SOFIA UNIVERSITY ST. KLIMENT OHRIDSKI

FACULTY: FACULTY OF ECONOMICS AND BUSINESS ADMINISTRATION

CURRICULUM

Approved:.....	Approved by the Academic Council with protocol № 11/28.06.2023

Professional field: 3.8 Economics

Master's Degree

Major:

E	F	E	9	2	7	7	2	3

Master's Programme: APPLIED ECONOMETRICS AND ECONOMIC MODELLING
In English

Mode of study: Full-time
Duration (number of semesters): 4 (four)

Professional Qualification: Master of Applied Econometrics and Economic Modelling

Qualification characteristics

Major: Economics and Finance
Master's Programme: Applied Econometrics and Economic Modelling in English

1. Programme Objectives

The Programme prepares highly qualified specialists with solid fundamental and practical background to carry out analyst and managerial tasks compliant with the modern developments of economic science, ICT and AI applications, and the EU-established good practices of decision making in businesses, financial institutions, public administration, and the non-governmental sector.

The goal of this programme is to acquaint the students with the modern developments of economic theory and to acquire knowledge and skills for modelling and analysis of data with a high degree of applicability in a real-life working environment. The curriculum has a pronouncedly interdisciplinary nature. It includes economics and finance courses, on the one hand, and STEM-related courses such as applied statistics and economic modelling, econometrics and statistical learning, specialized programming languages and digital solutions, on the other. The balanced teaching of classical and modern theoretical and empirical models and concepts leads to the development of practically oriented skills grounded on solid theoretical knowledge and prepares the students to take effective decisions through the usage of modern methods and tools, including working with real-life data and the application of modern software packages. The interdisciplinary nature of the Programme matches the needs of the Bulgarian and EU labour markets for applied specialists, statisticians, analysts, and managers in ICT and analytics businesses, finance and government who have STEM background. That combination of economics, finance, and STEM guarantees a broad, in-depth, and modern preparation of students and acts as a prerequisite for their successful job placement in the framework of a dynamically changing market environment domestically and abroad. Additionally, the curriculum also envisages the development of the so-called soft skills of students, thus preparing them for successful career growth in accordance with the modern labour market requirements.

The Master's Programme focus is on modern quantitative methods of analysis of economic data and processes. It is a full-time programme with intense training process. The training offered aims at building skills and competencies for solving real-world problems in many areas of government and business practice. In addition, the programme contributes towards skill transferability through complementing the modelling knowledge with the enhancement of critical thinking, project management, cross-disciplinary communication ability, etc. While the courses are specifically designed to be oriented towards the practice of the economist profession, they also provide strong theoretical foundations so that students acquire the ability to handle a wide range of problems many of which might turn out to be non-standard or unprecedented. In a more general setting, the linkage between theory and applications is constantly maintained and emphasized.

All courses are delivered by specialists having extensive experience in academia, government, and the analytics business. The curriculum is designed in such a way so that it largely matches the standard requirements concerning the quantitative economics analyst profession as known in the market-leading institutions domestically and internationally.

2. Programme Scope (knowledge and skills necessary for successful professional development; theoretical preparation and specialized trainings, etc.)

The programme is based on high international standards and modern teaching methods with a continuously renewed and fully needs-matching facilities (incl. hardware, software, and information) which allows a wide-range utilization of the power of information technology in the process of study. The Faculty of Economics and Business Administration has a well-developed network of academic, business, and institutional partnerships. The main courses in the curriculum have been developed because of a long-standing partnership with lecturers and scientists from leading Western universities, with experts and managers in international, European and national institutions, as well as with analysts and managers from businesses and the financial sector. This allows

the application of real-life cases, working with real-life data, carrying out of joint seminars, use of up-to-date software solutions, the inclusion of innovative methods for economic and financial modelling and forecasting, as well as business simulations and games in the study process.
The programme provides high-quality training at the Master's level. The design warrants the coverage of a broad range of topics and approaches to the practice of quantitative economic analysis.
The preparatory summer semester in the four-semester curriculum includes basic economic and statistical disciplines, which are subsequently required for students to effectively master the material of the following courses. The second semester starts with extensive courses on the mathematical and foundations necessary to successfully master the theory and toolkits offered in the specialized core courses. They cover advanced topics in probability and statistics, difference and differential equations and systems as the indispensable tools of the science of dynamic economics, topics in mathematical optimization such as linear and non-linear programming, the calculus of variations, discrete- and continuous-time dynamic programming, etc.
Core courses taught are devoted to static and dynamic econometric theory and methods, statistical learning, microeconomic and macroeconomic modelling, principles of banking and regulatory risk management, etc. With a strong view to practical applications, courses based on using computational software environments such as R, Python, VBA, SQL, EViews, and SAS, are provided.
In addition, students can choose among specialized courses related to topics such as credit risk modelling, scorecard development for financial risk assessment, decision science, etc. Finally, the programme provides options to take part in courses focused on project management, soft skills development, acquiring professional research skills, etc.
Besides exams as the traditional approaches to assessing students' progress, the learning process will also include solving practical problems, including through structured assignments. The programme completes with writing a Master's thesis on a topic which will be jointly defined and implemented in cooperation with interested businesses. In this respect, it will also serve as a tool facilitating the transition to the job market.

3. Acquired Skills and Competencies

After successfully completing the programme, the graduate student:
SHOULD KNOW:

1) The advanced mathematical and statistical theory and their applications to economics
2) The foundations of advanced econometric techniques for static and dynamic data analysis and forecasting
3) The principles of advance microeconomic, macroeconomic, and financial modelling
4) The principles of functioning of related industries
5) The efficient methods of time, stress, crisis, and change management, negotiations, communications, etc.

BE ABLE:

1) To express real-life problems as abstracts economic and econometric models
2) To translate modelling concepts and ideas in structured software code using computational software environments
3) To design and implement independent applied research
4) To communicate ideas and results to an audience, to clients, to managers, etc.

4. Professional Development

The programme graduates are economists skilled in the theoretical and empirical modelling of real-life problems and data. They can find employment in governments and central banks, in financial institutions, in market research agencies, in social networks and media research companies, in consultancies specialized in quantitative and decision analytics, in large industrial companies with own research units, etc. The Master's programme can also be considered as the preparatory stage for PhD studies leading to a career in academia.

The Programme graduates successfully find job placements predominantly in the following positions:[1]

- Mathematicians, actuaries, and statisticians, applied specialists in finance and mathematics, and developers of software and software applications analysts (incl. business analysts, data scientists, data modellers, financial risk analysts, etc.);
- Finance specialists;
- Managers in information and communication technologies, professional services, and analytics businesses.

[1] According to the National Classification of Professions and Occupations (NCPO 2011).

EFE	9	2	7	7

major code

Economics and Finance Major/Master's Programme in Applied Econometrics and Economic Modelling in English

academic year beginning from 2022/2023

№	course code				Course Title	Type - R, E, O	Term	ECTS credits	Number of Classes - total				Weekly load	Type of Grading* - e, ca, m, a
									Total	Lectures	Seminars	Practical classes / practice		
1	*2*				*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
Compulsory courses														
1	R	9	0	0	Concepts and Methods of Official Statistics	R	1	8	240 (90/150)	60	30	0	4/2/0	M
2	R	9	0	5	Macroeconomic Analysis	R	1	7	210 (90/120)	45	0	0	3/0/0	M
3	R	9	0	7	International Macroeconomics	R	1	6	180 (75/105)	45	0	0	3/0/0	M
4	R	9	0	4	Demography	R	1	5	150 (60/90)	60	0	0	4/0/0	M
5	R	9	1	2	Applied Statistics with SPSS/PSPP	R	1	4	120 (45/75)	45	0	0	3/0/0	M
6	R	9	1	0	Applied Econometrics I	R	2	7	210 (90/120)	60	30	0	4+2	M
7	R	9	0	3	Probabilistic and Statistical Computations with R	R	2	5	150 (60/90)	60	0	0	4+0	M
8	R	9	1	1	Applied Econometrics II	R	2	4	120 (60/60)	60	0	0	4+0	E

9	R	9	1	4	Statistical Learning	R	2	5	150 (60/90)	60	0	0	4+0	M
10	R	9	1	3	Applied Economic Modelling with Python	R	2	5	150 (60/90)	60	0	0	4+0	M
11	R	9	0	2	Cross-section and Panel Data Analysis	R	3	5	150 (60/90)	60	0	0	4+0	M
12	R	9	0	8	Microeconomic Modelling	R	3	3	90 (45/45)	45	0	0	3+0	CA
13	R	9	0	1	Time Series Analysis and Forecasting	R	3	5	150 (60/90)	60	0	0	4+0	M
14	R	9	0	6	Macroeconomic Modelling	R	3	3	90 (45/45)	45	0	0	3+0	CA
Elective courses – a minimum of 33 ECTS credits for the entire period of study														
1	E	9	5	8	Principles of Banking and Regulatory Risk Management	E	2	2	60 (30/30)	30	0	0	2+0	CA
2	E	9	6	2	Introduction to SAS Programming	E	2	3	90 (30/60)	30	0	0	2+0	M
3	E	9	6	5	SQL for Database Management	E	2	4	120 (45/75)	45	0	0	3+0	M
4	E	9	5	1	Data Analysis with Excel and VBA	E	3	4	120 (45/75)	45	0	0	3+0	M
5	E	9	5	4	Empirical Methods in Finance	E	3	3	90 (45/45)	45	0	0	3+0	CA
6	E	9	6	4	Decision Science	E	3	4	120 (60/60)	60	0	0	4+0	M
7	E	9	5	6	Credit Risk Modelling	E	3	2	60 (30/30)	30	0	0	2+0	CA
8	E	9	5	3	Introduction to Oracle	E	3	4	120 (60/60)	30	30	0	2+2	E
9	E	9	6	1	Typesetting with LaTeX	E	4	4	120 (45/75)	45	0	0	3+0	M
10	E	9	5	7	Project Management for Data Analytics	E	4	2	60 (30/30)	30	0	0	2+0	CA
11	E	9	5	5	Soft Skills for the Analytics	E	4	3	90 (30/60)	30	0	0	2+0	M
12	E	9	5	9	Scorecard Development for Financial Risk Assessment	E	4	5	150 (45/105)	45	0	30	3+0+2	CA

13	E	9	6	3	Skills for Applied Research	E	4	4	120 (60/60)	60	0	0	4+0	CA
14	E	9	6	0	Social and Economic Networks	E	4	3	90 (45/45)	45	0	0	3+0	CA
15	E	9	5	2	Text Analytics	E	4	3	90 (30/60)	30	0	0	2+0	CA

Study practice and course work

All students develop course projects in the following subjects: Concepts and Methods of Official Statistics; Demography; Applied Statistics with SPSS/PSPP; Applied Econometrics I; Probabilistic and Statistical Computations with R; Statistical Learning; Applied Economic Modelling with Python; Cross-section and Panel Data Analysis; Time Series Analysis and Forecasting; Introduction to SAS Programming; Data Analysis with Excel and VBA; SQL for Database Management; Typesetting with LaTeX; Soft Skills for the Analytics.

Graduation

Mode of graduation	ECTS credits	First exam session	Second exam session
Master's Thesis Defence	15	March	November

The curriculum was revised at a Faculty Council meeting with Record №7/03.04.2023.

DEAN:
/Assoc. Prof. Atanas Georgiev, PhD/

Sofia University "St. Kliment Ohridski"

Curriculum Reference Statement

Economics and Finance Major / Master's Programme in Applied Econometrics and Economic Modelling, in English

Mode of study: full-time; Length of study: 4 **(four) semesters**

ECTS: 120

Load, ECTS credits and grades by semester

Type of activity	Semester I			Semester II			Semester III			Semester IV			Total		
	Load (h.)	ECTS credits	number of grades	Load (h.)	ECTS credits	number of grades	Load (h.)	ECTS credits	number of grades	Load (h.)	ECTS credits	number of grades	Load (h.)	ECTS credits	number of grades
Compulsory courses	900	30	5	780	26	5	480	16	4	0	0	0	1260	42	9
Min. elective courses	0	0	0	180	6	2	360	12	3	450	15	4	990	33	9
Study practice	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Master's Thesis defence	0	0	0	0	0	0	0	0	0	450	15	1	450	15	1
Total	900	30	5	960	32	7	840	28	7	450	30	5	3600	120	24
of which auditorium	255			375			345			180			1155		

Mode of graduation	ECTS credits	Number of hours for preparation	First exam session	Second exam session
Защита на дипломна работа	15	450	February	November

Professional qualification acquired:
MASTER OF APPLIED ECONOMETRICS AND ECONOMIC MODELLING

The curriculum was revised at a Faculty Council meeting with Record №7/03.04.2023.

DEAN:
/Assoc. Prof. Atanas Georgiev, PhD/