

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 any potential future financial crises.”

(Hannes Mösenbacher, Head of Risk Control,
Raiffeisen Bank International AG)



Welcome!

DEAR PROSPECTIVE STUDENTS,

Our internationally oriented program is designed to provide you with an excellent academic and practical education, as well as with a promising outlook for a future career in today's challenging and dynamic financial markets. Throughout the program, a well-balanced curriculum builds strong quantitative skills coupled with a solid knowledge base of the underlying theory of finance. Students acquire the necessary knowledge and skills to use mathematical models to comprehend complex financial problems and learn how to apply these models in the field of economic sciences.

In addition to the program's interdisciplinary and internationally renowned faculty, the Vienna Graduate School of Finance (VGSF, www.vgsf.ac.at), an internationally oriented PhD program aiming to prepare its graduates for the international academic job market, is involved in the program as a cooperation partner.

As a student in our program, you can specialize by choosing between an Industry Track and a Science Track in the second year of your studies. In both tracks you will benefit from working closely together with our outstanding faculty and from their strong networks and links to the finance industry.

To succeed in this challenging program, we expect participants to have had extensive training at the undergraduate level in the fields of linear algebra (e.g. eigenvectors and eigenvalues), analysis (including multivariable calculus and simple ODEs), and probability (e.g. conditional expectation). We are looking forward to welcoming you to our program!

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



MSc Quantitative Finance

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 2014 (more information on page 10)
Contact	qfin@wu.ac.at



Content and Structure

A well-balanced curriculum ensures that students acquire not only theoretical but also practical knowledge and skills, and that the learning outcomes set for the overall program and the individual courses are achieved.

FIRST YEAR

The first year consists of a well-structured course program concentrating on the basics common to all specializations in quantitative finance. The courses cover mathematics, probability, statistics, and computing, and

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

(Jean Le Rond D’Alembert)

prepare students for subsequent courses on stochastic calculus and financial econometrics. Introductory courses in finance, microeconomics and related subjects like optimization and game theory complete this phase of the program. The successful completion of the courses “Mathematics 1” and “Financial Markets and Instruments” is a prerequisite for admission to all courses and examinations in the subsequent semesters.

SECOND YEAR

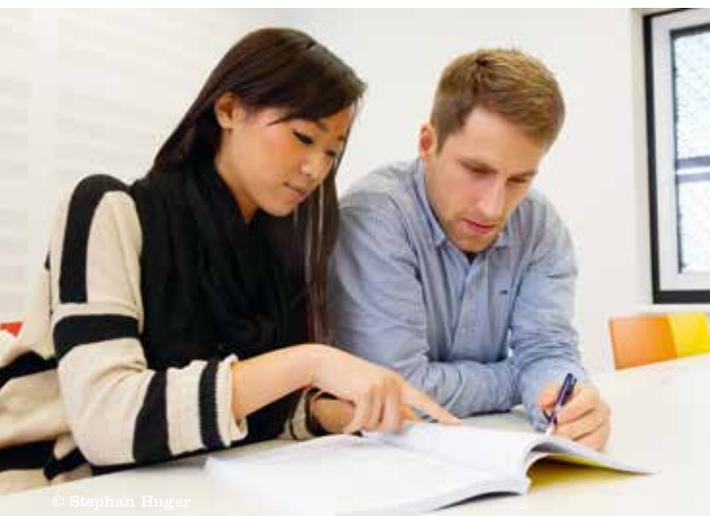
In the second year of their studies, students choose between a Science Track and an Industry Track.

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. Attendance of a weekly research seminar held by the Vienna Graduate School of Finance (VGSF) also gives students the opportunity to participate in the Department’s productive research atmosphere.

INDUSTRY TRACK

This specialization focuses on students seeking a career as quants in the finance industry. Besides courses in the major applications, the program 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.



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PROGRAM STRUCTURE SCIENCE TRACK

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

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

Common courses	Required courses	Electives	Master Thesis
<ul style="list-style-type: none"> › Asset Pricing › Corporate Finance › Financial Econometrics › Game Theory 	<ul style="list-style-type: none"> › Paper Reading and Writing › Research Seminar 1 & 2 	<p>At least six electives are offered each year, students select a total of three. 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 www.wu.ac.at/qfin/program</p>	
Total 20 ECTS	Total 12 ECTS	Total 12 ECTS (4 ECTS each)	20 ECTS



PROGRAM STRUCTURE INDUSTRY TRACK

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

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

Common courses	Required courses	Electives	Master Thesis
<ul style="list-style-type: none"> › Asset Pricing › Corporate Finance › Financial Econometrics › Game Theory 	<ul style="list-style-type: none"> › Industry Lab 	<p>At least six 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 www.wu.ac.at/qfin/program</p>	
Total 20 ECTS	Total 8 ECTS	Total 16 ECTS (4 ECTS each)	20 ECTS

Program Faculty

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

Ulrich Berger, Game Theory
Engelbert Dockner, Principles of Finance, Asset Pricing
Alexander Eisl, Industry Labs
Rüdiger Frey, Mathematics 1, Optimization, Continuous Time Finance 2, Quantitative Risk Management
Nils Friewald, Financial Engineering, Industry Labs
Alois Geyer, Econometrics
Michael Hauser, Financial Econometrics
Ronald Hochreiter, Industry Labs
Kurt Hornik, Program Director; Computing, Statistics 1, Statistics 2, Advanced Topics in Computing, Industry Labs
Rainer Jankowitsch, Paper Reading and Writing
Christian Laux, Corporate Finance, Advanced Topics in Corporate Finance
Alexander Mürmann, Microeconomics
Stefan Pichler, Program Director; Financial Markets and Instruments, Industry Labs
Klaus Pötzelberger, Probability, Mathematics 2
Helmut Strasser, Continuous Time Finance 1
Tanja Veza, Advanced Topics in Asset Pricing
Josef Zechner, Portfolio Management

PROGRAM MANAGEMENT

Georg Mikula, Program Manager

Qualification Profile and Career Prospects

The program has been designed to provide students with the advantageous combination of well-founded academic qualifications and a specialization in the field of modern finance.

In addition to comprehensive qualifications in the field of financial sciences, graduates have enhanced their social skills and competences by working in a multicultural setting and a stimulating learning environment. They also have advanced specialized skills in quantitative capital market-related models and methods, as well as in computational methods. 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 well in teams and participate actively in problem-solving processes
- › write and present academic papers (graduates of the Science Track)

- › develop and apply computational processes for solving finance-related problems (graduates of the Industry Track)

Thus, graduates are qualified to be experts in the increasingly complex world of finance, e.g. 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 and broaden their specialized knowledge in a relevant PhD program.



Program Application Criteria

“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, alumni of the program, Operational Risk Modeller)

The following requirements apply to the Master in Quantitative Finance:

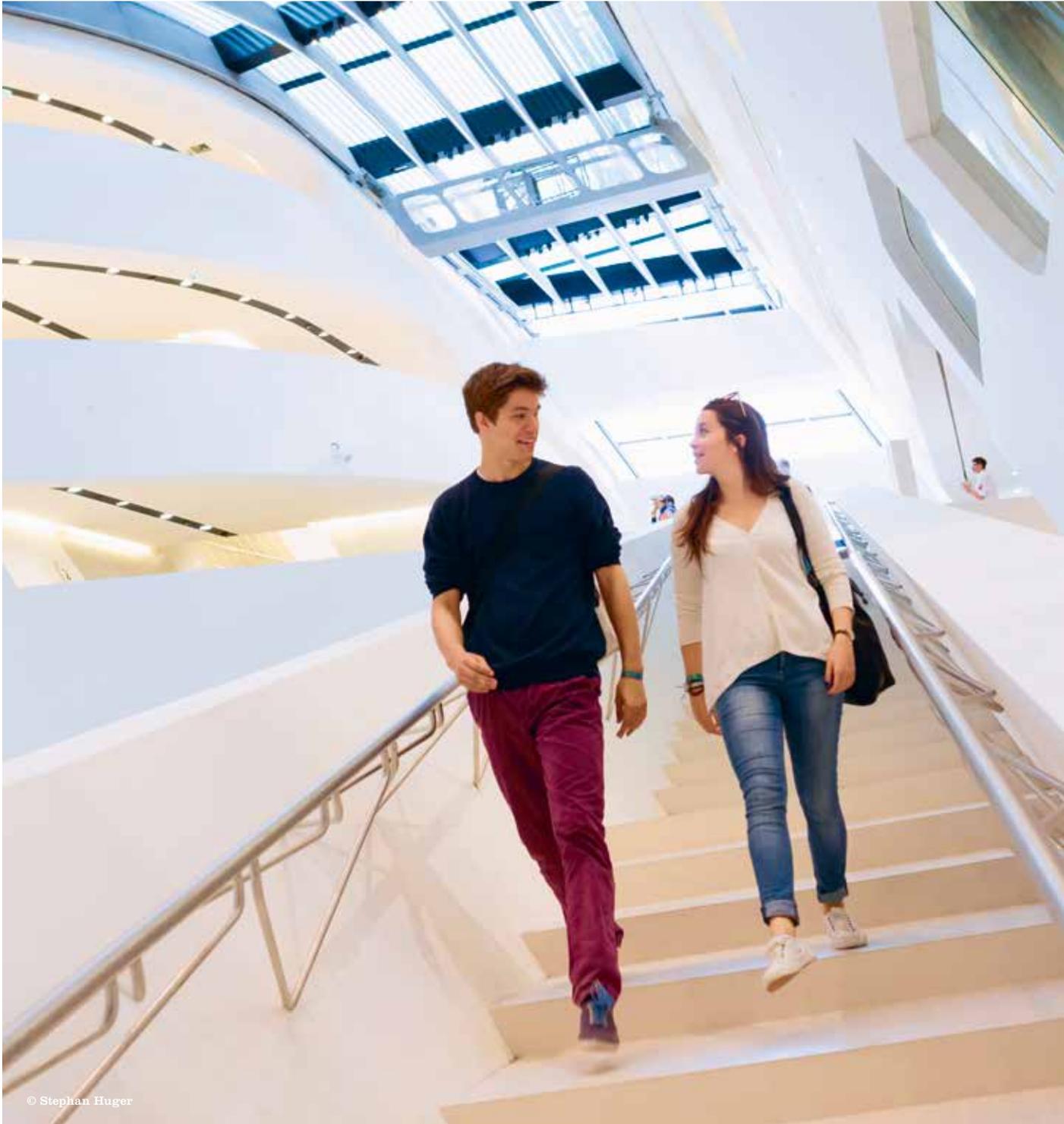
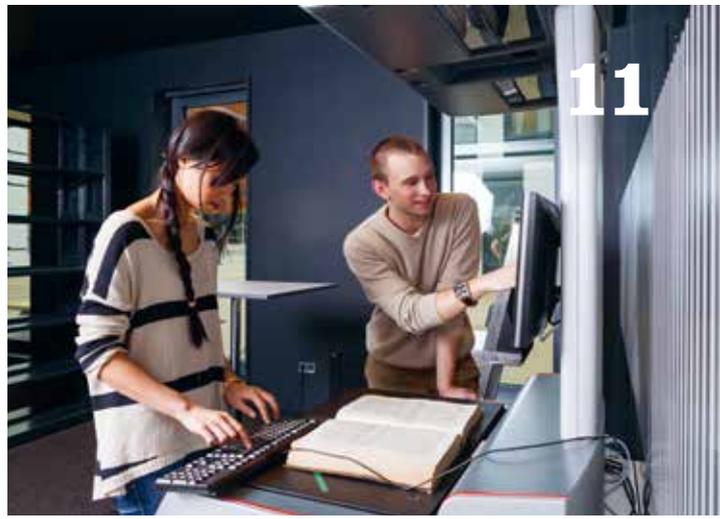
ONLINE APPLICATION

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

- › Skills and knowledge in business administration/economics/finance
- › Skills and knowledge in mathematics/statistics
- › Achievement potential
- › The GMAT (Graduate Management Admission Test) is highly recommended
- › Adding a letter of motivation to your application is highly recommended as well

For further and more detailed information on the application requirements and admission process, please visit the program's website at www.wu.ac.at/qfin



Application and Admissions at WU

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

APPLICATION

The rolling admissions policy allows students to apply from the beginning of September until spring. Submitted applications are batched and processed according to so-called priority deadlines. This means that the processing of applications submitted after a particular priority deadline will be delayed until after the next deadline. The first step in the application process is an online application. To keep quality standards high, all of WU's English-taught MSc programs are open to only a limited number of students. For this reason, all applicants are subject to a comprehensive selection process.

PROFICIENCY IN ENGLISH

Applicants must provide proof that they have a sufficient command of the English language (e.g. TOEFL 600/250/100, IELTS 7.0, CAE Certificate in Advanced English, English as a mother tongue, or a bachelor degree with English as language of instruction).

ADMISSIONS

Students selected for admission must come to WU's Admissions Office in person to enroll. Detailed information on the documents required are available online: [wu.ac.at/prospective/en/admission/international](https://www.wu.ac.at/prospective/en/admission/international)





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 vacation is in July, August, and September. All English-taught master programs start in the winter semester. Detailed information on enrollment deadlines and WU's academic calendar can be found on the WU website under [wu.ac.at/students/en/begin](https://www.wu.ac.at/students/en/begin)

TUITION FEES

No tuition fees apply for EU 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 €726.72. Under certain circumstances, the same regulations that apply to EU citizens can apply to non-EU students as well.

To find out more, please visit [wu.ac.at/students/en/org/tuition](https://www.wu.ac.at/students/en/org/tuition)

SCHOLARSHIPS

WU does not offer any traditional scholarships. However, if certain conditions apply, WU does have two financial aid programs that provide need-based and merit-based scholarship grants. For further information, please contact WU's Study Regulations Office ([wu.ac.at/structure/en/servicecenters/regulations](https://www.wu.ac.at/structure/en/servicecenters/regulations)) or visit the Austrian Database for Scholarships and Research Grants (OeAD) website at [grants.at](https://www.grants.at)

ORGANIZING YOUR STUDIES AT WU

- › **Getting started**
WU offers comprehensive information for international students on its website.
- › **Housing**
A cooperation with the OeAD Housing Office guarantees WU a certain quota of student residences each year.
- › **Bridging courses**
Students who want to refresh their skills before courses start are welcome to attend bridging courses.
- › **Online services**
A wide selection of online services is available to students on WU's website [wu.ac.at](https://www.wu.ac.at) WU's eLearning platform, Learn@WU
- › **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 transport, and only a few minutes away from the city center.

WU Key Data

2013/14

Students

Total students (fall 2013)	22,776 (47% women)
International students (fall 2013)	6,241 (27% of total)
Incoming exchange students	~ 1,000 per year
Outgoing exchange students	~ 1,000 per year

Faculty and Staff¹

Total faculty ²	570 (43% women)
Administrative staff	473 (67% women)
Total	1,043 (54% women)

Campus Resources

Premises Campus WU	100,000 m ²
Premises Library	
Total floor space	7,200 m ²
Volumes	~ 812,000

International

Partner universities	~230
Courses in English	~140/semester

Graduate Programs

German-taught MSc programs

- › Business Education
- › Business Law (LL.M.)
- › Economics
- › 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 Sciences³
- › PhD in Economics and Social Sciences³

English-taught MSc programs

- › 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

¹ 2013 in full-time equivalents

² not including personnel funded by third parties

³ English track available

English-taught Master Programs

Duration: 4 semesters; full-time programs; 120 ECTS credits; degree awarded: MSc (WU), except for International Management/CEMS and Strategy, Innovation, and Management Control (see program details below)

GENERAL ADMISSION REQUIREMENTS

Relevant bachelor degree; proof of sufficient proficiency in English; proof of achievement potential (valid GMAT results). More information: wu.ac.at/prospective/en

APPLICATION PERIODS

WU employs a rolling admissions policy, allowing students to apply from the beginning of September until spring. Rolling admission for the academic year 2015/16 starts September 1st, 2014 with the following three priority deadlines: October 8th, 2014; January 8th, 2015 and March 8th, 2015 (March 8th ist not applicable for International Management/CEMS).

PROGRAM DETAILS

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

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 experts from the industry

For further details visit: wu.ac.at/master/en

WU International

WU is a truly international university, because it recognized the necessity of thinking beyond Austria's borders early on and has made internationalization a number one priority.

CONFIRMED QUALITY

WU's international students can be sure they are studying at a leading European university. WU's high standards in research and teaching are confirmed by the international and prestigious EQUIS accreditation – a seal of quality that has been awarded to about only 140 universities worldwide (www.efmd.org).

WU is also a member of respected associations like CEMS (Global Alliance in Management Education), an alliance of 29 top business schools and over 68 of the world's leading multinational companies (www.cems.org), and PIM (Partnership in International Management), a network of 58 highly-renowned business schools and universities around the globe (www.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 (<http://rankings.ft.com>).

STUDY AROUND THE GLOBE

WU has successfully integrated many international aspects in its research and teaching over the past few years. With around 230 partner universities all over the world, WU maintains a strong international network. 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 very high percentage of international students: Today, more than one out of every four WU students comes from outside of Austria (not including exchange students), and this number is growing from year to year. Currently, most of WU's international students are from Germany, Turkey, Eastern Europe, Italy, China, and the USA.

Living in Vienna

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

HOUSING/ACCOMMODATION

WU has no on-campus dormitories or housing services. Still, accommodation can easily be found through the following channels or through newspapers/online ads:

- › [stuwo.at](#) – nonprofit student housing organization
- › [milestone.net](#) – high-quality living next to the WU
- › [wihast.at/index.en.html](#) – Wihast Dormitories
- › [housing.oead.ac.at/index_e.asp](#) – OeAD Housing Office next to the campus
- › [jobwohnen.at](#) – list of available apartments to share provided by Austrian Students' Union

WORKING IN VIENNA

WU's ZBP Career Center is the first place to go with any questions regarding working in Austria ([zbp.at](#))

- › Job openings for students, graduates and young professionals
- › Contacts to over 500 national and international companies
- › Approx. 1,500 job vacancies/year



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LIVING COSTS

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

Accommodation
approx. € 300 – 450 per month

Health insurance
approx. € 50 per month

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

Public transport
approx. € 150 per semester

Books
approx. € 75 – 150 per semester



University of the Future

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

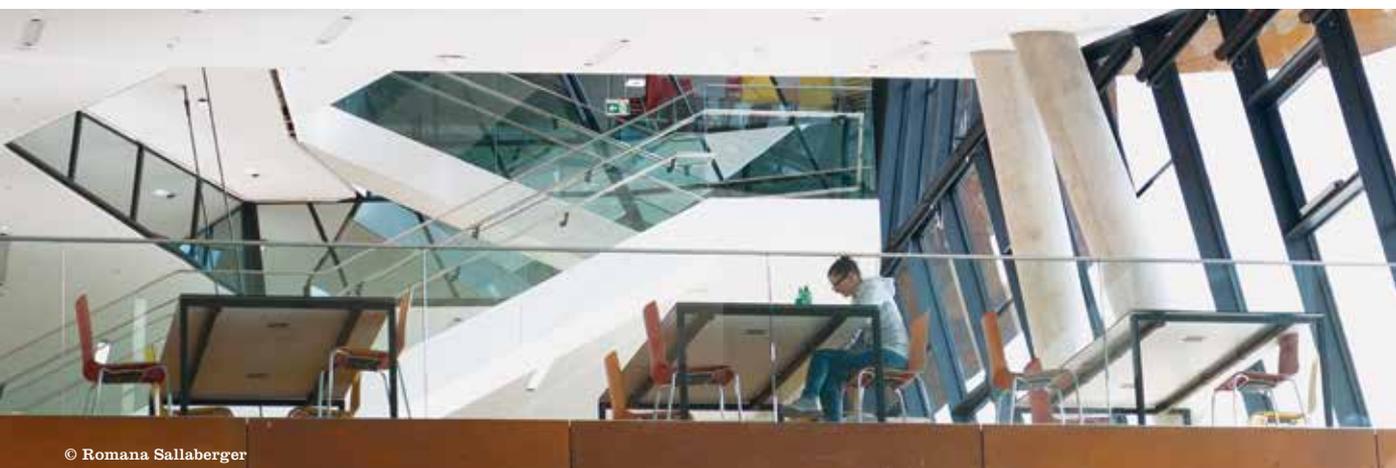
As a public institution, WU has lived up to its responsibility of building its new campus in an economical, ecological, and socially sustainable manner. WU's decision to locate the new campus in Vienna's second district has redefined this area and transformed it into an educational hub. We have not only 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 new 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 five building complexes, including the Teaching Center, which houses most of WU's auditoriums. The Teaching Center is intended mainly for bachelor degree students, while the master 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 the past, the various Institutes that make up the Departments were scattered across different locations. Now they have been brought together in four Department buildings, making life much easier for both students and faculty.

These are not the only improvements the new campus has to offer: All rooms have natural light, and the auditoriums feature state-of-the-art teaching equipment, including digital whiteboards. There are 3,000 student workplaces, three times as many as in the old buildings in Vienna's ninth district. These workplaces are located not only in the dedicated self-study areas, 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 top priority in planning the new campus was to create 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 m² of Campus WU's total surface area of 90,000 m² is open, publicly accessible space. Fences or barriers would contradict our vision of an open campus.

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

As different as they may look, the buildings are all based on the same overall technical concept: the buildings' infrastructures are standardized in terms of construction, energy supply, ventilation, and sanitary facilities. The entire campus has been designed in accordance with "green building" principles. Much of the required energy is obtained using geothermal energy from groundwater.

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.



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FURTHER INFORMATION AND CONTACT

To find out more about the Master in Quantitative Finance please visit wu.ac.at/qfin

Program Director of the Master in Strategy, Innovation, and Management Control:
Kurt Hornik and **Stefan Pichler**

For further questions please contact:
Georg Mikula
Program Manager
qfin@wu.ac.at

For information concerning applications and admissions please contact:
master.application@wu.ac.at

For all other study-related matters please contact:
admission@wu.ac.at

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WU on Twitter: twitter.com/wu_vienna

WU on Google+: google.com/+wuwien