UNIVERSITY OF ZIELONA GÓRA

FACULTY OF EXACT AND NATURAL SCIENCES

FULL-TIME COURSE PROGRAMME

course: **COMPUTER SCIENCE AND ECONOMETRICS**

cycle: **second cycle**

profile: **general academic**

recruitment in the academic year

2025/2026

1. General characteristics of the course programme

Course	Computer Science and Econometrics
Cycle	Second-cycle programme
Profile	General academic
Course delivery method	Full-time
Specification of the fields of science and scientific disciplines or fields of art and artistic disciplines to which the learning outcomes apply (including the leading discipline), and specification of percentage share of each discipline in the number of ECTS credits required to obtain qualifications corresponding to the level of education	Exact and natural sciences Disciplines: Mathematics (93 ECTS credits - 77%) – leading discipline Computer Science (27 ECTS - 23%)
Professional title awarded to graduates	Master (Polish title: *magister*)
Scientific category held by the basic organizational unit of the university	B+ Discipline Mathematics

2. Indication of the relationship between the course programme and the mission of the university and its development strategy

The graduates are specialists in the use of information systems in managing enterprises and the national economy, as well as the application of quantitative methods to analyse macro and micro economic processes.

The introduction of the course is consistent with the objective [K2] "Broadening the educational offer - orientation of learning outcomes to the needs of the labour market" specified in the "Development Strategy of the University of Zielona Góra until 2020" in the area of "Education". In addition, the course complies with the "Digital Agenda for Europe" and the "Agenda for New Skills and Jobs" in the Europe 2020 EU strategy.

3. Description of competencies expected from a candidate applying for admission to the first-cycle programme, second-cycle programme or single cycle master's programme

The candidate applying for admission to the second-cycle programme must be the holder of the following Polish degrees: *magister, magister inżynier, inżynier, licencjat* or other equivalent to bachelor or master degree.

The candidate applying for admission to the second-cycle programme must have competencies necessary to undertake second-cycle studies in Computer Science and Econometrics, and in particular:

- the candidate must have basic knowledge of economics, management and finance, information systems as well as statistics and econometrics;

- the candidate must be able to design and use information systems in company management;

- the candidate must be able to use mathematical, statistical and econometric methods and tools to analyse macroeconomic and microeconomic processes.;

4. Analysis of the compliance of the assumed learning outcomes with the needs of the labour market

The graduates acquire knowledge needed for advanced analysis of economic phenomena on a microeconomic and macroeconomic scale. Thy are specialists in the design and implementation of advanced IT systems and databases in business and administrative organizations, and in consulting activities that require analytical skills and the knowledge of mathematical, statistical, econometric and IT tools.

Students graduating from *business analytics* can be employed in consulting companies, business management centres or business and administrative organizations.

Students graduating from *statistics and econometrics* can be employed in economic information processing centres or in business management centres. They can also work in public administration and in organisations that plan and forecast the development of economic phenomena.

Students graduating from *information systems* can be employed in computer companies, IT centres, and R& D centres that use information technologies.

5. Description of methods of verifying and evaluating learning outcomes achieved by students throughout the entire educational process

The methods of verification and assessment of the learning outcomes achieved by the student are included in the syllabuses for individual subjects.

6. Course programme:

6.1 Description of the expected learning outcomes, with the indication of the field of science and scientific disciplines or fields of art and artistic disciplines to which the learning outcomes for this course relate.

See Appendix for:

- *Learning outcomes;*

Outcome symbol	After completing second-cycle studies in computer science and econometrics, the graduate:	Reference to PRK level 7
KNOWLEDGE		
K_W01	has extensive knowledge of the significance of computer science, econometrics and mathematics for developments in the fields of formal and natural sciences, for the knowledge of the world and for the development of society and economy	P7S_WG-O1.1 P7S_WG-O1.2A P7S_KK-O7.2
K_W02	is familiar with basic mathematical models used in economics, understands their mathematical and economic meaning, as well as possibilities and limitations of applying them	P7S_WG-O1.1
K_W03	knows basic measures of variability of economic magnitudes, understands the importance of using them and methods of calculating	P7S_WG-O1.1
K_W04	is familiar with international symbols used in actuarial science and with various types of insurance policies	P7S_WG-O1.1

K_W05	knows elements of classical risk theory, can estimate the probability of an insurer's ruin	P7S_WG-O1.1
K_W06	knows basic methods for multi-dimensional statistical data analysis used in market research	P7S_WG-O1.1
K_W07	knows basic sampling schemes for finite populations and methods to analyze data acquired from those schemes	P7S_WG-O1.1
K_W08	has basic knowledge of how to carry out simulation research and how to apply it to economics	P7S_WG-O1.1
K_W09	knows how to create, use and improve information systems	P7S_WG-O1.1
K_W10	is familiar with principles for designing software, knows principles for managing an IT project	P7S_WG-O1.1
K_W11	knows classification and functionality of management information systems	P7S_WG-O1.1
K_W12	knows at least two languages of object-oriented programming	P7S_WG-O1.1
K_W13	knows selected applications of information technology in science and economy	P7S_WG-O1.1 P7S_WG-O1.2A
K_W14	knows basic notions and techniques of information technology; knows selected advanced information technologies and methods	P7S_WG-O1.1
K_W15	demonstrates organized knowledge concerning theory, technical concept and principles that govern the operation of computer networks and the Internet; has elementary knowledge of how network devices work and know fundamentals of network devices configuration	P7S_WG-O1.1
K_W16	has broadened knowledge of at least one of the following academic disciplines: computer science and its branches, discrete mathematics, operations research (especially its application to economics), mathematical statistics and its application to economics	P7S_WG-O1.1
K_W17	has achieved English language proficiency equivalent to level B2 of the Common European Framework of Reference for Languages and knows specialist terminology used in articles on computer science, econometrics and mathematics	P7S_UK-O4.3
K_W18	knows principles of occupational health and safety	P7S_WK-O2.2
K_W19	has elementary knowledge of laws and code of ethics concerning academic research and educational activities	P7S_WK-O2.1 P7S_WK-O2.2
K_W20	knows and understands basic concepts and regulations concerning protection of industrial property and copyright laws; knows how to use patent information resources	P7S_WK-O2.2
SKILLS		
K_U01	can construct a line of advanced reasoning in accordance with principles of logic and can apply it to solve problems relating to previously studied academic disciplines	P7S_UW-O3.1
K_U02	can construct and analyze basic formal models found in economic issues, differentiate variables and parameters	P7S_UW-O3.1
K_U03	can determine relations between economic variables using the language of mathematics	P7S_UW-O3.1 P7S_UW-O3.3A
K_U04	can calculate measures of variability of economic magnitudes (marginal magnitudes, elasticity, increase rate, substitution rate)	P7S_UW-O3.1
K_U05	can calculate net premiums using tables of life expectancy and the principle of equivalence	P7S_UW-O3.1
K_U06	can determine his interests and develop them; can get in touch and interact with other specialists in the same discipline	P7S_UO-O5.1 P7S_UU-O6 P7S_UK-O4.1
K_U07	is able to choose a sampling scheme depending on available information concerning general population	P7S_UW-O3.1
K_U08	can use previously studied methods of statistical inference and can properly interpret acquired results, taking into account multidimensionality of data	P7S_UW-O3.1
K_U09	can support a decision making process using results of simulation research	P7S_UW-O3.1
K_U10	has skills needed to design, implement and improve information systems and	P7S_UW-O3.1

	database, in particular in economic and administrative organizations	
K_U11	has skills essential for providing consultancy services which require analytical abilities and use mathematical, statistical, econometric and information technology tools	P7S_UW-O3.1 P7S_UO-O5.2
K_U12	has skills needed to do research and activities requiring creativity skills	P7S_UW-O3.3.A
K_U13	can classify and recognize business models for e-economy	P7S_UW-O3.1
K_U14	can organize work of a team of computer programmers who create advanced information systems using modern tools and technologies	P7S_UO-O5.1 P7S_UO-O5.2 P7S_UK-O4.1 P7S_UK-O4.2
K_U15	can use selected modern information technologies	P7S_UW-O3.1
K_U16	can use computer programs for advanced analysis and data processing	P7S_UW-O3.1
K_U17	is able to use a program which analyzes packages and can analyze protocols and network applications	P7S_UW-O3.1
K_U18	can write a paper presenting a selected problem in computer science, econometrics, and discrete mathematics: can deliver a solution to the problem in a clear manner	P7S_UK-O4.1 P7S_UK-O4.2
K_U19	demonstrates skills to write papers and deliver oral presentations on topics in computer science and econometrics using expertly chosen bibliographic resources	P7S_UK-O4.1 P7S_UK-O4.2
K_U20	has language proficiency (English) relevant to the language of computer science, econometrics and mathematics, meeting the requirements for level B2 of European Framework of Reference for Languages	P7S_UK-O4.3
SOCIAL COMPETENCES		
K_K01	understands and is able to make other people see the importance of using precise language to describe economic problems	P7S_KK-O7.1 P7S_KK-O7.2 P7S_KR-O9
K_K02	understands the need for lifelong education, is able to learn on his own and organize learning process of other people	P7S_UU-O6 P7S_KK-O7.2
K_K03	is able to work in a team; understands the importance of systematic work on long term projects	P7S_UO-O5.2 P7S_KO-O8.3
K_K04	is able to formulate precise questions to deepen his understanding of a given topic or to find missing elements of reasoning; is able to formulate opinions on essential topics in computer science, econometrics and mathematics	P7S_UU-O6 P7S_KK-O7.2
K_K05	understands the significance of intellectual honesty, both in his own and in other people's activities, and is aware of the need to respect copyrights	P7S_KO-O8.1 P7S_KR-O9 P7S_WK-O2.2
K_K06	understands responsibility and social aspects of practical application of acquired knowledge and skills	P7S_KO-O8.2 P7S_KR-O9

- Reference to Polish Qualifications Framework descriptors.

6.2 Programme indicators

Programme indicators concerning the evaluated course	
Number of ECTS credits required to obtain qualifications corresponding to the level of education	at least 120 ECTS credits

Number of semesters required to obtain qualifications corresponding to the level of education	4
Number of ECTS credits assigned to classes requiring direct participation of academic teachers and students	at least 60 (50%)
Number of ECTS credits assigned to the modules of classes related to the conducted scientific research in the field/fields of science/art corresponding the evaluated course during which the student acquires in-depth knowledge and the ability to conduct scientific research (for academic profile courses)	at least 103 (86%)
Number of ECTS credits assigned to the modules of classes related to practical vocational preparation aimed at acquiring practical skills and social competencies by the student (for courses of practical profile)	-
Number of ECTS credits assigned to classes in humanities or social sciences (in the case of courses assigned to fields other than humanities or social sciences, respectively)	humanities – at least 3 social sciences - 2
Number of ECTS credits assigned to elective courses/modules	at least 42 (35%)
Number of ECTS credits assigned to internships and number of hours of internships (if the programme provides for internships)	-
Number of hours of physical education classes – for full-time first-cycle and single-cycle courses	-

Modules of classes related to conducted scientific research in the field of science or art related to the programme, aimed at gaining in-depth knowledge and skills to conduct scientific research by the student			
Module	Instructional method	Total number of hours	ECTS credits
Core subjects	L, Lab	45	7
Subjects in the major area of study	L, C, Lab, P, S	645	67
Subjects offered for the course / compulsory subjects for specialisation courses	L, C, Lab, P, S	285	at least 29
Total:		975	103 (86%)

General academic profile – includes classes related to scientific activity conducted at the university in the discipline or disciplines to which the course is assigned, in the amount exceeding 50% of ECTS credits and takes into account the participation of students in classes preparing for conducting scientific activity or participation in this activity.

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Elective classes modules			
Module	Instructional method(s)	Total number of hours	ECTS credits
Subjects offered for the course / compulsory subjects for specialisation courses	L, C, Lab, P, S	285	at least 29
Humanities subjects social science subjects	C C	30 30	at least 3 at least 2
Elective subjects needed to obtain 30 ECTS credits in semester	L, C, Lab, P	90	at least 8
	Total:	435	at least 42 (35%)

The student is allowed to choose classes to which ECTS credits are assigned in the amount of not less than 30% of the total number of ECTS credits.

6.3 Description of subjects or groups of subjects - with learning outcomes, content, instruction forms and teaching methods ensuring the achievement of the outcomes, and ECTS credits (syllabuses);

Appendix – subject catalogue in the SylabUZ system

6.4 Methods of verifying and evaluating the student's achievement of the assumed learning outcomes

> Methods of verifying and evaluating the achievement of learning outcomes are described in the syllabuses.

The rules regarding diplomas are defined in the resolution: Rules for the preparation and evaluation of diploma theses at the Faculty of Mathematics, Computer Science and Econometrics.

6.5 Study programme with class modules;
See appendix.

Graduation requirements

The course in *computer science and econometrics* lasts 2 years (4 semesters). The minimum

number of ECTS credits is 120. The student must obtain at least 30 ECTS credits in each semester.

• The student of *computer science and econometrics* is awarded the master's degree (In Polish: magister) after

1. completing courses for which they obtained at least 120 ECTS credits, including
– compulsory module for *computer science and econometrics*,
– additional subjects module offered in *computer science and econometrics* programme for which the student obtained at least 29 ECTS credits,
– humanities module offered in *computer science and econometrics* programme for which the student obtained at least 3 ECTS credits, and social science module, for which the student obtained at least 5 ECTS credits

2. passing the diploma examination for which they received grade 3 or higher.

• The student of *computer science and econometrics* is awarded the master degree (Polish *magister*) with one of the following specialisations: *Business Analytics, Statistics and Econometrics, Information Systems* after

1.   completing courses for which they obtained at least 120 ECTS credits, including
– compulsory module for *computer science and econometrics* course,
– specialisation compulsory module for which the student obtained 29 ECTS credits,
– humanities module offered to computer science and econometrics students for which they obtained at least 3 ECTS credits, and social science module, for which the student obtained at least 5 ECTS credits

2.   passing the diploma examination for which they received grade 3 or higher.

6.6 The duration, rules and form of student internships

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