

Master of Science (MSc)  
**Quantitative  
Finance**

**WU**  
WIRTSCHAFTS  
UNIVERSITÄT  
WIEN VIENNA  
UNIVERSITY OF  
ECONOMICS  
AND BUSINESS



“WU’s Master in Quantitative Finance offers an optimal program design that combines well-founded academic qualifications in computing, statistics, and mathematics with a specialization related to the challenges faced by the modern financial industry. By learning how to develop and apply quantitative methods and models and gaining knowledge in the fields of credit and market risk management, graduates become well-equipped for future challenges in financial markets.”

HANNES MÖSENBACHER, CRO,  
RAIFFEISEN BANK INTERNATIONAL AG





# Welcome to WU

## DEAR PROSPECTIVE STUDENTS,

The Master in Quantitative Finance (QFin) is designed to prepare students for a broad range of careers in the financial industry and academia. The curriculum builds strong quantitative skills coupled with a solid base of financial theory. Students acquire the necessary knowledge and skills to use mathematical models and apply statistical tools in the context of financial economics. A lot of focus in the program is on computing and data analysis and several professors are strongly involved in the international development community of R.

By joining the QFin program, students benefit from our strong academic and industry networks. The Vienna Graduate School of Finance (VGSF) is involved as a cooperation partner – guaranteeing an exposure to the international academic world. In collaboration with committed students from the QFin Club, we additionally organize Company Talks, inviting practitioners and graduates working in top institutions to talk about their current challenges and how to place yourself in the industry.

The structure is designed to guarantee a high degree of flexibility in the curriculum. In the second year, students choose between Industry Track and Science Track, and select among several electives. This system allows students to diversify their curriculum and to focus on a career either in academia or industry.

The QFin program aims to prepare students to face challenges – careers requiring to deal with complex financial problems and to innovate facing market challenges. We are looking forward to welcoming you here at WU Vienna.

**Kurt Hornik** (left side) and **Stefan Pichler** (right side)  
Program Directors



# MSc Quantitative Finance

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## AT A GLANCE

Duration	4 semesters, full-time degree program
Credits	120 ECTS credits (incl. 20 ECTS credits for the master thesis)
Language of instruction	English
Degree awarded to graduates	Master of Science (WU)
Start	Every winter semester
Capacity	Up to 60 students per academic year
Application	Rolling admissions start in September (more information on page 10)
Contact	<a href="mailto:qfin@wu.ac.at">qfin@wu.ac.at</a>



# Contents and Structure

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The WU Master in Quantitative Finance is an intensive program designed to prepare students for a wide range of careers in the highly competitive financial service sector – careers requiring analytical skills and ability to develop new concepts. The two tracks structure covers a broad range of topics guaranteeing a comprehensive and flexible curriculum.

## FIRST YEAR

In the first year QFin students investigate core analytical subjects and deal with demanding quantitative methods, providing the tools to solve complex finance matters.

Students learn about finance and microeconomics. The curriculum also covers mathematics, probability, statistics, optimization and computing - preparing students for subsequent courses on stochastic calculus and financial econometrics. Additionally, students receive an extensive training in "R", by one of its main developers. To complete this first year, students learn to think outside the model with classes on optimization and game theory.

## SECOND YEAR

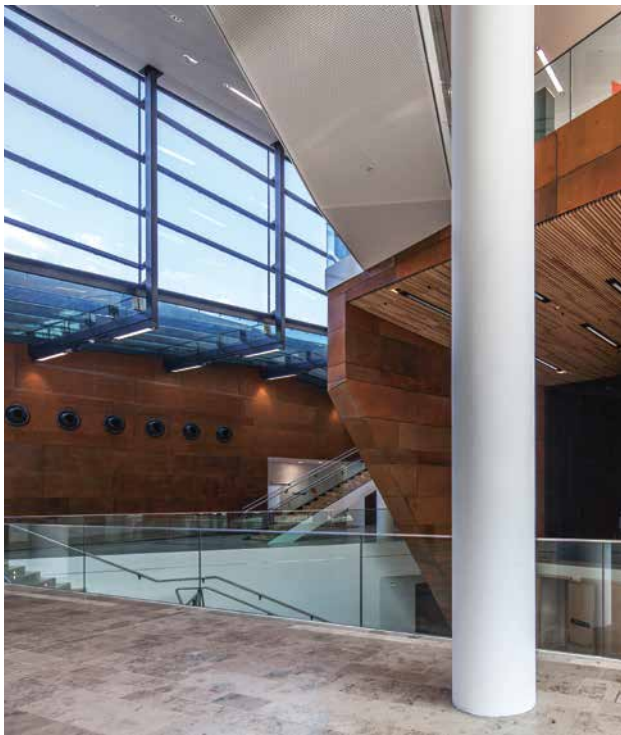
In the second year students choose between a Science Track and an Industry Track.

## SCIENCE TRACK

This specialization focuses on preparing students for an academic career. Besides advanced courses in all major fields of finance and numerous electives, special emphasis is placed on academic literature research and scientific writing. To experience academic research, students attend the weekly research seminars – providing access to state-of-the-art international research.

## INDUSTRY TRACK

The other specialization targets on students seeking a career as quants in the finance industry. Besides courses in the major fields, the track concentrates on combining financial models with computational skills. In the Industry Lab, students have the opportunity to apply their skills and knowledge in a real-world environment, making use of WU's numerous corporate partnerships.



**“The imagination in a mathematician who creates makes no less difference than in a poet who invents”**

Jean Le Rond D'Alembert



## PROGRAM STRUCTURE SCIENCE TRACK

### 1st semester

Mathematics 1	Financial Markets and Instruments	Computing	Probability	Principles of Finance	Statistics 1
5 ECTS	4 ECTS	5 ECTS	5 ECTS	4 ECTS	5 ECTS

### 2nd semester

Mathematics 2	Optimization	Statistics 2	Continuous Time Finance 1	Microeconomics	Econometrics
5 ECTS	4 ECTS	5 ECTS	5 ECTS	4 ECTS	5 ECTS

### 3rd and 4th semester

Core courses	Mandatory courses	Electives	Master Thesis
<ul style="list-style-type: none"> <li>› Asset Pricing</li> <li>› Corporate Finance</li> <li>› Financial Econometrics</li> <li>› Game Theory</li> <li>› Master Thesis Seminar</li> </ul>	<ul style="list-style-type: none"> <li>› Paper Reading and Writing</li> <li>› Research Seminar 1 &amp; 2</li> </ul>	<p>At least seven electives are offered each year, students select a total of three.</p> <p>The number and the contents of the electives vary regularly depending on current developments in theory and practice.</p> <p>The actual electives available are announced on <b>wu.at/qfin</b></p>	
Total 20 ECTS	Total 12 ECTS	Total 12 ECTS (4 ECTS each)	20 ECTS





## PROGRAM STRUCTURE INDUSTRY TRACK

### 1st semester

Mathematics 1	Financial Markets and Instruments	Computing	Probability	Principles of Finance	Statistics 1
5 ECTS	4 ECTS	5 ECTS	5 ECTS	4 ECTS	5 ECTS

### 2nd semester

Mathematics 2	Optimization	Statistics 2	Continuous Time Finance 1	Microeconomics	Econometrics
5 ECTS	4 ECTS	5 ECTS	5 ECTS	4 ECTS	5 ECTS

### 3rd and 4th semester

Core courses	Mandatory courses	Electives	Master Thesis
<ul style="list-style-type: none"> <li>› Asset Pricing</li> <li>› Corporate Finance</li> <li>› Financial Econometrics</li> <li>› Game Theory</li> <li>› Master Thesis Seminar</li> </ul>	<ul style="list-style-type: none"> <li>› Industry Lab</li> </ul>	<p>At least seven electives are offered each year, students select a total of four. The number and the contents of the electives vary regularly depending on current developments in theory and practice. The actual electives available are announced on <a href="http://wu.at/qfin">wu.at/qfin</a></p>	
Total 20 ECTS	Total 8 ECTS	Total 16 ECTS (4 ECTS each)	20 ECTS

# Our Team

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An interdisciplinary faculty of internationally renowned researchers from the fields of statistics, mathematics, finance, and economics ensures that the curriculum is both comprehensive and well-balanced.

## FACULTY

**Stefan Bogner**, Corporate Finance  
**Hannelore De Silva**, Game Theory  
**Alexander Eisl**, Industry Labs  
**Zehra Eksi-Altay**, Term-structure Models, Industry Labs  
**Rüdiger Frey**, Mathematics 1, Continuous Time Finance 1 & 2, Dynamic Credit Risk Modeling  
**Alois Geyer**, Econometrics  
**Michael Hauser**, Financial Econometrics  
**Ronald Hochreiter**, Industry Labs  
**Kurt Hornik**, Program Director; Computing, Statistics 1 & 2, Adv. Topics in Computing, Industry Labs, Research Seminar, Master Thesis Seminar  
**Rainer Jankowitsch**, Program Director; Financial Markets and Instruments, Research Seminar, Master Thesis Seminar, Paper Reading and Writing  
**Gregor Kastner**, Advanced Topics in Financial Econometrics  
**Alexander Mürmann**, Microeconomics  
**Christian Ochs**, Industry Labs  
**Stefan Pichler**, Industry Labs, Master Thesis Seminar  
**Klaus Pötzelberger**, Probability, Mathematics 2  
**Michael Raab**, Bridging Course  
**Otto Randl**, Portfolio Management – Applications  
**Birgit Rudloff**, Optimization, Quantitative Risk Management, Paper Reading and Writing  
**Leopold Sögner**, Asset Pricing  
**Michaela Szölgényi**, Financial Engineering  
**Laura Vana**, Industry Labs  
**Andrea Wagner**, Bridging Course  
**Josef Zechner**, Portfolio Management – Foundations

## PROGRAM MANAGEMENT

**Georg Mikula**, Program Coordinator  
**Adrian Baron**, Program Coordinator



# Qualification Profile and Career Prospects

Our program is designed to qualify highly skilled students with the necessary theoretical and empirical training to make a real difference in the business and academic world.

By the time they graduate, QFin students are sophisticated finance professionals who understand the principles of finance and have the expertise to meet market challenges. Our students are equipped with the technical and financial tools needed in today's financial industry.

After completing the program, graduates will be able to

- › understand and analyze complex financial problems using mathematical and statistical models;
- › apply mathematical and statistical methods and computational procedures for financial decision-making;
- › handle financial market data and information systems in theory and practice
- › work in teams and participate successfully in problem-solving processes
- › write and present academic papers (Science Track)
- › develop and apply computational processes for solving finance-related problems (Industry Track)

Our graduates have the experience and competence to work in industry or pursuing an academic career. Our graduates work in:

- › asset management
- › credit and market risk management
- › treasury and trading
- › financial engineering
- › research and technical analysis
- › corporate finance

Graduates are also qualified to further deepen their specialized knowledge in a relevant PhD program.



**“I have been part of the first cohort of students of the Master in Quantitative Finance. The program equipped me with a great deal of quantitative skills and spurred my interest in conducting research. I greatly benefitted from the involvement of faculty members and from their advices. Today, when I look back, I am deeply thankful for the opportunities this program gave me in initiating an academic career.”**

Florian Nagler, Assistant Professor (Bocconi University)

# Program Application Criteria

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## ONLINE APPLICATION

The admission process starts with an online application. Applicants' aptitude for the Master in Quantitative Finance is judged based on the following criteria:

- › A bachelor degree or equivalent first degree in a subject relevant to the program. (The program must be worth at least 180 ECTS credits). Examinations must have been completed successfully in one of the following subjects:
  - › Business administration, and/or economics, and/or finance, worth a minimum of 60 ECTS credits
  - › Mathematics, and/or statistics, and/or computing worth a minimum of 45 ECTS credits

Furthermore, applicants have to indicate the following competences:

- › Skills and knowledge in business administration/economics/finance
- › Skills and knowledge in mathematics/statistics
- › Achievement potential
- › The GMAT or GRE are highly recommended
- › Applications can be supported by academic letters of reference
- › Adding a letter of motivation to your application is highly recommended as well

Applicants with a strong academic background in finance are expected to prove sufficient skills in statistics and mathematics. Applicants with a (bachelor) degree in engineering or quantitative studies, should prove their interest and adequate knowledge in finance.

For further and more detailed information on the application requirements and admission process, please visit [wu.at/qfin](https://wu.at/qfin)

**“What I valued most in this program was the unique combination of an outstanding education in both mathematics and finance, led by an excellent faculty of experts in each topic. The program not only taught me the skills I needed, but it also brought me into close contact with the financial industry and potential employers, which helped me to find my dream job.”**

Christian Sagmeister, alumnus of the program,  
Operational Risk Modeller





# Application and Admission to WU

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Selection procedures apply for all English-taught MSc programs. WU employs a rolling admissions policy with three priority deadlines.

## APPLICATION

To keep quality standards high, all of WU's English-taught MSc programs have a limited number of places available and a comprehensive selection process is in place. The first step is an online application. WU's rolling admissions policy allows students to apply from the beginning of September until spring and gives students the opportunity to apply early and secure a place in the WU program of their choice. The three priority deadlines are October 8th, January 8th, and March 8th (March is not applicable for International Management/CEMS). The specific selection process varies by program.

## PROFICIENCY IN ENGLISH

Applicants must provide proof that they have a sufficient command of the English language, e.g. TOEFL 100, IELTS 7.0, CAE Certificate in Advanced English, English as a first language, or a full English-taught bachelor's program (at least 3 years) or master's program (at least 2 years).

## ADMISSIONS

Successful applicants who have received an admission offer must enroll in person at WU's Admissions Office.

Detailed information on the admission requirements and the application procedures for the English-taught master's programs is available online: [wu.at/application-guide](https://wu.at/application-guide)





## ACADEMIC CALENDAR

At WU, the academic year is divided into two semesters. The winter semester starts in October and ends in February. It is followed by the summer semester, which runs until the end of June. Summer break is in July, August, and September. All English-taught master's programs start in the winter semester.

Detailed information on enrollment deadlines and WU's academic calendar can be found on the WU website at [wu.at/academic-calendar](https://www.wu.ac.at/academic-calendar)

## TUITION FEES

No tuition fees apply for EU, EEA, and Swiss citizens during the standard duration of their program (plus two extra semesters). All those exceeding the standard duration, however, are required to pay a tuition fee of approximately €360 per semester. Non-EU students are required to pay €727. Under certain circumstances, the same regulations that apply to EU, EEA, and Swiss citizens may apply to other students as well.

To find out more, please see [wu.at/fees](https://www.wu.ac.at/fees)

## SCHOLARSHIPS

WU offers two financial aid programs that provide need-based and merit-based scholarship grants.

For further information, please contact WU's Study Regulations Office: [wu.at/study-service](https://www.wu.ac.at/study-service)

For other scholarship options, visit the Austrian Database for Scholarships and Research Grants (OeAD) at: [grants.at/en](https://www.grants.at/en)

## ORGANIZING YOUR STUDIES AT WU

### › Getting started

WU offers comprehensive information for international students on its website.

### › Housing

International students coming to Vienna can choose from various housing options.

### › Online services

A wide selection of online services is available to students on WU's website [wu.ac.at](https://www.wu.ac.at) and WU's learning and information portal **LEARN**.

### › The Austrian Students' Union at WU

The Austrian Students' Union (ÖH) represents the interests of all WU students and offers them a wide spectrum of services.

### › Student jobs at WU

WU students have many opportunities to actively participate in student and campus life. They may, for instance, choose to become course tutors, join one of our academic units as student staff members, or get involved with the Students' Union.

### › Centrally located

WU is easily accessible by public transportation, and only a few minutes away from the city center.

# WU Key Data

2018/19

## Students

Total students (2018/19 winter semester)	22,016 (48% women)
International students (2018/19 winter semester)	6,023 (49% women)
Incoming exchange students	~1,000 per year
Outgoing exchange students	~1,000 per year

## Faculty and Staff<sup>1</sup>

Total faculty <sup>2</sup>	497 (50% women)
Administrative staff	513 (85% women)
Total	1,147 (64% women)

## Campus Resources

Premises Campus WU	100,000 m <sup>2</sup>
Premises Library	
Total floor space	7,200 m <sup>2</sup>
Volumes	~658,400

## International

Partner universities	~240
Courses in English	~450/Semester

## Graduate-Programs

### German-taught master's programs

- › Business Education
- › Business Law (LL.M.)
- › Export and Internationalization Management
- › Finance and Accounting
- › Management
- › Socioeconomics
- › Taxation and Accounting

### German-taught doctoral/PhD programs

- › Doctoral Program in Business Law (Dr. iur.)
- › Doctoral Program in Social and Economic Sciences<sup>3</sup>
- › PhD in Economic and Social Sciences<sup>3</sup>

### English-taught master's programs

- › Economics
- › Information Systems
- › International Management/CEMS
- › Marketing
- › Quantitative Finance
- › Socio-Ecological Economics and Policy
- › Strategy, Innovation, and Management Control
- › Supply Chain Management

### English-taught doctoral/PhD programs

- › PhD in International Business Taxation
- › PhD in Finance

<sup>1)</sup> full-time equivalents in 2018

<sup>2)</sup> not including personnel funded by third parties

<sup>3)</sup> English track available



# English-Taught Master's Programs

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Duration: 4 semesters; full-time programs;  
120 ECTS credits; degree awarded: MSc (WU)

## PROGRAM DETAILS

### Economics

- › Focus on analyzing economic policy and business problems with state-of-the-art theories and methods
- › Applied Track and Science Track
- › 11 areas of specialization, many attractive international partner programs.

### Information Systems

- › Focus on IT-related knowledge with a particular emphasis on management and research topics
- › Students acquire skills ranging from system analysis to system implementation
- › Based on state-of-the-art research

### International Management/CEMS

- › Joint program: MSc (WU) and CEMS MIM degrees
- › Focus on international strategy and cross-cultural management
- › Internship abroad, business project, and exchange semester

### Marketing

- › Focus on customer-oriented management concepts, marketing research, and decision tools
- › Qualifications for marketing specialist/executive positions, academic careers & advanced management consulting with a wide choice of marketing electives
- › Double degree with University Bocconi (5 slots)

### Quantitative Finance

- › Focus on building strong quantitative skills coupled with a solid knowledge base of the underlying theory of finance
- › Students can choose between an Industry Track or a Science Track
- › Strong networks and links to the finance industry

### Socio-Ecological Economics and Policy

- › Focus on socioeconomic analysis of sustainability issues
- › Students choose two of four concentration areas in the fields of Environment, Population, Multi-Level Policy, and Social Policy

### Strategy, Innovation, and Management Control

- › Optional double degree in cooperation with selected partner schools
- › Focus on all major aspects of organizational leadership, as well as corporate development and strategic management
- › Case studies, business projects, and exchange semester

### Supply Chain Management

- › Focus on design and analysis of supply chains for focal companies
- › Management and coordination of global supply chains
- › Learn to measure, evaluate, and control the quality of supply chain processes
- › Discussions of recent issues in SCM with industry experts

For further details see:  
[wu.at/master-en](https://www.wu.at/master-en)

# WU International

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WU is a truly international university. It has recognized the necessity of thinking beyond Austria's borders early on. The international outlook of WU's teaching and research activities is a number one priority.

## CONFIRMED QUALITY

Becoming one of the world's top business and economics universities has always been a high priority at WU. With its prestigious international accreditations, WU has achieved this goal. Fewer than 1% of universities worldwide can claim triple accreditation by EQUIS, AACSB, and AMBA, the three most well-respected accreditation agencies. WU is one of only six universities in the German-speaking world to belong to this exclusive group of schools.

WU is also a member of respected associations like CEMS (Global Alliance in Management Education), an alliance of 32 top business schools and more than 70 of the world's leading multinational companies ([cemso.org](https://cemso.org)), and PIM (Partnership in International Management), a network of 65 highly renowned business schools and universities around the globe ([pimnetwork.org](https://pimnetwork.org)).

## RANKINGS

International ratings like the Financial Times Ranking have repeatedly positioned WU and its programs among the top universities in its field, and document WU's continuous progress each year ([rankings.ft.com](https://rankings.ft.com)).

## STUDY AROUND THE GLOBE

WU has successfully integrated many international aspects in its research and teaching over the past few years. WU maintains a strong international network with around 240 partner universities all over the world, 130 of them offering exchange places for master students. Today WU is involved in numerous externally funded international research projects and has increased the number of its faculty members with international backgrounds, especially over the last few years.

## INTERNATIONAL STUDENTS

As a result of these efforts, WU has a high percentage of international students: Today, more than one out of every four WU students comes from outside of Austria (not including exchange students). More than 110 nations are represented in WU's student population, with the majority of international students coming from countries in Europe. Together with around 1,000 exchange students, they contribute to the international and diverse atmosphere at WU.



# Living in Vienna

Vienna is consistently ranked the city with the world's highest quality of living according to Mercer's Quality of Living Ranking.

## HOUSING

WU has no on-campus dormitories or housing services. Still, international students can choose from various housing options:

### › Student dormitories:

WU cooperates with the OeAD Housing Office to guarantee a limited number of places in student dormitories ([housing.oead.at/en](https://housing.oead.at/en)). Other providers include: [stuwo.at](https://www.stuwo.at), [wihast.at](https://www.wihast.at), [akademikerhilfe.at](https://www.akademikerhilfe.at), [milestone.net](https://www.milestone.net), [linked-living.com](https://www.linked-living.com)

### › Private accommodation:

WU recommends [housinganywhere.com](https://www.housinganywhere.com), a peer-to-peer platform for finding private student apartments.

## WORKING IN VIENNA

WU's ZBP Career Center is the first place to go for any questions regarding working in Austria ([zbp.at](https://www.zbp.at)).

- › Job openings for students, graduates and young professionals
- › Approx. 3,000 job vacancies per year
- › Approx. 1,800 CV checks, coachings and career advice

Please note that good German language skills are often required for jobs or internship positions in Vienna, both at local and international companies.

## LIVING COSTS

Life in Vienna is quite affordable, especially for a capital city

Housing  
approx. €400–600 per month

Health insurance  
approx. €60 per month

Essentials (food, personal expenses)  
approx. €300 per month

Public transportation  
approx. €150 per semester

Books  
approx. €75–150 per semester

Communications  
approx. €15–30 per month

Entertainment  
approx. €50–150 per month





# University of the Future

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Internationalism, innovation, diversity – Campus WU is the concrete realization of WU's vision for a modern university. The fundamental principles of the architecture reflect the values and ideas we cherish at WU.

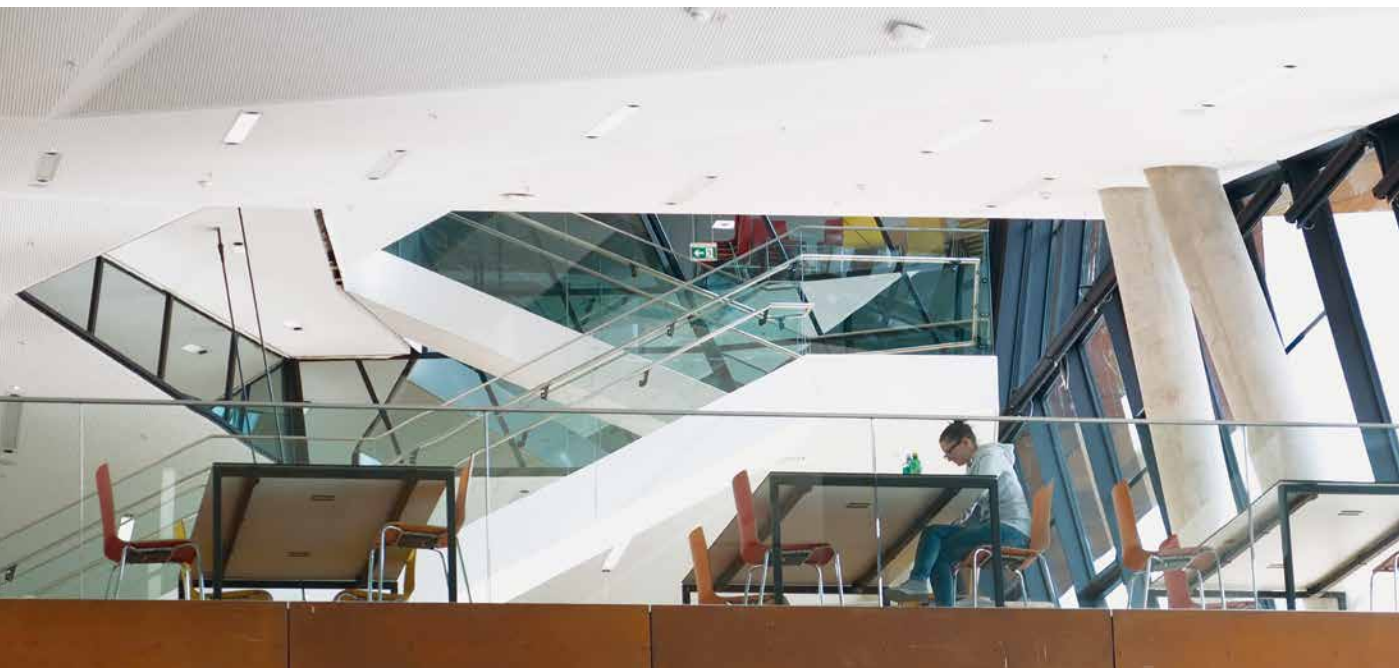
In October 2013, WU relocated to an impressive new campus in Vienna's 2nd district. As a public institution, WU is aware of its responsibility, and built its campus in an economical, ecological, and socially sustainable manner. We have not only constructed new buildings, but in the process we have also given concrete realization to our ideas of what the university of the future should look like. The campus is more than just a place for academic research and teaching and learning practical skills; it is also designed to create a new space for social, cultural, and political life.

The imposing Library & Learning Center (LC), designed by the Iraqi-British architect Zaha Hadid, is a testament to the central importance of research and teaching at WU. The Library & Learning Center is surrounded by six building complexes, including the Teaching Center, which houses most of WU's auditoriums. The Teaching Center is intended mainly for bachelor's degree students, while

the master's degree programs are taught primarily in the individual department buildings. The Executive Academy building is the home of continuing education and life-long learning programs. In this way, the various buildings and their functions reflect the three tiers of teaching and learning represented by the Bologna Process.

WU's department-based organizational structure was also a contributing factor. In its former location, various academic units were scattered across the district. Now they have been brought together in five department buildings, making life much easier for both students and faculty.

The campus infrastructure features auditoriums with state-of-the-art teaching equipment, including digital whiteboards. There are 3,000 student workplaces, located not only in areas intended for individual study, but also in project rooms that can be booked by teaching staff and





students alike. They cater to different needs by providing quiet spots for focused academic work as well as opportunities for work on group projects in communication-friendly study areas.

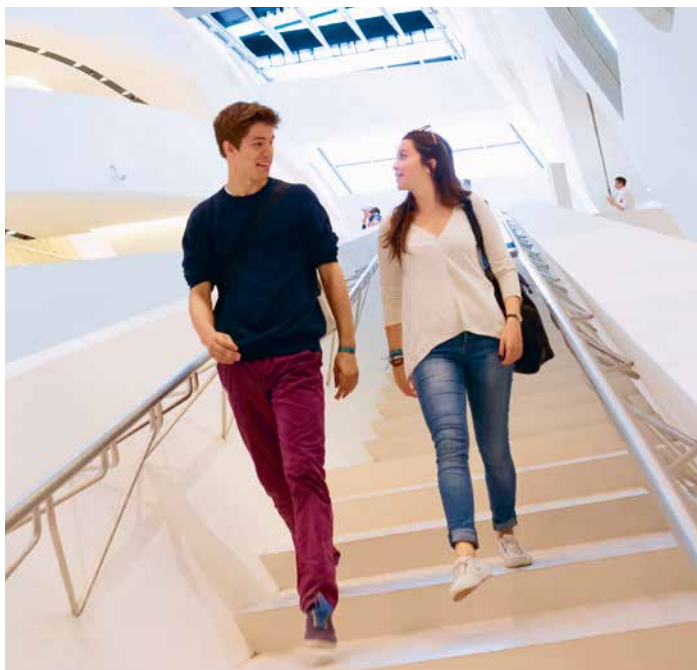
The campus provides an environment for WU students and staff that encourages productive work and communication. Not only the buildings themselves, but also the surrounding grounds offer plenty of opportunities for communication and meeting people. 55,000 m<sup>2</sup> of Campus WU's total surface area of 90,000 m<sup>2</sup> is open, publicly accessible space. Fences or barriers would contradict our vision of an open campus.

Visitors and area residents are more than welcome on Campus WU. The campus offers not only food for thought, but also restaurants, cafés, and shops, all in a stimulating architectural environment.

The campus is not only architecturally outstanding, the entire complex was also designed in accordance with "green building" principles. Much of the required energy is obtained using geothermal energy from groundwater, and "green IT" systems capture the heat from server facilities and recycle it back into the buildings' energy supply.

Another key feature of Campus WU is barrier-free accessibility. All auditoriums are specially equipped for people with disabilities, all areas are designed to be wheelchair accessible, and the campus also features a tactile guidance system for the visually impaired.

We have not only made sure to comply with all relevant legal guidelines, but we have also drawn on experience gained from best practice examples. WU aims to play a pioneering role – in all respects.



## Information and contact

To find out more about the Master's Program in Quantitative Finance, please visit:

**wu.at/qfin**

For further questions please contact:

**Georg Mikula**, Program Manager

**qfin@wu.ac.at**

Academic Directors of the Master's Program in Quantitative Finance:

**Kurt Hornik** and **Stefan Pichler**



WU (Vienna University of Economics and Business)  
Welthandelsplatz 1, 1020 Vienna, Austria  
wu.ac.at

Arriving by public transport:  
Subway: U2 stations "Messe-Prater" or "Krieau"  
Bus: 82A, "Südportalstraße" stop