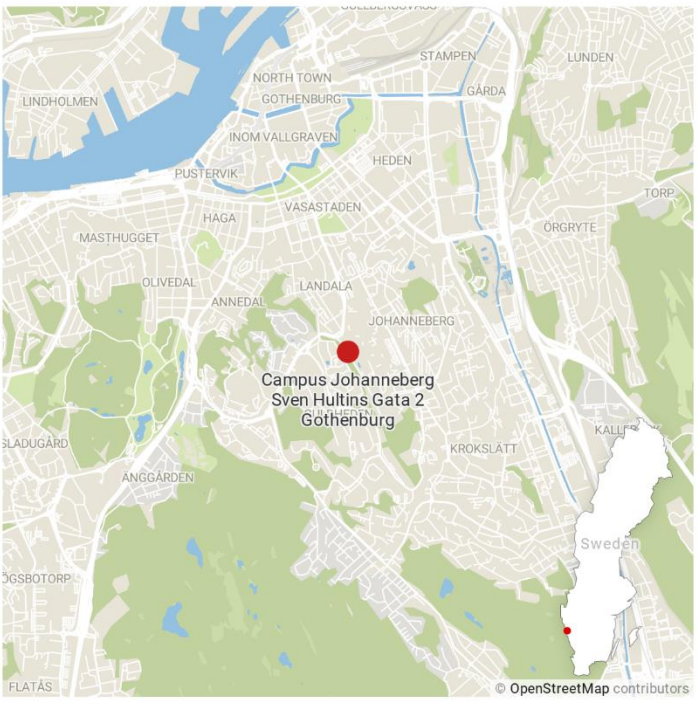
Wireless, Photonics and Space Engineering (Gothenburg, Sweden)

1. **Field**: Engineering
2. **Type of studies:** Master's studies
3. **Institute of higher education:** Chalmers University of Technology
4. **Programme description:** This programme offers a unique opportunity to study a combination of subjects for which Chalmers has world-class facilities: Onsala Space Observatory with radio telescopes and equipment to study the Earth and its atmosphere, the Nanofabrication Laboratory with a clean-room for research and fabrication of advanced semiconductor devices and integrated circuits, and research laboratories with state-of-the-art photonics and microwave measurement equipment. We focus on applied science and engineering, where we combine theory with hands-on practice, labs and projects. We are involved in cutting edge research and the manufacturing of components for e.g. microwave and millimeter wave electronics, instruments for radio astronomy and remote sensing, optical fibres, lasers, and microwave antennas. As a student of this programme, you will gain solid knowledge in wireless, photonics and space engineering as well as specialized skills in a chosen sub-field. You will be prepared for a career in the field through studies of wireless and optical communication components and systems, RF and microwave engineering, photonics, and space science and techniques.
5. **Requirements**
6. **Language of instruction:** English
7. **Tuition fee: free of charge**
8. **Duration**: 2 years
9. **Website**



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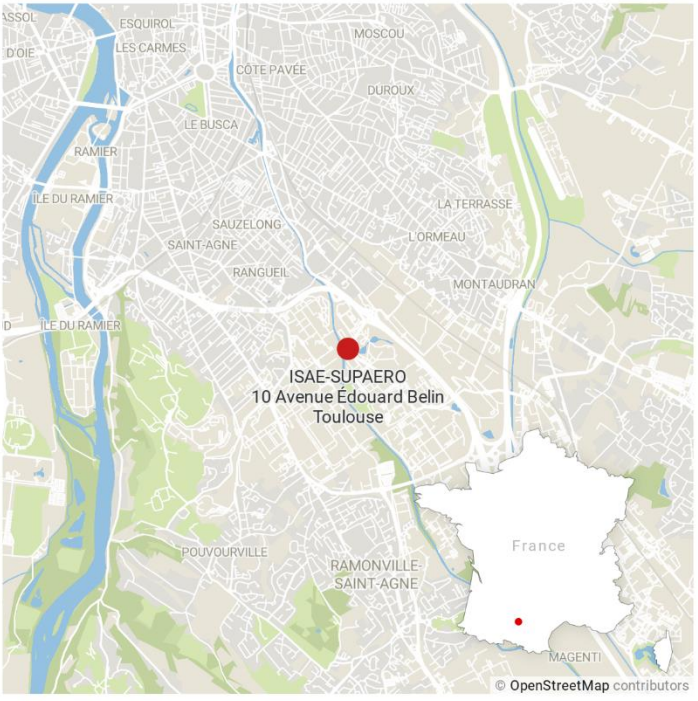
4. ADVANCED MASTER'S STUDIES

Advanced Manufacturing Processes for Aeronautical Structures (Toulouse, France)

1. **Field**: Engineering
2. **Type of studies:** Advanced Master's studies
3. **Institute of higher education:** National Higher French Institute of Aeronautics and Space
4. **Programme description:** The Advanced Master course AMPAS, is designed by IMT Mines Albi and ISAE with the support of aeronautical industry partners. It will give a specialization to master level students allowing them to take over high level responsibilities in airframe structure manufacturing plants. It is especially well suited to students who have followed general studies in mechanical engineering, material science or equivalent and who would like to gain a major chance to be recruited by aeronautical industry. The academic course consists of modules aiming to provide a deep knowledge of the three main material families used in airframe structures (i.e. aluminum, titanium and long fiber reinforced polymer composites) and their related forming routes in aeronautical industries. It is also devoted to gain knowledge in aircraft architecture, on aeronautical supply chain specificities, lean manufacturing, quality management and certification requested to be able to take over technical and organisational responsibilities in industry.
5. **Requirements**
6. **Language of instruction:** English
7. **Tuition fee: €9500**
8. **Duration**: 1 year
9. **Website**



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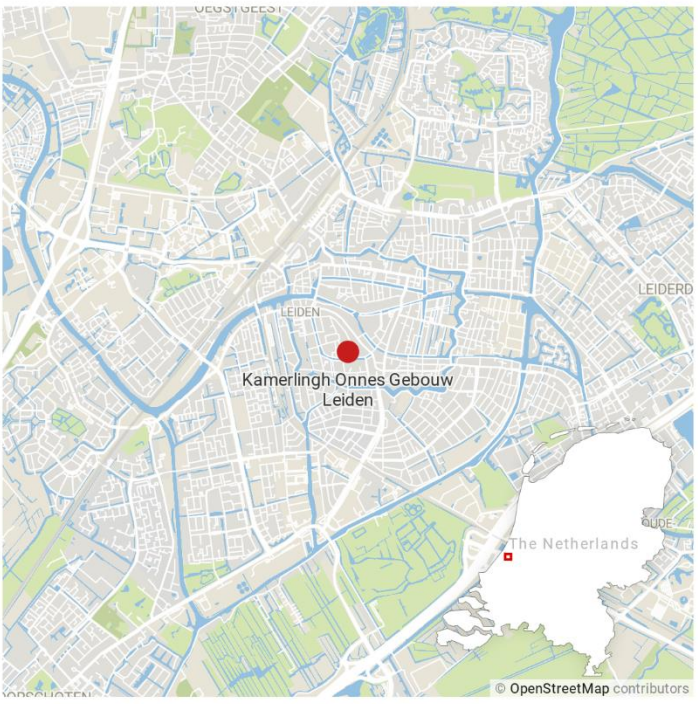
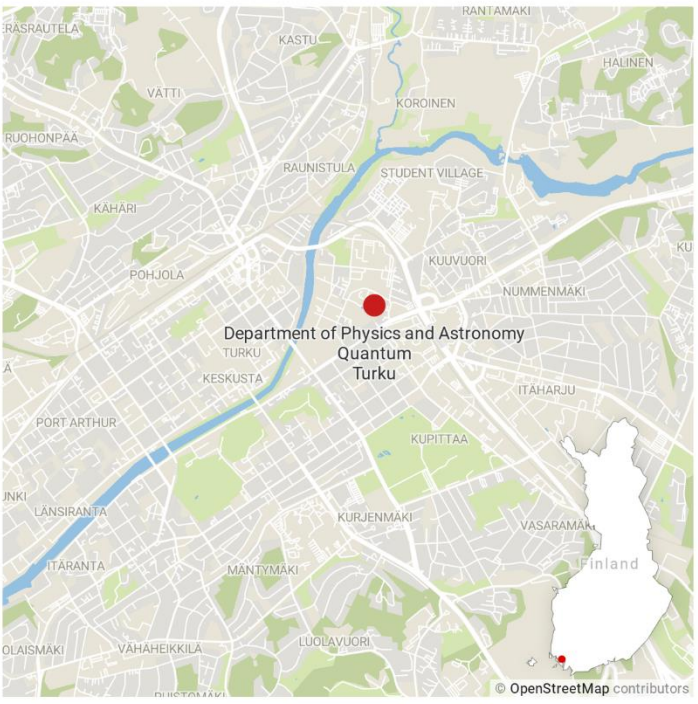
Air and Space Law (Leiden, Netherlands)

1. **Field**: Space law
2. **Type of studies:** Advanced Master's studies
3. **Institute of higher education:** Leiden University
4. **Programme description:** The LL.M. programme Air and Space Law combines public air law, private air law and space law. It has a clearly defined European and international dimension, making it unique in the world. In this intensive one-year master's programme, you will gain a solid legal foundation in this exciting field, learning from some of the foremost experts in academia and legal practice. The programme covers issues such as: passenger safety, accident investigation, environmental protection, the use of drones, fair competition, sustainability of space activities, militarization of outer space.
5. **Requirements**
6. **Language of instruction:** English
7. **Tuition fee: €2,143 (2020-2021 academic year)**
8. **Duration**: 1 year
9. **Website**



Master's Degree Programme in Physical and Chemical Sciences: Astronomy and Space Physics (Turku, Finland)

1. **Field**: Space science
2. **Type of studies:** Advanced Master's studies
3. **Institute of higher education:** University of Turku
4. **Programme description:** The Astronomy and Space Physics track is one of the four specialization tracks of the Master´s Degree Programme in Physical and Chemical Sciences. The other tracks of the programme are Materials Chemistry, Materials Physics, and Theoretical Physics. Upon graduation, you will be able to use the diverse set of skills acquired as part of this track, including computational and numerical techniques. The Astronomy and Space Physics track includes a solid grounding in theoretical aspects as well as providing opportunities for observational studies (e.g. of supernovae or accreting black holes); the space physics group performs experimental, theoretical and computational research on high-energy phenomena in near-Earth space.
5. **Requirements**
6. **Language of instruction:** English
7. **Tuition fee:** free for citizens of EU/EEA countries or Switzerland
8. **Duration**: 2 years
9. **Website**



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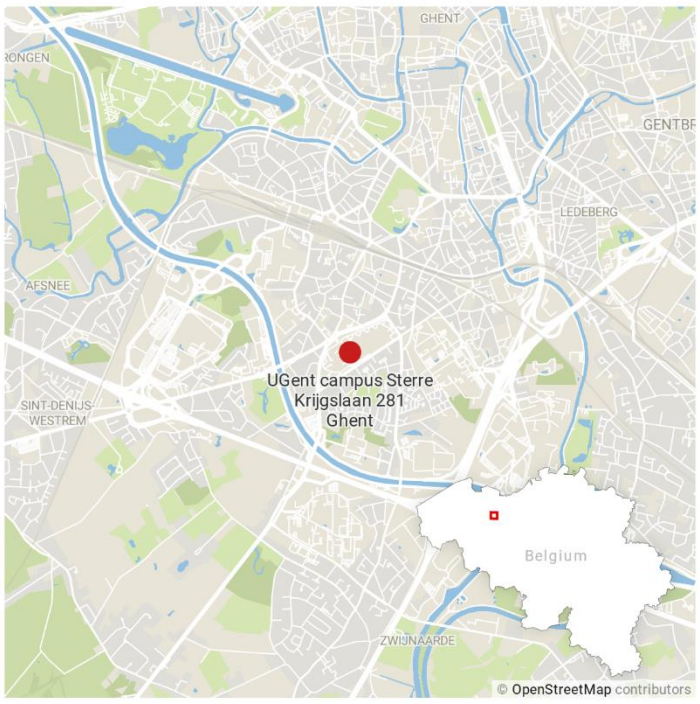
Master of Science in Space Studies (Ghent/Leuven, Belgium)

1. **Field**: Space studies
2. **Type of studies:** Advanced Master's studies
3. **Institute of higher education:** Ghent University, KU Leuven
4. **Programme description:** This advanced master's programme addresses students who have successfully completed an initial master's programme in either the humanities and social sciences, exact sciences and technology, or biomedical sciences. The interdisciplinary nature of the programme is set by the requirement that all students follow a common trunk of 30 credits of introductory courses. The goal is to get the students acquainted with the different aspects that form the foundation of space-related activities. Special attention goes to the combination of a high level of knowledge transfer with the diverse backgrounds of the students. Depending on their background and interest students have the opportunity to deepen their knowledge through more domain specific optional courses, for a total of 15 credits, covering the three domains of (A) Space Law, Policy, Business and Management, (B) Space Sciences, and (C) Space Technology and Applications. For the master's dissertation (15 credits) students are embedded in a research team of one of the organizing universities, or in an external institute, organization or industrial company, in which case an academic supervisor is assigned as a coordinator. The master's dissertation should form a final piece of work of the interdisciplinary programme, in which the acquired knowledge and abilities are applied to a complex and specific project.
5. **General Requirements:** Bachelor of Science Degree including a major in Astronomy. Swedish upper secondary school course English B/English 6 or equivalent.

   Language Requirements: You must be able to demonstrate proficiency in English by taking an internationally recognised test, such as TOEFL, IELTS, etc. Previous upper secondary studies or university studies completed in some countries can also meet the requirement. Check the website of the university where you would like to study for more information about language requirements as they decide what level is required for Master's courses and programme.
6. **Language of instruction:** English
7. **Tuition fee:** 6000 €
8. **Duration**: 1 year
9. **Website**



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Master of Space Studies (Leuven, Belgium)

1. **Field**: Space science
2. **Type of studies:** Advanced Master's studies
3. **Institute of higher education:** KU Leuven
4. **Programme description:** The Master of Space Studies programme is designed to prepare scientists to respond to a myriad of challenges and opportunities within the space sector. The large scale of space projects imposes important constraints on management and requires a truly international response with accompanying European and international legal and political measures. One will learn, through interaction with industry, the skills necessary to compete for employment an research opportunities from among the broad applications of the space industry, including security and defense. In addition to coursework in space sciences, the curriculum is enriched by a master's thesis and a series of guest lecturers from international, national and regional institutions.
5. **Requirements**
6. **Language of instruction:** English
8. **Duration**: 1 year
9. **Website**

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Astrophysics and Space Physics (Crete, Greece)

1. **Field**: Advanced Physics
2. **Type of studies:** Master's studies
3. **Institute of higher education:** Department of Physics of the University of Crete & Foundation for Research and Technology
4. **Programme description:** The Master's degree Diploma in "Astrophysics and Space Physics" is offered by an intensive Master's Program in "Advanced Physics", which is organized annually by the Physics Department of the University of Crete, in collaboration with the Institute of Technology and Research, since 2008.

   In order to obtain the Master's Degree in Astrophysics and Space Physics, each postgraduate student must hold a degree in Physics or another related faculty and successfully complete 5 postgraduate courses (3 General Physics and 2 Astrophysics) and complete a Master's thesis in an Astrophysics topic. The experimental or theoretical Master's thesis project is to be carried out under the supervision of a faculty member or researcher of the Department, in a modern cutting-edge research area.
5. **Requirements:** Prerequisites for admission: Bachelor's degree in Physics or equivalent BSc training
6. **Language of instruction:** English
7. **Tuition fee:** There is the possibility of financial support for up to 3 postgraduate students with scholarships for the entire duration of their studies.
8. **Duration**: 1 year
9. **Website**

5. COURSES

Short courses

Executive Space Course

1. **Field**: Space studies
2. **Type of studies:** other
3. **Institute of higher education:** International Space University (various locations, e.g. Strasbourg, Lisbon)
4. **Programme description:** The course looks at current space and space-related activities and explains the technology, science, business and policies upon which each phase of a space program or mission is based. Taught from an international perspective, the course allows participants to gain an understanding of the differences as well as the common approaches to space strategy across the globe. The course explains core engineering and technical concepts in a simple, understandable manner, allowing participants to develop their knowledge of space-related activities and terminology. The Course is intended for two broad categories of professionals, those working in the space sector but who do not have a broad space background or those currently working outside the space sector but who have an interest in developing a better understanding of it.
5. **Language of instruction:** English
6. **Tuition fee:** 3750 €
7. **Duration**: 1 week
8. **Website**

Space Resources Professional Course

1. **Field**: Space studies
2. **Type of studies:** other
3. **Institute of higher education:** International Space University (location of the course: Luxembourg City)
4. **Programme description:** This course provides a broad overview of the space resources field, including the current knowledge of available resources in the Solar System, identification, collection, extraction, processing, and utilization systems under development, economic and technical feasibility studies, legal and policy issues, and space exploration architectures and commercial ventures that may be enabled by utilizing extraterrestrial resources in the near future.
5. **Language of instruction:** English
6. **Tuition fee:** 500 €
7. **Duration**: 2 days
8. **Website**

Summer Courses

CanSat: Hands-on Satellite Design

1. **Field**: Space studies
2. **Type of studies:** other
3. **Institute of higher education:** Technische Universität Berlin
4. **Programme description:** Students will have knowledge of the most important topics related to space technologies. Students will know the parts of a space system and understand their correlations, and will be able to plan and conduct a space mission. Practically, students will be capable of designing a part of a space system with regard to mechanics, electronics and programming.
5. **Requirements**
6. **Language of instruction:** English
7. **Tuition fee:** 2300 €
8. **Duration**: 4 weeks
9. **Website**

Space Mission Design

1. **Field**: Space studies
2. **Type of studies:** other
3. **Institute of higher education:** Technische Universität Berlin
4. **Programme description:** The group will choose their own mission idea conduct a feasibility study. Each participant is responsible for one aspect of the mission but must work intensely with all other participants for to be successful. The goal is to prepare and present a full scenario and spacecraft configuration of the space mission. The supervising space engineers guide the participants through the process.
5. **Requirements**
6. **Language of instruction:** English
7. **Tuition fee:** 700 €
8. **Duration**: 2 weeks
9. **Website**

Space Robotics

1. **Field**: Space studies
2. **Type of studies:** other
3. **Institute of higher education:** Technische Universität Berlin
4. **Programme description:** Small student teams are provided with a sophisticated rover system. The goal of the teams is to operate the rover in a Mars analog mission scenario on a test-bed. The practical skills to program the rover are imparted in hands-on lectures. The teams must build their own manipulator to pick up ground samples or objects. Besides the practical lectures and the hands-on project, the students are taught about space rover technologies and robotic exploration of other planets.
5. **Requirements**
6. **Language of instruction:** English
7. **Tuition fee:** 2300 v
8. **Duration**: 4 weeks
9. **Website**

Summer School Alpbach

1. **Field**: Space studies
2. **Type of studies:** other
3. **Institute of higher education:** Austrian Research Promotion Agency (FFG)
4. **Programme description:** Each year about 60 selected participants from among the member and cooperating states of the European Space Agency are given the opportunity to expand and strengthen their knowledge of selected space issues. The purpose of the Summer School is to foster the practical application of knowledge derived from lectures, to develop organisational and team-work skills and to encourage creativity. Four student teams are set up to define the scientific objectives of a space mission and a preliminary end-to-end mission design including the spacecraft, scientific instruments, mission and science operations that will meet the stated objective under the supervision of noted scientific and engineering experts. Each student team conceives and elaborates an innovative satellite mission and present it to an expert review panel on the last day. The teams themselves are responsible for the selection of the subject of the project and for the team structure and working methods. A key element of the summer school is the workshop, to which more than 50% of the time spent in Alpbach are being given.
5. **Requirements**
6. **Language of instruction:** English
7. **Tuition fee:** 450 € (accommodation not included)
8. **Website**

Online courses

Aerospace materials

1. **Field**: Engineering
2. **Type of studies:** other
3. **Institute of higher education:** Tomsk State University
4. **Programme description:** The course involves the study of the main types of metallic materials used in the manufacture of aerospace parts, their properties and technological aspects of production. The course examines the dependence of strength and other properties of titanium, aluminum alloys and high-strength steels on their composition, production and machining technologies. The course is aimed at developing competencies required when selecting and using modern aerospace materials, equipment and quality control tools.
5. **Language of instruction:** English
6. **Tuition fee:** free / paid certificate available
7. **Duration**: 6 weeks (11 hrs)
8. **Website**

Astrophysics: Cosmology

1. **Field**: Space studies
2. **Type of studies:** other
3. **Institute of higher education:** Australian National University
4. **Programme description:** This course is designed for people who would like to get a deeper understanding of astronomy than that offered by popular science articles and shows. You will need reasonable high-school level Maths and Physics to get the most out of this course.
5. **Language of instruction:** English
6. **Tuition fee:** free / 50 €
7. **Duration**: 10 weeks
8. **Website**

Digitalisation in the Aerospace Industry

1. **Field**: Space studies
2. **Type of studies:** other
3. **Institute of higher education:** Technical University of Munich
4. **Programme description:** The online course aims at making you aware of special production requirements connected with digitalisation. You will learn about the role of robotics and automation in manufacturing and gain a better understanding of differing perspectives on research and manufacturing as well as the points where these intersect.
5. **Language of instruction:** English
6. **Tuition fee:** free (paid certificate available)
7. **Duration**: 3 weeks (14 hrs)
8. **Website**

Introduction to Aerospace Structures and Materials (online)

1. **Field**: Engineering
2. **Type of studies:** other
3. **Institute of higher education:** Delft University of Technology
4. **Programme description:** How aerospace structures are designed and why particular choices are made, which materials are used and the reasons for using them, how to explain loads and stresses aerospace structures have to withstand, How aircraft and spacecraft are manufactured, The safety philosophies that are used in aerospace structural design and how they affect design choices, How to create preliminary design solutions for structural design problems.
5. **Language of instruction:** English
6. **Tuition fee:** free / 50 €
7. **Duration**: 8 weeks
8. **Website**

Introduction to Satellite Communications (online)

1. **Field**: Space studies
2. **Type of studies:** other
3. **Institute of higher education:** Institut Mines-Télécom
4. **Programme description:** How is a satellite built? How do they fly? How do they communicate and how does the network operate? You will get all the answers in this course from teachers and researchers from three schools associated with Institut Mines-Télécom. The course is made of: teaching videos, equipment demonstrations and simulation programs. They will guide you through the discovery of satellite communications. Professionals in the space field will share their vocation for this scientific and technical sector.
5. **Language of instruction:** English
6. **Tuition fee:** free
7. **Duration**: 6 weeks /12 hrs
8. **Website**

Science: Galaxies, Stars and Planets

1. **Field**: Space studies
2. **Type of studies:** other
3. **Institute of higher education:** Open University (Milton Keynes, UK)
4. **Programme description:** Flexible online courses introducing fascinating topics in science. It covers the exploration of our Solar System; the discovery of planets orbiting other stars; the birth, life and violent death of stars; and the creation of the Universe itself.
5. **Language of instruction:** English
6. **Tuition fee:** 170 GBP
7. **Duration**: 100 hrs
8. **Website**

Space Mission Design and Operations

1. **Field**: Engineering
2. **Type of studies:** other
3. **Institute of higher education:** Swiss Federal Institute of Technology in Lausanne
4. **Programme description:** The course focuses on conceptual understanding of space mechanics, maneuvers, propulsion and control systems used in all spacecraft. You will gain knowledge of the challenges related to the use of the space environment as a platform for scientific and utilitarian purposes.
5. **Language of instruction:** English
6. **Tuition fee:** free of charge (certificate $50 USD)
7. **Duration**: 15-30 hrs
8. **Website**

The Conquest of Space: Space Exploration and Rocket Science

1. **Field**: Engineering
2. **Type of studies:** other
3. **Institute of higher education:** University Carlos III of Madrid
4. **Programme description:** By successfully completing this course, you will acquire the critical tools to understand the key events and developments of the Space Age. You will learn to solve basic technical and engineering problems of space travel, rocket propulsion, space systems, and human space flight.
5. **Language of instruction:** English
6. **Tuition fee:** free of charge (certificate $129 USD)
7. **Duration**: 20-30 hrs
8. **Website**

6. USEFUL LINKS

Please find the set of helpful links listed below for your own search of courses, which you find appealing:

DEGREES

https://www.bachelorstudies.com/

https://www.findamasters.com/

https://studyqa.com/

https://www.mastersportal.com/

https://www.masterstudies.com/

COURSES

https://www.edx.org/

https://www.coursera.org/

https://www.distancelearningportal.com/

https://www.isunet.edu/

https://www.classcentral.com

7. FUTURE SPACE PROJECT CONSORTIUM MEMBERS

The Space Research Centre is an interdisciplinary research institute of the Polish Academy of Sciences, established to conduct scientific research and activities in order to develop the space industry in Poland.
Our mission is the development and dissemination of space activities, which might help our country in achieving the image of the state actively involved in space research at world level and the creation of satellite technologies.
Our goal is to explore bridges between the latest scientific discoveries in the field of space research and its practical application in daily life. We develop solutions and promote the use of satellite systems in the national economy, in areas such as navigation, telecommunications and earth observation.
Address: Space Research Centre of Polish Academy of Sciences, Bartycka 18A, 00-716 Warsaw, Poland
Contact: Phone +48 22 4966 200, e-mail cbk@cbk.waw.pl

Polish Space Agency (POLSA) was established by the Act of 26 September 2014. The task of the Agency is to support the Polish space industry by combining the world of business and science. We also help to get provision for entrepreneurs in obtaining funds from the European Space Agency (ESA). An important aspect of the Agency's activity is to promote the development of satellite technology that can be used in everyday life, including communication, navigation, environmental monitoring and weather forecasting. The priority task of the Polish Space Agency is to take care of the security of the country and its citizens and to increase Polish defense capabilities through the use of satellite systems.
Address: Trzy Lipy 3 (Section C),80-172 Gdansk, Poland
Contact: Phone +48 58 500 87 60, e-mail: sekretariat@polsa.gov.pl

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Computer Assisted Education and Information Technology Centre (OEIiZK) is an in-service teachers training institution specialized in computer science and ICT. We provide support for teachers in their professional development as far as computer skills and didactic applications of information technology are concerned. We are a public institution for in-service teacher education managed by the Mazovian Province Local Government. We started our activities in 1991. Our pedagogical team consists of twenty five highly qualified teachers-consultants for whom information technology (IT) at school are the field of professional activity. Success in teacher training which is constantly reported is based on our research, completed and implemented projects and publications.
Address: Raszyńska 8/10 02-026 Warsaw, Poland
Contact: Phone +48 22 579 41 00, e-mail: sekretariat@oeiizk.waw.pl

NEMO Science Museum is an interactive, informal learning environment in which the general public comes into contact with science and technology. Visitors see, hear and experience how scientific phenomena and technology play an important part in their lives. NEMO works closely with the fields of science and education. NEMO is a registered museum and the owner of a significant historical collection. In addition to the full museum experience in the centre of Amsterdam, people can also get a taste of NEMO at Schiphol Airport.

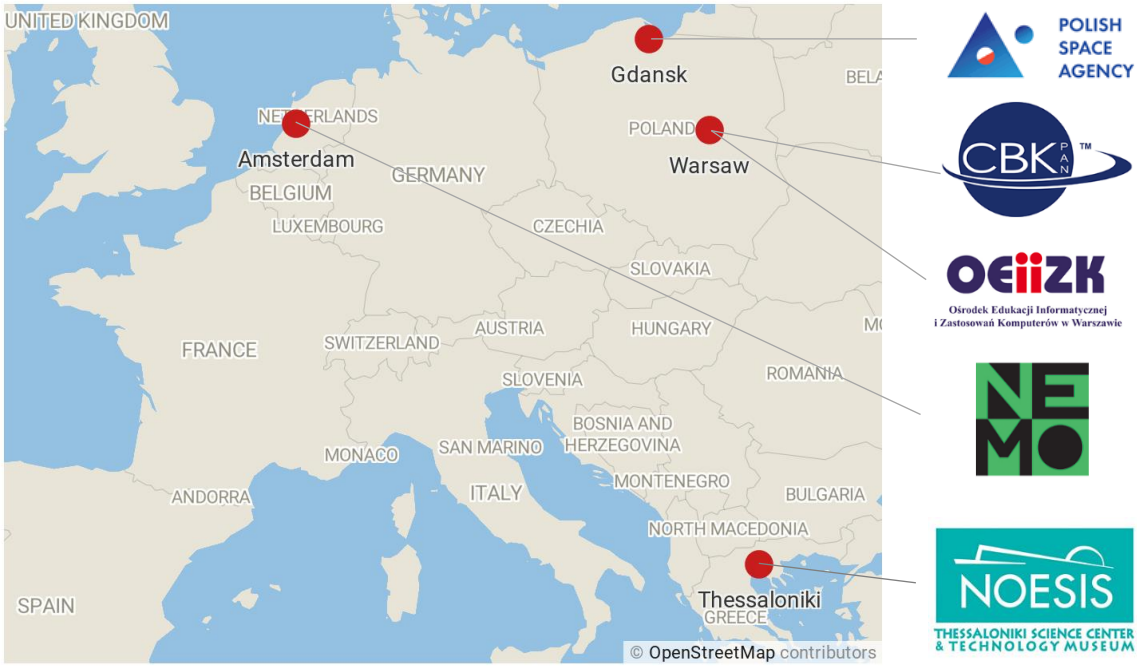
Address: Oosterdok 2 1011 VX Amsterdam PO Box 421 1000 AK Amsterdam, Netherlands

Contact: Phone +31 (0)20-531 32 33, e-mail info@e-nemo.nl

NOESIS Science Center and Museum of Technology is a cultural, educational, public benefit Institution that offers the student community, but also the general public a suitable environment for getting to know and understanding the positive sciences and informing them about technological developments. Its founder was the Technical Museum of Thessaloniki, which began its course in 1978 and then, in 2001, developed into NOESIS. It reports to the General Government and reports to the General Secretariat for Research and Innovation (GGEK).

Address: 6th km Thessaloniki-Thermi Rd, PO Box 60330, 57001 Thermi, Greece

Contact: Phone +30 2310 483000, e-mail: info@noesis.edu.gr



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