



Welcome to MCF

Master in Computational Finance

A WORD FROM THE PROGRAM DIRECTOR

Today's world produces an unprecedented amount of data. To make sense of them, the world needs experts.

Here, at MCF we have created an integrated approach to education for financial industry, but the knowledge acquired can be used in a variety of industries.

Our program combines data science, programming, finance industry knowledge, new fintech trends, probability theory and global industry practice.

Welcome!



NEW WAY TO STUDY

Both worlds: academia and global industry practice

Real time trading, modelling based on real data – that is only a small part of experiential way of learning we encourage at MCF.

Due to the number of students and teachers residing abroad, we have enabled hybrid studies: a combination of in-class and online lessons.

My company delegated me to the MCF's module Financial Computing and Quantitative Investments. This amazing course provides the full scope of the investment problematic. A lot of useful and practical concepts were covered. Be ready to "get your hands dirty" and work on numbers of team assessments and projects, which of course, will lead to your better understanding. Another pleasant bonus in this course was introduction to web scrapping and Machine Learning Algorithms to analyze texts.

This course is highly recommended mainly to those, who have some basic knowledge of Python, Linear Algebra and Statistics.

Dmitry Benediktovich

Consultant in Market Risk team
Ernst & Young (EY), Czech Republic



SCHOLARSHIPS & CORPORATE PARTNERSHIPS

Did you know that several of the MCF students are benefiting from scholarships by reknowned global banks, regional investing companies and big IT firms?



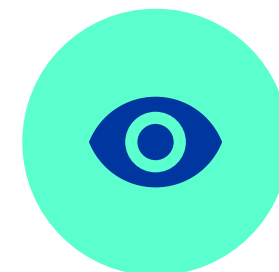
7

scholarships



10

corporate
partners



3

months to find
great job

At Banca Intesa Beograd we believe that the combination of skills such as the ability to efficiently work with data, understand the financial, statistical and machine learning models, and mastery in expressing such models in a computer code are imperative to business and growth.

And MCF is a solid partner in helping to internalize and build such abilities and skills, vital for the contemporay banking industry.

Djordje Stojanovski

Chief Risk Officer
Executive Board Member
Banca Intesa Beograd



CAREER DESTINATIONS

MCF attracts very talented candidates with different backgrounds and helps them grow into real experts following our unique way of teaching.

There is a vast demand, both locally and globally for experts with the skills you will gain at MCF.

If you only look at the career pages on the web sites of the leading global consulting firms, banks, fintech firm, blockchain developers, etc – you will find many job openings that MCF expertize fits perfectly.

Most of our students find jobs while they study.

MCF ADVISORY BOARD

Our advisory board keeps us on track with business needs of today's financial markets helping us to design our courses to the requirements of the top global financial organizations.



Vladimir Aleksić

JP Morgan

Vladimir Aleksić is Vice President at JP Morgan (London). He holds a PhD in Mathematics and Computing at King's College, University of London. He has a decade long experience split between the Macro Index desk within the Markets business, and the Chief Investment Office. In addition, he has the expertise in developing and executing quantitative investment strategies in interest rates, FX and commodities.



Marko Kangrga

RavenPack

Marko Kangrga is the Head of Quantitative Research for Americas at RavenPack. He focuses on novel approaches and techniques for combining fundamental drivers with big data quantitative frameworks to identify alpha opportunities from a wide universe of securities across multiple asset classes. Previously, as the head trader/investment analyst at an event-driven hedge fund in New York, he was responsible for macro research, idea generation and risk management. He has a B.S. degree in Finance with a minor in Computer Science from the University of Evansville in 2008.

MCF ADVISORY BOARD



Vladimir Lučić

Imperial College London

Vladimir Lučić is a Visiting Professor in the Mathematical Finance Group, Imperial College London. Prior to joining the Imperial College, Vladimir occupied a number of senior quantitative roles in the Investment Banking space, including the global head of Quantitative Analytics for Equity Derivatives, Structured Funds and QIS at Barclays, Head of Statistical Modelling and Development for rates and credit at Barclays, and head of Quantitative Investment Strategies in the cross-asset volatility space at Macquarie Group. Vladimir is also an Adjunct Professor at Faculty of Computer Science, Dalhousie University, Canada. He holds a PhD in Math from Univ. of Waterloo.



Marko Jevremović

JP Morgan

Marko Jevremović is Executive Director at JP Morgan in New York in charge of quantitative research for Liquidity, Custody and Depositary Receipts within Securities Services business. He holds a MSc in Math from Cambridge University. Prior to joining JP Morgan, he led modeling stream of Portfolio Quantitative Analytics at UBS in London, with experience across most of the major asset classes and studying firm-wide cross-asset impacts on XVAs, capital and collateral optimization.



Petar Marković

Deutsche Bank

Petar Marković is a Vice President at FIC Structuring at Deutsche Bank, New York. Previously, he was Vice President in Investment Banking Financing Group of Goldman Sachs in New York focusing on quantitative analytics, derivatives hedging, and risk management for corporate clients. Out of nine years at Goldman Sachs, he spent the first seven in Risk division, modeling risk across assets for the firm. He holds a BSc in Electrical Engineering and MSc in Quantitative Finance (IMQF) from University of Belgrade, and Executive MBA degree from Columbia University in New York.

MCF ADVISORY BOARD



Martin Summer

OeNB

Martin Summer is the Head of the Economics Studies Division of the Austrian Central Bank (OeNB). He holds a PhD in Economics from the University of Vienna. Prior to joining OeNB, he worked as a lecturer at the University of Vienna, Birmingham and Regensburg, as a visiting researcher and academic advisor at the Bank of England, and as a visiting scholar at the Financial Markets Group of the London School of Economics. His research interests are in banking regulation and systemic risk, financial stability, and financial economics. He is an Associate Editor of the journal *Mathematical Finance*.



Ivan Bjelajac

MVP Workshop

Ivan is a serial entrepreneur, currently serving as CEO of MVP Workshop, a Web3 Venture Builder company, and co-founder of Polygon Edge, EVM based blockchain scaling solution. He has been involved full-time with building software products since 2001 as an engineer, tech executive, or (co)founder in multiple corporations and startups, while also being involved in 6 startup exits. In MVP Workshop R&D studio, he worked on over 50 different Web3 projects, some of which turned out to be unicorns, such as Celsius Network (\$50M ICO in 2018 and \$750M investment in 2021) and Polygon (Ethereum's Internet of Blockchains, currently the most used EVM based blockchain scaling solution).

THE PROGRAM

Application and Entry Requirements

We are looking for talented and creative individuals interested in developing world-class expertise in the field of computational finance and becoming active players in the regional and global marketplace. While strong quantitative aptitude is beneficial, there are no formal requirements in terms of the background or a major. What is crucial is curiosity and motivation.

To apply for the MCF Master degree program send us your CV in English, and a proof that you have previously completed the university-level academic studies for the minimal duration of 4 years (240 ECTS). A candidate that has completed a university education outside of Serbia needs to provide us, also, with a document certifying the equivalence of her degree to a degree in Serbia (this is called convalidation or nostrification) before entering into the Master degree program. Convalidation is done by an accredited university in Serbia (say, Union University).

To apply for the MCF Short-cycle program just send us your CV in English. One does not need to have completed a 4-year university education or to nostrify diploma in order to enter into the Short-cycle program. After completing the Short-cycle program those participants that satisfy entry requirements into the Master degree program can complete the Master degree program by writing and defending a Master thesis (in English). No additional fees are assessed for completing the Master degree program after you complete the Short-cycle program.

Required courses

Financial Computing and Quantitative Investments

The aim of the course is to enable participants to understand and implement in Python key concepts in investment science and quantitative investment strategies.

By the end of the course, participants should acquire the tools required for making sound investment decisions. They should be able to understand both the foundational theory and underlying concepts, as well as learn how to practically apply these concepts in Python in all stages of the work flow.

This course is required for all participants. It carries 6 ECTS credits.

Financial Derivatives

The goal of the course is to develop firm understanding of the principal ideas and models that underpin modern financial practice and theory and to build hands-on experience in valuation, hedging and trading of financial derivatives using Python.

At the end of the course, students will understand the institutional aspects and methods of valuation and hedging of derivative securities in discrete and continuous time, effectively utilize data on financial derivatives and implement derivative valuation and hedging methods in Python. They shall also test their derivative-based investment strategies using a realistic trading simulator.

This course is required for all participants. It carries 6 ECTS credits.

Statistics and Financial Data Analysis

The course provides a comprehensive introduction to key concepts used in applied statistical work with financial data. The emphasis is both on the key principles of the underlying statistical theory as well as on the economic intuition behind the estimates.

At the end of the course, the students will have a good understanding of the “traditional” statistical methods for financial data analysis (outside the machine learning framework), their merits and disadvantages, and will be well equipped to conduct individual data-based research or industry projects. In addition, they will be able to implement these concepts in R.

This course is required for all participants. It carries 6 ECTS credits.

Machine Learning

The course provides a comprehensive introduction to the most important machine learning models and algorithms and their applications in finance, with an emphasis on model performance, validation, and interpretability and their implementation in Python.

At the end of the course, the students will have a good understanding of the most important (supervised and unsupervised) machine learning algorithms and their applications. They will know which models are suitable for a given problem and data set, how to evaluate the model quality, and how to interpret the results. In addition, they will have implemented a number of models using large sets of financial data.

This course is required for all participants. It carries 6 ECTS credits.

Fixed Income and Credit

The objective of the course is to develop understanding of fixed income securities and markets as well as interest rate derivatives. We study valuation and hedging using these instruments and discuss how these methods are used in practice.

At the end of the course, students will understand the institutional aspects and methods of valuation of fixed income securities such as bonds and related instruments, construction of yield curves, valuation and hedging using interest rate derivatives. In addition, they will be able to implement these models in Python.

This course is required for all participants. It carries 3 ECTS credits.

Elective Courses (select 2 from the list)

Topics in Financial Technologies

The aim of the course is to study interconnection between new technology and finance and provide fundamental understanding of digital innovation of financial intermediation functions (money, payments, capital raising, market aggregation, price discovery) with emphasis on scalable business models and consumer products.

Upon the completion of the course participants should be familiar with principal varieties of Fintech ecosystem and what and how is disrupted in traditional money, payment, lending, banking and investment industries. Participants should be able to understand the basic requirements and features of technology, data and algorithms underpinning the Fintech industry. They should be able to understand specific management challenges in such ventures including regulation, management of customers, value propositions, and best practices. Finally, they shall get a chance to structure thinking about starting a new business in this industry.

This course is elective. It carries 6 ECTS credits.

Algorithmic Trading, Blockchain, and Decentralized Finance (DeFi)

The course provides a comprehensive introduction to key concepts used in applied statistical work with financial data. The emphasis is both on the key principles of the underlying statistical theory as well as on the economic intuition behind the estimates.

This course provides an introduction to the blockchain technology, cryptocurrencies, retail trading and algorithmic trading. A Technical Analysis and Trading Systems will be introduced as a necessary basis for retail and algorithmic trading on cryptocurrency and other markets. In addition, participants receive hands-on introduction to creating blockchain applications and what kinds of Decentralized Finance ecosystems, technologies, tools, products and techniques exist, with strong focus on Ethereum as a case study.

At the end of the course, participants will learn how to apply Technical Analysis on cryptocurrencies, but also on many other asset classes. They will be able to create and use Technical Indicators, to assess the risk involved in trading, to apply sound money management techniques and to create profitable trading systems that can be applied for manual and algorithmic trading on various markets. Participants will learn the basics of Solidity and how to create tokens in Ethereum using that programming language. They will learn how to create ERC20 and ERC721 tokens on top of Ethereum. In other words they will know how to create fungible and non-fungible tokens.

This course is elective and carries 6 ECTS credits.

Investments

The course provides in-depth contextual understanding of the financial investing in conventional (with the focus on equity) and in alternative asset classes (private equity, venture capital, hedge funds, etc.) from the point of view of institutional investors. The course demonstrates best practice governance in a comprehensive investment transaction life cycle and with a particular emphasis on structuring and valuation segments.

After the completion of the course participants should be able to understand how to value financial (equity) investments and implement best practice governance in a full transaction life cycle. The covered concepts spotlight relevant induction on and first-hand experience in industry changing trends through growth and cyclical investing approaches, ESG investing, impact investing, mergers and acquisition, innovative transformations and venture funding, etc. This course offers a completing puzzle piece to the ground math and statistical modeling problems solving coursework.

This course is elective and carries 6 ECTS credits.

Quantitative Risk Management

The aim of the course is to provide practical, hands-on training for those interested in working in risk management and complete their preparation for passing the FRM and PRM certificates, two globally recognized certificates for risk managers.

By the end of the class students should be able to perform independent risk modeling and verifications of risk models across major risk classes, understand contemporary risk regulation and the role that regulatory and economic capital, cost of funding and fund transfer pricing play in modern financial institutions. In addition, they should know how to implement many of these models in R and/or Python.

This course is elective. It carries 6 ECTS credits.

Numerical Methods

The aim of the course is to provide a comprehensive and mathematically rigorous introduction to Monte Carlo and finite difference methods for pricing financial options and for evaluating their sensitivities to various input parameters.

At the end of the course, the student should have a thorough understanding of the basic theory behind Monte Carlo and finite difference methods, and be able to implement them in standard applications.

This course is elective. It carries 6 ECTS credits.

Elective Courses (select 2 from the list)

Before the beginning of the program, we organize an approximately two month preparation course where students can learn programming (Python, some R), math and probability theory that are needed for computational finance. By the end of the course students should be able to confidently write codes in Python and R addressing typical problems in finance and economics, working efficiently with financial data and creating sophisticated data visualizations. Students will understand some of the key concepts in calculus, linear algebra and probability and learn how they apply to challenges that we face in finance and economics. No prior programing knowledge is assumed. Bootcamp does not earn ECTS credits.

Elective Courses (select 2 from the list)

Upon the completion of the MCF Master degree program one receives the academic title Master in Computer Science-Computational Finance from the School of Computing, Union University, Belgrade. The program is accredited as the official Master program in the Republic of Serbia.

Upon completion of the MCF Short-cycle program one receives the Certificate of Completion of the Master in Computational Finance (MCF) Short-Cycle program from the School of Computing, Union University, Belgrade. The program is approved by the National Council for Higher Education of the Republic of Serbia.

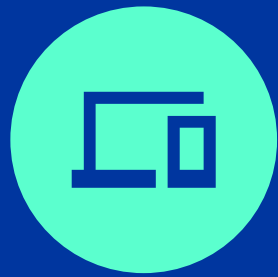
MCF Master degree program
KEY FACTS

Duration	12 months
Language of Instruction	English
Required Courses	5
Number of Electives to Complete	2 out of 6
Degree	Master in Computer Science – Computational Finance
Number of ECTS upon completion	60
Full Tuition and Fees	6000 EUR
Scholarship aid available	No
Finacial aid available (tuition reduction)	Yes

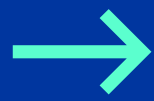
MCF Short-Cycle Program
KEY FACTS

Duration	12 months
Language of Instruction	English
Required Courses	5
Number of Electives to Complete	2 out of 6
Degree	Master of Computational Finance (Short-Cycle) Certificate of Completion
Total number of ECTS obtained wth MCF	39
Full Tuition and Fees	6000 EUR
Scholarship aid available	Yes
Finacial aid available (tuition reduction)	Yes

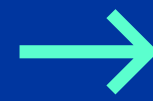
3 STEPS TO ENTER THE PROGRAM



Apply online



Interview with
the Program Directro



Acceptance Letter
via email

FINANCIAL AID

MCF has a number scholarships available as well as up to 50% discount for qualified accepted candidates.

WHILE COMPLETING THE MCF PROGRAM, YOU CAN OBTAIN, ALSO, A MASTER CERTIFICATE IN COMPUTATIONAL FINANCE FROM COLLEGIO CARLO ALBERTO, TORINO, ITALY.



Research
Education
Outreach

CCA

The Collegio Carlo Alberto (CCP), located in Torino, Italy, is a foundation created in 2004 as a joint initiative of the Compagnia di San Paolo and the University of Torino with the purpose of establishing cutting-edge education and research programs in finance, economics and broader social sciences. Today, CCP is one of the leading centers of excellence in economic and finance research and education in Europe. Our cooperation with CCP is the first of its kind for the Collegio and reflects high international demand for the level and mix of skills that the MCF program provides. Importantly, the agreement creates a direct link between the MCF program participants and the leading Italian and European financial institutions.

According to the terms of the agreement, upon the completion of the MCF program each program participant can, without additional cost, earn the Collegio's Master in Computational Finance certificate as well. For this, she needs to attend two additional short courses (typically one or two days long) taught by distinguished finance professionals selected by the Collegio. In addition, they can participate in the Collegio's Career Days organized by their sponsors - leading Italian and European financial and fintech firms. This allows them to meet the same prospective employers as the CCA students. Both the courses and the career day participation is currently online. Master certificates of CCP are broadly recognized among businesses in Italy and worldwide. Please contact us if you need more information

MEET YOUR TEACHERS

Along with a faculty of very devoted professors with degrees from the world's top universities, globally experienced business practitioners share their knowledge with the MCF students.



Branko Urošević, PhD

Full Professor

Professor of Economics and Finance at the School of Computing (Raf) and Fellow, CESIfu, Munich. Holds a PhD in Physics from Brown University and a PhD in Finance from U.C. Berkeley. He created and directed the IMQF program at the University of Belgrade until 2020. From 2021, he directs and teaches at the MCF program. Taught at the Frankfurt School of Finance and Management, ICEF (Moscow), and Pompeu Fabra (Barcelona). Worked in McKinsey & Co and KPMG (Chicago). His recent research is in quantitative investment strategies and risk management.



Mladen Stanojević, PhD

Assistant Professor

Assistant Professor in Algorithmic Trading, Operating Systems, Computer Networking, Natural Language Processing, Speech Recognition, Visual Systems at the School of Computing (Raf) in Belgrade. He has an extensive experience in manual and algorithmic, retail trading and developed 500+ automatic trading systems since 2000. His research interests are in Algorithmic Trading, Artificial Intelligence, Machine Learning, Knowledge Representation, Natural Language Processing and Visual Systems.

MEET YOUR TEACHERS



Drago Inđić, PhD

Assistant Professor

Assistant Professor in Economics and Finance at the School of Computing (Raf). Managing Director, Oxquant Consulting, Oxford, UK. PhD in Engineering from Imperial College (UK). A hedge fund professional and an EU expert, he taught at London Business School and Queen Mary University London. He is teaching and launching fintech solutions based on data science and machine learning.



Nikola Vasiljević, PhD

Assistant Professor

Assistant Professor in Economics and Finance at the School of Computing (Raf). Received a PhD in Economics (Banking and Finance) from the University of Zurich. External Lecturer at the Department of Banking and Finance at the University of Zurich. Previously, he worked for seven years as an investment strategist for International Wealth Management division of Credit Suisse in Zurich. Main research interests: asset pricing, asset allocation, financial engineering, and machine learning.



Vladislav Radak, PhD

Lecturer

Finance lecturer and banking consultant. Holds a PhD in Finance from Technical University in Dortmund and BSc and MSc in Math from University of Belgrade. Specialized in market risk, he worked for Deloitte and PwC, where he consulted most of the top 10 German banks in the last decade. Voted top lecturer at TU Dortmund in 2019. His areas of expertise include investments, financial risk management, and banking transformation.



MASTER IN COMPUTATIONAL FINANCE



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