UNIVERSITY of LIFE SCIENCES in Lublin

FACULTY OF PRODUCTION ENGINEERING

FIELD OF STUDY

# MANAGEMENT AND PRODUCTION ENGINEERING

specialization: Management and Food Engineering

Modules
full-time second-cycle studies
for the recruitment of 2024/2025

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| The name of the field study | Management and Production Engineering |
| Course title | Decision making theory |
| Language | English |
| Type of the course | elective |
| Level of study | Second-cycle studies |
| Form of study | S – full-time |
| Year of study | I |
| Semester of study | 1 |
| Number of ECTS credits (contact/non-contact) | 3 (1.88/1.12) |
| Academic title/degree, name and surname of the person responsible for the course | PhD Zbigniew Kobus associate professor |
| Didactic unit offering a course | Department of Technology Fundamentals |
| Objective of the course | Providing knowledge on identifying and solving decision-making problems. Developing skills in using methods and techniques for creatively solving production and business problems. |
| Learning outcomes | Knowledge: |
| | 1. The graduate knows the methods of graph and network theory as well as decision trees necessary to understand the principles of knowledge representation in the field of planning, scheduling and management of production processes. |
| | 2. The graduate knows the methods of modelling decision-making situations in the case of strategic games under conditions of risk (risk management) and under conditions of uncertainty (playing with nature, playing with a partner). Knows the principles of representing uncertainty in the management of production processes. |
| | Skills: |
| | 1. The graduate is able to develop a conceptual model, determine the space of possible decisions, define preferences, determine selection criteria and use decision trees to formally represent knowledge in the field of evaluating possible strategies. |
| | 2. The graduate is able to make decisions in conditions of risk and uncertainty based on mathematical models. |
| | Social competence: |
| | 1. The graduate is ready to work in a group. |
| | 2. The graduate is ready to pass on his knowledge. |
| Pre-requisites | Operations research |
| Course contents | Lectures: Anatomy of the decision-making process: the idea of rational choice - values, preferences, goals of the decision-maker. Programming under risk conditions. Programming under uncertainty – zero-sum two-person games, games with nature. Decision trees – structure, sequential decisions. Methods for reducing uncertainty. Time inconsistency of decisions. Selection strategies. Assessment pitfalls. Nonlinear optimization problems - algorithm for determining local extremum.<br>Classes include:<br>Making decisions in conditions of risk and uncertainty. Determining mixed strategies and Nash equilibria in complex decision situations. Decision making based on decision trees. Solving nonlinear optimization problems. Psychological problems in decision-making - time inconsistency, determining risk propensity. |
| References | Basic literature:<br>W. L. Winston. Operations Research: Applications and Algorithms, Cengage Learning, 2022.<br>Supplementary literature: |

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| | Dixit A.K., Nalebuff B.J.: The art of strategy. Game theory in business and private life. MT Business |
| Teaching methods | Lectures in the form of a multimedia presentation<br>Classes - solving accounting tasks, using the MS Excel package to create decision trees.<br>Teaching methods - discussion, demonstration of performing subject tasks. |
| Assessment methods | K1, K2 – colloquium, oral answer.<br>S1, S2 – assessment of correct calculations and proper reasoning during exercises and tests<br>SC1, SC2 – participation in class discussions, group work during classes, observation of student involvement.<br>Form of documentation: instructor's diary, reports, tests, examination papers. |
| Elements and weights affecting the final grade | Detailed criteria for assessing exams and control papers<br>1) the student demonstrates a sufficient (3.0) degree of knowledge or skills when he or she obtains from 51 to 60% of the total points determining the maximum level of knowledge or skills in a given subject (respectively, in the case of a partial pass - its part),<br>2) the student demonstrates a sufficient plus (3.5) degree of knowledge or skills when he or she obtains from 61 to 70% of the sum of points determining the maximum level of knowledge or skills in a given subject (respectively - its part),<br>3) the student demonstrates a good degree (4.0) of knowledge or skills when he obtains from 71 to 80% of the total points determining the maximum level of knowledge or skills in a given subject (respectively - its part),<br>4) the student demonstrates a plus good degree (4.5) of knowledge or skills when he or she obtains from 81 to 90% of the sum of points determining the maximum level of knowledge or skills in a given subject (respectively - its part),<br>5) a student demonstrates a very good degree (5.0) of knowledge or skills when he or she obtains more than 91% of the sum of points determining the maximum level of knowledge or skills in a given subject (respectively - its part).<br>The final grade is influenced by: test results (70%) and oral answer (30%). |
| ECTS credits balance | - participation in lectures – 15 hours, 0.6 ECTS,<br>- participation in practical classes – 30 hours, 1.2 ECTS,<br>- participation in consultations – 2 hours, 0.08 ECTS,<br>- preparing to classes – 28 hours, 1,12 ECTS,<br>The total student workload is 75 hours. which corresponds to 3 points of ECTS. |
| Workload related to classes requiring the direct participation of an academic teacher | - participation in lectures – 15 hours, 0.6 ECTS,<br>- participation in practical classes – 30 hours, 1.2 ECTS,<br>- participation in consultations – 2 hours, 0.08 ECTS,<br>The total number of contacts is 47 hours, which corresponds to 1.88 ECTS. |
| Relation of course learning outcomes to the learning outcomes of the field of study | K1 – ZI_W02<br>K2 – ZI_W04<br>S1 – ZI_U03<br>S2 – ZI_U04<br>SC1 – ZI_K01<br>SC2 – ZI_K02 |

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| The name of the field study | Management and Production Engineering |
| Course title | Decision Support Systems |
| Language | English |
| Type of the course | elective |
| Level of study | Second-cycle studies |
| Form of study | S – full-time |
| Year of study | I |
| Semester of study | 1 |
| Number of ECTS credits (contact/non-contact) | 3(1.88/1.12) |
| Academic title/degree, name and surname of the person responsible for the course | PhD Zbigniew Kobus associate professor |
| Didactic unit offering a course | Department of Technology Fundamentals |
| Objective of the course | The aim of the course is to provide knowledge on the ability to formulate problems and use knowledge management methods in an enterprise.<br>Acquiring practical skills in designing and effective use of IT decision support systems in the field of financial and production analyses. |
| Learning outcomes | Knowledge: |
| | The graduate knows formal knowledge representation systems and understands the role of computer models in knowledge management and supporting decision-making processes using adaptive systems with built-in automatic reasoning mechanisms and knows methods of coding knowledge in a rule-based system, in probabilistic networks (Bayesian networks) and in the form of sets blurred. |
| | Skills: |
| | 1. The graduate is able to develop a formal model of a selected issue, implement this model in the GeNIe Modeler environment and conduct simulation experiments using automatic inference methods built into this system. |
| | 2. The graduate is able to propose a model structure in the form of a rule-based knowledge base. Is able to encode knowledge in the form of fuzzy sets. Is able to use these models in terms of information support for management. |
| | Social competence: |
| | 1. The graduate is ready to work in a group. |
| | 2. The graduate is ready to pass on his knowledge. |
| Pre-requisites | Operations research |
| Course contents | Lectures include:<br>Basic concepts and definitions regarding formal knowledge representation systems. Probabilistic networks, knowledge coding principles, inference methods. Knowledge representation in the form of discrete variables. Implementation of computational procedures. Rule-based knowledge representation. System structure. Knowledge coding. Inference methods. The concept of a fuzzy set. Fuzzy inference. Decision making in a fuzzy environment. Network classification and their applications.<br>Classes include:<br>Creating conceptual models of various practical issues. Application development and simulation experiments with computer models. |
| References | Basic literature:<br>O. Pourret, P. Naim, B. Marcot: Bayesian Networks: A Practical Guide to Applications, John Wiley & Sons, 2008<br>Supplementary literature:<br>GeNIe Modeler programmer's manual |

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| Teaching methods | Lectures in the form of multimedia presentations<br>Classes - solving accounting tasks, simulations in universal high-level programming languages (GeNIe Modeler)<br>Teaching methods - discussion, demonstration of performing subject tasks |
| Assessment methods | K1 – colloquium, oral answer.<br>S1, S2 – assessment of correct calculations and proper reasoning during exercises and tests<br>SC1, SC2 – participation in class discussions, group work during classes, observation of student involvement.<br>Form of documentation: instructor's diary, reports, tests, examination papers. |
| Elements and weights affecting the final grade | Detailed criteria for assessing exams and control papers<br>1) the student demonstrates a sufficient (3.0) degree of knowledge or skills when he or she obtains from 51 to 60% of the total points determining the maximum level of knowledge or skills in a given subject (respectively, in the case of a partial pass - its part),<br>2) the student demonstrates a sufficient plus (3.5) degree of knowledge or skills when he or she obtains from 61 to 70% of the sum of points determining the maximum level of knowledge or skills in a given subject (respectively - its part),<br>3) the student demonstrates a good degree (4.0) of knowledge or skills when he obtains from 71 to 80% of the total points determining the maximum level of knowledge or skills in a given subject (respectively - its part),<br>4) the student demonstrates a plus good degree (4.5) of knowledge or skills when he or she obtains from 81 to 90% of the sum of points determining the maximum level of knowledge or skills in a given subject (respectively - its part),<br>5) a student demonstrates a very good degree (5.0) of knowledge or skills when he or she obtains more than 91% of the sum of points determining the maximum level of knowledge or skills in a given subject (respectively - its part).<br>The final grade is influenced by: test results (70%) and oral answer (30%). |
| ECTS credits balance | - participation in lectures – 15 hours, 0.6 ECTS,<br>- participation in practical classes – 30 hours, 1.2 ECTS,<br>- participation in consultations – 2 hours, 0.08 ECTS,<br>- preparing to classes – 28 hours, 1,12 ECTS,<br>The total student workload is 75 hours. which corresponds to 3 points of ECTS. |
| Workload related to classes requiring the direct participation of an academic teacher | - participation in lectures – 15 hours, 0.6 ECTS,<br>- participation in practical classes – 30 hours, 1.2 ECTS,<br>- participation in consultations – 2 hours, 0.08 ECTS,<br>The total number of contacts is 47 hours, which corresponds to 1.88 ECTS. |
| Relation of course learning outcomes to the learning outcomes of the field of study | K1 – ZI_W04<br>S1 – ZI_U03<br>S2 – ZI_U04<br>SC1 – ZI_K01<br>SC2 – ZI_K02 |

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| Field of study | Management and Production Engineering |
| Name of the training module including the Polish name | Język obcy specjalistyczny 1 - Polski<br>Foreign Language specialist 1 - Polish |
| Language of instruction | English/Polish |
| Type of the training module | obligatory |
| Level of the training module | Second-cycle studies |
| Form of studies | S – full-time |
| Location in the programme (year) | I |
| Location in the programme (semester) | 1 |
| Number of ECTS credits with a division into contact/noncontact | 2 (1.28/0.72) |
| Name and surname of the person in charge | MA. Ewa Badurowicz |
| Unit offering the subject | Foreign Languages Teaching and Certification Centre |
| Aim of the module | Development of language competence in accordance with the Common European Framework of Reference for Languages (CEFR). Improvement of language competence in specialized vocabulary.<br>Development of the ability to communicate correctly in a professional environment.<br>Knowledge transfer necessary to apply advanced grammatical structures and techniques for working with foreign-language source text. |
| Learning outcomes | Skills: |
| | S1. Communicating effectively in professional settings and everyday situations |
| | S2. Being able to discuss, argue, report and interpret events of daily life |
| | S3. Reading with understanding and analyze foreign-language source texts in the represented scientific field |
| | S4. Preparing and delivering a presentation related to the field studied. |
| | Social competences: |
| | SC1. Understanding the importance of lifelong learning |
| Preliminary and additional requirements | Speaking the foreign language at the level in accordance with the Common European Framework of Reference for Languages. |
| Contents of the training module – a compact description | Classes conducted as part of the module include the expansion of specialized vocabulary in the represented scientific discipline, students will be prepared to read with understanding professional literature and work independently with source texts, as well as to prepare and deliver a presentation related to the studied field of knowledge.<br>The vocabulary will also be expanded during the exercises and previously acquired skills in self-presentation, interests, life in society, modern technology and professional work will be practiced.<br>The module also includes the practice of advanced grammatical and lexical structures in order for the student to achieve efficient communication. |
| Recommended and obligatory reading list | Primary literaturę:<br>1. „ Polski Krok po kroku” Iwona Stemperek, Anna Stelmach – podręcznik do nauki języka polskiego Poziom 2<br>2. „Hurra!!! Po polsku 3” – Małgorzata Małolepsza, Aneta Szymkiewicz<br>3. „Polski w pracy” Małgorzata Małolepsza, Aneta Szymkiewicz, Agnieszka Jasińska– podręcznik<br>Supplementary literature: |

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| | 1. "O ekonomii po polsku" Magdalena Szelc-Mays, Paweł Długosz - podręcznik |
| The intended forms/activities/ teaching methods | Lecture, discussion, presentation, conversation, grammar-translation method (specialized texts), communicative and direct method with special emphasis on communication skills |
| Methods of verification and documentation forms of the achieved learning outcomes | S1 – evaluation of oral statements in class<br>S2 – evaluation of oral statements in class<br>S3 – written test on the knowledge and use of specialist vocabulary<br>S4 – assessment of oral presentation<br>SC1 – evaluation of the preparation for classes and activity during classes, critical evaluation of the presentation given<br>Documentation forms of the achieved learning outcomes:<br>midterm test kept for 1 year<br>teacher's register kept for 5 years<br><br>Assessment criteria are available in Foreign Languages Teaching and Certification Centre |
| Balance of ECTS credits | **CONTACT**:<br>Class participation: 30h<br>Office hours: 2h<br>**Total contact: 32h/ 1.28 ECTS**<br><br>**NONCONTACT:**<br>Class preparation: 12h<br>Preparation for tests: 6h<br>**TOTAL NONCONTACT: 18h / 0.72 ECTS**<br><br>**There are 50 hours of the total student workload which is equal to 2 p. ECTS** |
| Number of contact hours | Workload related to activities requiring direct participation of academic teachers:<br>- participation in classes - 30 hours<br>- participation in office hours - 2 hours<br>A total of 32 hours, which corresponds to 1.28 ECTS credits. |
| Relating modular learning outcomes to directional learning outcomes | S1 – ZI_U10<br>S2 – ZI_U10<br>S3 – ZI_U10, ZI_U06<br>S4 – ZI_U10, ZI_U06<br>SC1 – ZI_K03 |

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| The name of the field study | Management and Production Engineering |
| Course title | Organization of production system |
| Language | English |
| Type of the course | obligatory |
| Level of study | Second-cycle studies |
| Form of study | S – full-time |
| Year of study | I |
| Semester of study | 1 |
| Number of ECTS credits (contact/non-contact) | 5 (1.96 / 3.04 ) |
| Academic title/degree, name and surname of the person responsible for the course | PhD. Magdalena Kachel-Górecka associate professor |
| Didactic unit offering a course | Department of Machinery Exploitation and Management of Production Processes, Faculty of Production Engineering. |
| Objective of the course | The aim of the course is to familiarize students with basic concepts of establishing and running an enterprise and the organization of production conducted in it (tax forms, inputs in production, the role of manager and his approach to employees, production process, types of production, demand analysis, etc. |
| Learning outcomes | Knowledge: |
| | 1. economic, legal and social issues that enable the description and analysis of the processes of production; the student has the knowledge of management including quality management, project management, strategic management and business management |
| | 2. technical and physical foundations and chemical processes adapted for the field of study of Management and Production Engineering |
| | Skills: |
| | 1. find, analyse and use necessary information from various sources and in various forms appropriate for Management and Production Engineering |
| | 2. explore and apply modern information technologies to acquire and process information in the field of production and provision of services |
| | 3. assess, independently, thoroughly, theoretically and taking into account many aspects, present situations and is able to take actions to solve the arising or expected problems in the field of Management and Production Engineering |
| | Social competence: |
| | 1. organise and direct work of teams (projects, tasks, etc.) and organisations in and outside of the work environment; the student is aware of his/her responsibilities regarding the above |
| Pre-requisites | knowledge of mathematics and microeconomics |
| Course contents | **Lectures:**<br>1. Introduction to issues of production organization.<br>2. Presentation of basic concepts of the production system; needs analysis, their development and degree of satisfaction, forms of needs, analysis of human behavior as buyers of goods on the market.<br>3. Lean Management.<br>4. The economic process and its basic links, enterprise, production system. The essence and tasks of organization of production processes.<br>5. Parameters of the production process. Characteristics of the input and output process in the production system. Material, |

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| | energy and information connections as elements of the production system.<br>6. Surrounding the production system. Production and manufacturing process. Production factors.<br>7. Production, production and administration structures. Rules for building a production and administrative structure.<br>8. Production planning and control. Management of systems and production enterprises. Property (of enterprises, farms).<br>9. Expenditure - forms of input and their types.<br>10. Costs - differences between costs and expenses.<br><br>**Classes:**<br>1. Topics and organization of exercises in the subject as well as the conditions and method of passing.<br>2. Demand forecasting in the context of determining the production program, methods of estimating future demand, demand and the production program - tasks.<br>3. Optimization of the enterprise's production program - gross margin method. Production organization assumptions. Choice of production direction, production volume.<br>4. Production process. Creating the structure of the selected process according to technological phases as well as parts and assemblies.<br>5. Process documents.<br>6. Production cycle planning; the cyclogram and its use to determine the finished product execution plan.<br>7. Planning of material needs - MRP.<br>8. Optimization of the production program.<br>9. Production control with the use of cards - Kanban.<br>10. Total equipment efficiency - OEE indicator. |
| References | Obligatory literature:<br>1. Pascal Denis. Lean Production Simplified, Third Edition CRC Press, Taylor & Francis Group, 2015.<br>2. Jefrey K. Liker. The Toyota Way: 14 Management Principles from the World's Greatest Manufacturer. ISBN 978-1260468519, 2003.<br>3. Karen Martin and Mike Osteling. Value Stream Mapping: How to Visualize Work and Align Leadership for Organizational Transformation. ISBN-13: 978-0071828918, 2013.<br>Recommended literature:<br>1. Pascal Denis. Lean Production Simplified, Third Edition<br>2. Jefrey K. Liker. The Toyota Way: 14 Management Principles from the World's Greatest Manufacturer<br>3. Karen Martin and Mike Osteling. Value Stream Mapping: How to Visualize Work and Align Leadership for Organizational Transformation |
| Teaching methods | Lectures, group work |
| Assessment methods | K1- written test,<br>K2- written test,<br>S1- written test,<br>S2- assessment of design tasks,<br>S3- assessment of design tasks,<br>SC1- assessment of the student's work as a member of the team performing project tasks<br>Forms of documenting the achieved results: written test, notes from the lecturer, exam. |
| Elements and weights affecting the final grade | The mark from the test is 20% of the weight of passing the subject. |

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| | The grade for the project is 20% of the weight of passing the course.<br>The exam grade is 60% of the weight of completing the subject<br>**Final grade 60%+20+20%= 100%** |
| ECTS credits balance | CONTACT<br>Form of classes Number of hours ECTS points<br>1. Lectures 15, ECTS 0.60<br>2. Classes 30, ECTS 1.20<br>3. Participation in the consultation.<br>2, ECTS 0.08<br>4. Exam 2, ECTS 0.08<br>**Total contact time: 49 hours 1.96 pts. ECTS**<br><br>NON-CONTACT<br>Form of classes Number of hours ECTS points<br>1. Preparation to quarter aud. 10, ECTS 0.40<br>2. Preparation for lab quarters 16, ECTS 0.64<br>3. Studying the letters. 20, ECTS 0.80<br>4. Preparation project, 15, ECTS 0.60<br>5. Preparation for the exam 15, ECTS 0.60<br>**Total contact: 76 hours 3.04 points ECTS** |
| Workload related to classes requiring the direct participation of an academic teacher | Participation in lectures – 15 hours<br>Participation in classes – 30 hours<br>Participation in consultations – 2 hours<br>Participation in the exam – 2 hours<br>**Total 49 hours which is 1.96 points. ECTS** |
| Relation of course learning outcomes to the learning outcomes of the field of study | K1-ZI_W02<br>K2-ZI_W03<br>S1-ZI_U01<br>S2-ZI_U03<br>S3- ZI_U09<br>SC1- ZI_K01 |

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| The name of the field study | Management and Production Engineering |
| Course title | ***Design of food products*** |
| Language | English |
| Type of the course | obligatory |
| Level of study | Second-cycle studies |
| Form of study | S – full time |
| Year of study | I |
| Semester of study | 1 |
| Number of ECTS credits (contact/non-contact) | 5 (1.96/3.04) |
| Academic title/degree, name and surname of the person responsible for the course | Professor Marian K. Panasiewicz |
| Didactic unit offering a course | Department of Food Engineering and Machines |
| Objective of the course | The aim of the subject "Designing food products" is to familiarize students with the stages of food product design from the creation of an idea to serial production and with the types of innovations used, as well as with the factors guaranteeing success or failure, taking into account the quality of new food and the legal aspect of admitting it to marketing. The student participates in the development of technology for obtaining a new product, taking into account the quality of the product, its composition and packaging, health safety and durability, as well as the economic aspect - profitability of production. Additionally: acquiring food design skills in relation to flavor compositions, list of ingredients and nutritional value. Acquiring knowledge in the field of developing technologies for obtaining new products and dishes, taking into account the product quality, its composition and packaging, health safety and durability. |
| Learning outcomes | Knowledge:<br>K1. Knows the legal and organizational basis of business entities, institutions, associations and organizations related to food production. Classifies the factors determining the burdensomeness of various forms of work in individual and global terms. |
| | K2. Diversifies basic concepts and knowledge regarding the principles and procedures for developing recipes for innovative products, dishes, dishes and drinks. |
| | Skills: |
| | S1. Characterizes and classifies factors determining the success of introducing and accepting new products and dishes.<br>Identifies food safety problems at all stages of food production. |
| | S2. Recognizes biological, physical and chemical hazards of food. |
| | Social competence: |
| | SC1. It shapes self-discipline and self-esteem, as well as a sense of responsibility for the health and safety of oneself and other people. |
| References | **Obligatory:**<br>1. Chukwuebuka Egbuna. Functional Foods and Nutraceuticals. Publishing house. Springer Nature Switzerland AG, 2021.<br>2. Trojanowski T. Marketing mix of food industry enterprises. (eBook). Publishing house. Uniwersytet Jana Kochanowskiego. 2020.<br>3. Campbell-Platt Geoffrey. Food Science and Technology. Publishing house. John Wiley And Sons Ltd., Wiley John&Sons Inc.2020. |

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| Pre-requisites | Basic knowledge of economics, mathematics, chemistry. |
| Course contents | Lectures include: 1. The concept of a new product, functions and features of products, product life cycles, product and buyer needs, consumption needs and directions of their development. Goals of designing new food products. 2. Stages of designing a new product. Discussion of individual design stages. Idea generation, selection and selection of ideas (concept testing). Product design, its composition, production methods and type of packaging. Market testing, economic analysis. Design correction. Commercialization of a new product - producing a prototype, developing a marketing plan, starting production, implementing the marketing plan, serial production. 3. Elements of product management. Ways to find a place on the market for new products. The role of market and consumer research. Costs of introducing the product to the market. Examples of introducing new products to the market - successes and failures and their causes. 4. Product innovation. Factors shaping product development, trends in the development of new products. The impact of new food processing and preservation technologies on the innovativeness of food products. Technical solutions of machines and the impact on the innovation of food products. 5. Recipe and product innovation. Design and analysis of the raw material composition and food additives used. Quality management in product implementation and development. 6. Packaging as an element of quality assurance and promotion of a new product. Packaging design - style, shape, material, graphic design. Packaging functions. Packaging marking. Packaging and environmental protection. 7. Discussion of the legal conditions for introducing new foods to the market. Basic legal regulations regarding novel foods.<br>Classes include: Introduction to food product design. Getting to know the exercise program, rules for passing exercises, and basic design issues. 2. Stages of designing a new food product. Getting to know the individual elements of product creation and starting practical development of a new food product. 3. Designing a new food product. Development of composition and production methods, taking into account good production and hygiene practice and legal regulations. 4. Product packaging. Packaging design, development of the shape, size of the packaging, its style, selection of materials, graphic design and marking in accordance with the requirements. 5 Topic of the exercise: Verification of the food product design and preparation for implementation Practical verification of food product design and planning of activities aimed at introducing the product to the market, elements of marketing strategy - development and implementation marketing plan, production profitability. Presentation of new food product designs. 6. Modification of existing food products. Practical analysis of a selected food product and its modification in terms of new requirements and needs of consumers, taking into account innovative solutions. 7. Legal regulations regarding introducing a new food product to the market. Getting to know the current legal regulations regarding the introduction of a new product to the market, tracking legislative changes, new legal regulations. |
| Teaching methods | multimedia presentations, discussion |
| Elements and weights affecting the final grade | Final grade: grade for exam 70% + grade for classes 30%. |

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| ECTS credits balance | **Contacts**<br>Lecture 15 h 0.60 ECTS<br>Classes 30 h 1.20 ECTS<br>Consultations 2 h 0.08 ECTS<br>Exam 2 h 0.08 ETCS<br>**Summary 49 h 1.96 ECTS**<br><br>**No-contacts**<br>preparing the project 30 h 1.20 ETCS<br>literature research 15 h 0.60 ECTS<br>preparation for the test 15 h 0.60 ECTS<br>preparation for the exam 16 h 0.64 ETCS<br>**Summary no-contact 76 h 3.04 ECTS**<br><br>**Total 125 h – 5 ECTS** |
| Workload related to classes requiring the direct participation of an academic teacher | Participation in lecture – 15 h.<br>Participation in classes –30 h.<br>Participation in consultations –2 h.<br>Participation in exam – 2 h.<br>**Total 49 h - 1.96 ECTS** |
| Relation of course learning outcomes to the learning outcomes of the field of study | K1. - ZI_W06<br>K2 - ZI_W03<br>S1. - ZI_U04<br>S2. - ZI_U05<br>SC1. ZI_K01 |

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| The name of the field study | Management and Production Engineering |
| Course title | Modelling of production processes |
| Language | English |
| Type of the course | obligatory |
| Level of study | Second-cycle studies |
| Form of study | S – full-time |
| Year of study | I |
| Semester of study | 1 |
| Number of ECTS credits (contact/non-contact) | 4 (1.88/2.12) |
| Academic title/degree, name and surname of the person responsible for the course | PhD Zbigniew Kobus associate professor |
| Didactic unit offering a course | Department of Technology Fundamentals |
| Objective of the course | The aim of the course is to provide knowledge in the field of modeling and simulation of production processes.<br>Familiarization with the methodology of designing and simulating experiments. |
| Learning outcomes | Knowledge: |
| | 1. The graduate has knowledge of existing analytical and simulation methods for modeling production processes. |
| | 2. The graduate has knowledge in planning experiments, creating a simulation model and its implementation. |
| | Skills: |
| | 1. The graduate is able to select appropriate methods and tools depending on the type of processes and tasks being solved. |
| | 2. The graduate is able to develop deterministic and stochastic analytical models of production processes and conduct simulation experiments using these models.. |
| | Social competence: |
| | 1. The graduate is ready to work in a group. |
| | 2. The graduate is ready to pass on his knowledge. |
| Pre-requisites | Elements of applied mathematics, basics of computer science, basic knowledge of production processes and the management of these processes |
| Course contents | Lectures include:<br>Concepts of process modelling and simulation theory. Simulation modelling methodology, discrete and continuous event models. Abstract, conceptual, physical model. Simulation experiment design methodology, design of experiments (DOE). The use of simulation tests for scheduling production orders. Discussion of computer tools for modelling and simulation of production processes.<br>Classes include:<br>Designing an experience in Design Expert Creating material balances. Simulation of continuous processes (liquid flow profile, changes in soluble substance concentration). Process modelling using the flow metaphor with feedback. Temperature regulation in the production room. Population growth models. Optimization of product inventory management. Simulation of queue processes. |
| References | Basic literature:<br>L. G. Birta , G. Arbez Modelling and Simulation: Exploring Dynamic System Behaviour, Springer Science & Business Media, 2007<br>Supplementary literature:<br>2. Vensim and Design Expert documentation. |
| Teaching methods | Lectures in the form of a multimedia presentation<br>Classes - solving accounting problems, simulations in Design Expert, Vensim |

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| | Teaching methods - discussion, demonstration of performing subject tasks |
| Assessment methods | K1, K2 – colloquium, oral answer.<br>S1, S2 – assessment of correct calculations and proper reasoning during exercises and tests<br>SC1, SC2 – participation in class discussions, group work during classes, observation of student involvement.<br>Form of documentation: instructor's diary, reports, tests, examination papers. |
| Elements and weights affecting the final grade | Detailed criteria for assessing exams and control papers<br>1) the student demonstrates a sufficient (3.0) degree of knowledge or skills when he or she obtains from 51 to 60% of the total points determining the maximum level of knowledge or skills in a given subject (respectively, in the case of a partial pass - its part),<br>2) the student demonstrates a sufficient plus (3.5) degree of knowledge or skills when he or she obtains from 61 to 70% of the sum of points determining the maximum level of knowledge or skills in a given subject (respectively - its part),<br>3) the student demonstrates a good degree (4.0) of knowledge or skills when he obtains from 71 to 80% of the total points determining the maximum level of knowledge or skills in a given subject (respectively - its part),<br>4) the student demonstrates a plus good degree (4.5) of knowledge or skills when he or she obtains from 81 to 90% of the sum of points determining the maximum level of knowledge or skills in a given subject (respectively - its part),<br>5) a student demonstrates a very good degree (5.0) of knowledge or skills when he or she obtains more than 91% of the sum of points determining the maximum level of knowledge or skills in a given subject (respectively - its part).<br>The final grade is influenced by: test results (70%) and oral answer (30%). |
| ECTS credits balance | - participation in lectures – 15 hours, 0.6 ECTS,<br>- participation in practical classes – 30 hours, 1.2 ECTS,<br>- participation in consultations – 2 hours, 0.08 ECTS,<br>- creating computer applications – 40 hours, 1.6 ECTS,<br>- literature study – 13 hours, 0,52 ECTS,<br>The total student workload is 100 hours. which corresponds to 4 points of ECTS. |
| Workload related to classes requiring the direct participation of an academic teacher | - participation in lectures – 15 hours, 0.6 ECTS,<br>- participation in practical classes – 30 hours, 1.2 ECTS,<br>- participation in consultations – 2 hours, 0.08 ECTS,<br>The total number of contacts is 47 hours, which corresponds to 1.88 ECTS. |
| Relation of course learning outcomes to the learning outcomes of the field of study | K1 – ZI_W04<br>K2 – ZI_W05<br>S1 – ZI_U03<br>S2 – ZI_U04<br>SC1 – ZI_K01<br>SC2 – ZI_K02 |

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| The name of the field study | Management and Production Engineering |
| Course title | Integrated management systems |
| Language | English |
| Type of the course | obligatory |
| Level of study | Second-cycle studies |
| Form of study | S – full-time |
| Year of study | I |
| Semester of study | 1 |
| Number of ECTS credits (contact/non-contact) | 4 (1.88/2.12) |
| Academic title/degree, name and surname of the person responsible for the course | Ph. D. Piotr Maksym |
| Didactic unit offering a course | Department of Technology Fundamentals |
| Objective of the course | The aim of the course is to familiarise students with modern theories, methods of construction and management, and directions of development of IT management systems. Developing students' systems thinking in managerial management in relation to modern integrated information systems. Learning the principles of functioning of integrated management systems based on a selected example. |
| Learning outcomes | Knowledge: |
| | 1. Basic knowledge of the architecture of operating systems and computer networks, which is necessary to implement integrated enterprise management IT systems. |
| | 2. Knowledge of organizational management methods implemented in MRP II / ERP II and earlier systems. |
| | Skills: |
| | 1. Skills in selecting the appropriate system depending on the needs of the enterprise. |
| | 2. Basic skills in working with selected modules of the integrated management system. |
| | Social competence: |
| | 1. Is aware of the role of integrated systems in the modern world and the importance of proper selection depending on the scale and type of application. |
| Pre-requisites | Basic of computer science |
| Course contents | Information and knowledge in enterprise management and basic information systems supporting management processes. IT projects supporting management. Presentation of issues related to the evolution of IT management systems. The concept of an integrated information system (IIS) supporting management processes. Selected systems, implementation methodology and software supporting their implementation (including electronic document management systems (DMS), enterprise resource planning systems (ERP), customer relationship management systems - (CRM) - sales process management and task automation systems (BI) ), systems for planning material needs and production resources (MRP)/(MRP II), decision support systems - (DSS)). Application of information technologies to support e-management. Issues of economic and social aspects of computerization of information systems in business. |
| References | Obligatory literature:<br>1. O'Brien J. A., Marakas G. M. Management Information Systems. McGraw-Hill/Irwin 2011.<br>2. O'Leary D. E. Enterprise Resource Planning Systems Systems, Life Cycle, Electronic Commerce, and Risk. Cambridge University Press 2012. |

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| | 3. Bradford M. Modern ERP: Select, Implement, and Use Today's Advanced Business Systems Amazon 2020.<br>Recommended literature:<br>4. ERP Systems for Manufacturing Supply Chains Sagegg O. J., Alfnes E. Amazon 2020. |
| Teaching methods | Teaching methods: lecture, discussion, presentation of integrated systems. |
| Assessment methods | K1, K2 – written final test,<br>S1, S2 – presentation of students' projects and information based on the lecturer's diary,<br>SC1 – written final test, discussion.<br><br>Forms of documenting achieved results:<br>Written final test on lecture content, project presentation (digital form) |
| Elements and weights affecting the final grade | Final grade – grade from the written final test (60%), grade from the project (35%), and attendance and activity during lectures (5%). |
| ECTS credits balance | **Contact**<br>lectures 45h – 1.80<br>consultations 2h – 0.08<br>**Total contact 47 hours - 1.88 points ECTS**<br><br>**Non-contact**<br>reading recommended literature/materials 15h – 0.60<br>prepare project + presentation 20h – 0.80<br>preparation for the written final test 18h – 0.72<br>**Total non-contact 55 hours - 2.12 points ECTS** |
| Workload related to classes requiring the direct participation of an academic teacher | lectures 45h – 1,80<br>consultations 2h – 0,08 |
| Relation of course learning outcomes to the learning outcomes of the field of study | K1 - ZI_W02<br>K2 - ZI_W07<br>S1 - ZI_U01<br>S2 - ZI_U03<br>SC1 - ZI_K05 |

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| Field of study | Management and Food Engineering |
| Course title | Safety and Hygiene in Food Production |
| Language | English |
| Type of the course (obligatory/optional) | obligatory |
| Level of the course | Second-cycle studies |
| Form of study | S – full-time |
| Year of study | I |
| Semester of study | 1 |
| ECTS credits (contact/non-contact classes) | 3 (1.88/1.12) |
| Name of lecturer | PhD Agnieszka Starek-Wójcicka, associate professor |
| Unit responsible for course of study | Department of Biological Bases of Food and Feed Technologies |
| Objective of the course | The aim of the course is to acquaint students with the hygienic requirements that must be met and controlled at all stages of production or marketing to ensure food safety. Students should also assimilate the most important legal regulations, control rules, food standards. Graduates should also be aware of the threats to the proper course of production and processing processes and the health of consumers. |
| Learning outcomes | Knowledge: |
| | 1. Has knowledge of threats and technological problems, as well as types of quality management systems in the agricultural and food industry. |
| | 2. Knows the theoretical basis of issues and concepts in the field of food hygiene and safety and awareness of changes in food ingredients during processing and storage. |
| | Skills: |
| | 1. Can apply appropriate techniques and materials to solve problems in the field of hygiene and food safety and subordinate the results to practical purposes. |
| | 2. Can identify raw materials and processed products and select biological, mechanical and chemical methods to identify food contamination. |
| | Social competence: |
| | 1. Is able to effectively organize work and lead a group during the analysis of food products, including the degree of food contamination. |
| Pre-requisites | Basic knowledge of biology, physics and chemistry. |
| Course contents (min. 100 words) | Lectures cover: issues in the field of food law in Poland and the European Union. Quality management systems in the agricultural and food industry. Microbial and other biological contamination of food and methods of their identification. Chemical and physical hazards in food. Additives and their safety. Traditional and innovative methods of food preservation. Allergies and food intolerances. Parasitic diseases associated with food processing. Methods of preventing food poisonings and infections, including the tasks of sanitary services in their prevention. Legal and institutional protection of consumers against the risks associated with food and nutrition.<br><br>Classes include: description of chemical and biological contamination of food. Bacterial toxins, mycotoxins. Dioxins. PAHs. Radioactive contamination of food. Types, sources and methods of elimination of food mechanical impurities. Conditions for safe food storage. The importance of the cold chain of food storage for product quality and consumer safety. |

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| | The importance of proper hand washing techniques and devices for maintaining the proper quality of raw materials and food products. Microbiological tests of control and processed food products by various methods. Detection and determination of chemical preservatives. Determination of the content of anti-nutritional substances. Identification and marking of dyes. Calculation of the intake of heavy metals and dioxins with the daily and weekly food ration. Hygiene of the dairy industry. Hygiene of the egg and poultry industry. Hygiene of milling and fruit and vegetable processing. Balancing the diet, nutrition in accordance with the standards. |
| References | Recommended literature:<br>Luning, P. A., & Devlieghere, F. (Eds.). (2006). Safety in the agri-food chain. Wageningen Academic Pub.<br>Lelieveld, H., Holah, J., & Napper, D. (Eds.). (2014). Hygiene in food processing: principles and practice. Elsevier.<br>Varzakas, T., & Tzia, C. (Eds.). (2015). Handbook of food processing: food safety, quality, and manufacturing processes (Vol. 35). CRC Press.<br>Holah, J., Lelieveld, H. L. M., & Gabric, D. (Eds.). (2016). Handbook of hygiene control in the food industry. Woodhead Publishing.<br><br>Obligatory literature:<br>Goddek, S., Joyce, A., Kotzen, B., & Burnell, G. M. (2019). Aquaponics food production systems: combined aquaculture and hydroponic production technologies for the future (p. 619). Springer Nature.<br>Doyle, M. P., Diez-Gonzalez, F., & Hill, C. (Eds.). (2020). Food microbiology: fundamentals and frontiers. John Wiley & Sons. |
| Teaching methods (forms/methods/acts) | Lectures will be conducted mainly using the problem method with elements of informative lecture. Discussing issues based on illustrations.<br>Auditorium and laboratory classes checking and consolidating knowledge in the field of data interpretation, techniques of stimulating creative thinking, work in small groups, individual presentations of students, confrontation of various research results. |
| Assesment and examination methods | Ways to verify the learning outcomes achieved:<br>Knowledge:<br>answers to introductory questions to the topic of exercises 2-3 tests checking the knowledge of problems in the field of hygiene and safety of food production.<br>Skills:<br>performing physico-chemical and microbiological tests (group work of three or four people), preparing home exercises, participating in group discussions; team interpretation of the results of physical, chemical and microbiological analyzes based on available standards.<br>Social competence:<br>participation in team exercises in class; answers to introductory questions to the topic of exercises; doing homework exercises and preparing for tests.<br><br>Forms of documenting achieved results:<br>teacher's diary, written assignments, test report. |
| Elements and weights affecting the final grade | The final assessment consists of: |

<table>
<tr><td></td><td>– activity in class - 15%,<br>- presentation of reports - 15%,<br>- written work in the form of problem questions in the field of knowledge covering the entire content of the education module - 70%.<br><br>Percentage of knowledge required to obtain<br>the final grade is respectively:<br>very good 91% - 100%,<br>good plus 81% - 90%,<br>good 71% - 80%,<br>sufficient plus 61% - 70%,<br>sufficient 51% - 60%,<br>insufficient 50% and less.</td></tr>
<tr><td>ECTS points balance</td><td>CONTACT<br>Form of classes Number of hours ECTS credits<br>Lectures 15 0.60<br>Classes 30 1.20<br>Consultations 2 0.08<br><br>Total contact 47 hours 1.88 points ECTS<br><br>NON-CONTACT<br>Form of classes Number of hours ECTS credits<br>Preparation for classes 10 0.40<br>Studying literature 13 0.52<br>Preparation for the colloquium 5 0.20<br><br>Total non-contact 28 hours 1.12 points ECTS<br><br>The total student workload is 75 hours<br>which corresponds to 3 pts. ECTS</td></tr>
<tr><td>Workload related to classes requiring the direct participation of an academic teacher</td><td>- participation in lectures - 15 hours,<br>- participation in auditorium and laboratory classes - 30 hours,<br>- consultations - 2 hours<br>Total 47 hours which is 1.88 ECTS credits.</td></tr>
<tr><td>Relation of modular learning outcomes to directional learning outcomes</td><td>Modular effect code – directional effect code<br>K1 – ZI_W04<br>K2 - ZI_W10<br>S1 - ZI_U04<br>S2 - ZI_U05<br>SC1 - ZI_K01</td></tr>
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| The name of the field study | Management and Production Engineering |
| Course title | Operations & Maintenance Management |
| Language | English |
| Type of the course | obligatory |
| Level of study | Second-cycle studies |
| Form of study | S – full-time |
| Year of study | I |
| Semester of study | 1 |
| Number of ECTS credits (contact/non-contact) | 4 (1.88/2.12) |
| Academic title/degree, name and surname of the person responsible for the course | PhD Zbigniew Kobus, associate professor |
| Didactic unit offering a course | Department of Technology Fundamentals |
| Objective of the course | The aim of the course is to familiarize students with the technical and organizational aspects of the functioning of technical systems operational maintenance. During the classes, students will become acquainted with methods for modelling specific organizational problems that support decision-making processes in the field of technical maintenance, as well as inventory control and machine reliability. |
| Learning outcomes | Knowledge: |
| | 1. Knows the life cycle of devices, objects, and technical systems. They have a basic understanding of technical maintenance issues, including organizational, technical, and economic aspects. They are acquainted with fundamental concepts and definitions, the tasks of the machine maintenance system, and the technological, organizational, and economic aspects. |
| | 2. Knows the basic elements of reliability theory that enable modelling the predictability of the behaviour of technical objects: non-repairable and repairable. |
| | Skills: |
| | 1. Is able to propose a system for tracking and documenting service activities in the field of technical maintenance. They can determine the optimal service life based on economic criteria. They can utilize inventory management models. |
| | 2. Is able to model a simple system for reliability assessment and is able to analyse and interpret the calculation results |
| | Social competence: |
| | 1. Has an awareness of the role and significance of technical maintenance in terms of machine safety and performance quality. |
| | 2. Has an awareness of the need to acquire and improve knowledge in order to enhance the quality and safety of machines. |
| Pre-requisites | Mathematics 1, Operations Research, basics of computer science |
| Course contents | Lectures include:<br>Among other things, fundamental concepts in the field of machine operation and maintenance, operational strategies, basics of reliability theory, diagnostics as a source of information about the object's condition, uncertainty assessment in state recognition processes, basic inventory management strategies, operational reliability assessment models for predicting object behaviour. Description of multi-state systems.<br>Classes include:<br>Operational assessment of products, reliability models of technical objects, determination of spare parts inventory, inventory management policies, building simulation models of reliability structures, modelling and analysis of obtained results. |

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| References | Obligatory literature:<br>1. S. Duffuaa and A. Raouf, Planning and Control of Maintenance Systems. Modeling and Analysis, Springer International Publishing, 2015<br>2. W. Meeker, L. Escobar and F. Pascual, Statistical methods for reliability data, Hoboken: John Wiley & Sons, 2022<br>3. M. Ben-Daya, S. O. Duffuaa, A. Raouf, J. Knezevic and D. Ait-Kadi, Handbook of Maintenance Management and Engineering, Springer, 2009<br><br>Recommended literature:<br>1. R. Johnson, Miller & Freund`s, Probability and Statistics for Engineers, Pearson, 2018<br>2. R. F. Stapelberg, Handbook of Reliability, Availability, Maintainability and Safety in Engineering Design, Springer, 2009<br>3. J. Lawless, Statistical Models and Methods for Lifetime Data, Hoboken: Wiley-Interscience, 2003<br>4. U. D. Kumar, Reliability, Maintenance and Logistic Support - A life Cycle Approach, Springer Science+Business Media, 2000 |
| Teaching methods | Lectures in the form of a multimedia presentation.<br>Classes - calculation tasks, discussion, demonstration of performing subject tasks, computer-based methods to solve various tasks. |
| Assessment methods | K1, K2 – written or oral test.<br>S1, S2 – assessment of correct calculations and proper reasoning during exercises; test.<br>SC1, SC2 – participation in class discussions, active involvement in group work during classes.<br>Form of documentation: instructor's diary, tests. |
| Elements and weights affecting the final grade | The final grade is based on test results (70%) and the classes grade (30%) |
| ECTS credits balance | CONTACT<br>- participation in lectures – 15 hours, 0.6 ECTS,<br>- participation in classes – 30 hours, 1.2 ECTS,<br>- participation in consultations – 2 hours, 0.08 ECTS,<br>Total contact time 47 hours, 1.88 points ECTS<br><br>NON-CONTACT:<br>- preparation for classes – 20 hours, 0.8 ECTS,<br>- preparation for final test – 20 hours, 0.8 ECTS,<br>- literature study – 13 hours, 0,52 ECTS,<br>Total non-contact time 53 hours, 2.12 points ECTS<br><br>The total student workload is 100 hours. which corresponds to 4 points of ECTS. |
| Workload related to classes requiring the direct participation of an academic teacher | - participation in lectures – 15 hours, 0.6 ECTS,<br>- participation in classes – 30 hours, 1.2 ECTS,<br>- participation in consultations – 2 hours, 0.08 ECTS,<br>The total number of contacts is 47 hours, which corresponds to 1.88 ECTS. |
| Relation of course learning outcomes to the learning outcomes of the field of study | K1, K2 – ZI_W02, InzZI_W01<br>S1 – ZI_U03<br>S2 – ZI_U04<br>SC1 – ZI_K04<br>SC2 – ZI_K03 |

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| The name of the field study | Management and Production Engineering |
| Course title | Design of agri-food investment |
| Language | English |
| Type of the course | obligatory |
| Level of study | Second-cycle studies |
| Form of study | S – full-time |
| Year of study | II |
| Semester of study | 2 |
| Number of ECTS credits (contact/non-contact) | 4 (1.96/2.04) |
| Academic title/degree, name and surname of the person responsible for the course | Professor Agnieszka Wójtowicz |
| Didactic unit offering a course | Department of Thermal Technology and Food Process Engineering |
| Objective of the course | The aim of the course is to introduce students to the technological design in agri-food industry plants. Presentation of the organization and principles of logistics in the enterprise, the principles of selecting raw materials and additives, machines and technological devices, warehouses and storage methods, energy and environmental aspects, technological requirements. This knowledge will enable students to efficiently use technical and technological documentation in accordance with their field of study. |
| Learning outcomes | Knowledge: |
| | K1. Student knows and understands the impact of production processes on raw materials and their quality including the suitability for the manufacture of various products |
| | K2. Student knows and understands issues related to the principles of sustainable development and the knowledge in the field of implementation of integrated production processes in agri-food processing plants. |
| | Skills: |
| | S1. Student is able to select and modify methods, techniques, technologies, tools and materials to solve current problems concerning processes of production in agri-food industry. |
| | Social competence: |
| | SC1. Student is prepared to independently acquire and improve the knowledge in agri-food design |
| Pre-requisites | Technical drawing, Production processes, Logistics in the enterprise, Food industry machines |
| Course contents | The lectures include: law requirements for technological project design, proper technology selection and its parameters to achieve good quality of products, technological schemes in the food industry, design of the production and technological processes, storage of food and feed, transport development, environmental protection and energy aspects, food and feed healthy aspects, rules for location and land development of industrial plants.<br><br>The classes include: introduction to technological design, preparing an independent technological design project of a selected food or agri-food industry plant. The project includes: determining the raw material base and sales market, developing a production program and technology, calculating the size of production, storage and social rooms, energy requirements calculations, preparing a simplified construction design and a land development plan using available methods. |
| References | Basic literature: |

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| | 1. Food processing technology : principles and practice / P. Fellows. Boca Raton : Cambridge : CRC Press ; Woodhead Publishing, 2000<br>2. Cereals processing technology / ed. by Gavin Owens. Boca Raton : Cambridge : CRC Press ; Woodhead Publishing Limited, 2001<br>3. Meat science, milk science and technology / ed. by H. R. Cross and A. J. Overby, Amsterdam : Elsevier Science Publishers, 1988<br>4. Food technology processing and laboratory control / advisory ed. F. Aylwaed, Jodhpur : Agrobios, 2001<br>5. Handbook of food preservation / ed. by M. Shafiur RahmanNew York ; Basel : Marcel Dekker, 1999<br>6. Handbook of fruit science and technology : production, composition, storage, and processing / ed. by D. K. Salunkhe, S. S. Kadam. New York : Marcel Dekker, 1995<br>7. Food processing operations and scale-up / Kenneth J. Valentas, Leon Levine, J. Peter Clark. New York : Marcel Dekker, 1991<br>8. Handbook of food engineering / ed. by Dennis R. Heldman, Daryl B. Lund. New York : Marcel Dekker, 1992<br>Auxiliary literature:<br>1. Methods in food science and technology. Part 1 / monograph edited by Maria Walczycka, Urszula Błaszczyk. Publishing House of the University of Agriculture in Krakow, 2022<br>2. Principles of fermentation technology / Peter F. Stanbury and Allan Whitaher. Oxford : Pergamon Press, 1986<br>3. Managing frozen foods / ed. by Christopher J. Kennedy. Boca Raton : Cambridge : CRC Press ; Woodhead Publishing Limited, 2000<br>4. Principles of cereal science and technology / R. Carl Hoseney. St. Paul : American Association of Cereal Chemists, 1986<br>5. Technology of biscuits, crackers and cookies / Duncan Manley. Cambridge : Woodhead Publishing Limited, 1996<br>6. Developments in soft drinks technology. / ed. by H. W. Houghton. London ; New Jork : Elsevier Applied Science Publishers, 1984<br>7. Handbook of meat product technology / M. D. Ranken. Oxford : Blackwell Science, 2000<br>8. Advanced dairy science and technology / ed. by Trevor J. Britz, Richard K. Robinson. Oxford: Blackwell Publishing, 2008<br>9. Petfood technology / editors Jennifer L. Kvamme, Timothy D. Phillips, Mt. Morris, Illinois : Watt Publishing, cop. 2003<br>10. Food machinery : for the production of cereal foods, snack foods and confectionery / Ling-Min Cheng. New York : Ellis Horwood, 1992 |
| Teaching methods | Lectures and auditorium class in the form of multimedia presentations, laboratory class - calculations and performance of design tasks. |
| Assessment methods | K1 – written exam note<br>K2 – written exam note |

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| | S1 – assessment of project implementation<br>SC1 – assessment of project implementation |
| Elements and weights affecting the final grade | Note of project implementation – 50%<br>Written exam – 50% |
| ECTS credits balance | CONTACT<br>Form Hours Points ECTS<br>Lecture 15 h. 0.60 ECTS<br>Class 30 h. 1.20 ECTS<br>Consulting 2 h. 0.08 ECTS<br>Written exam 2 h. 0.08 ECTS<br>Total 49 h. that is 1.96 ECTS<br><br>NON-CONTACT<br>Form Hours Points ECTS<br>Preparation for class 10 h. 0.40 ECTS<br>Completion of projects 18 h. 0.72 ECTS<br>Preparation for exam 10 h. 0.40 ECTS<br>Reading of literature 13 h. 0.52 ECTS<br>Total non-contact 51 h. that is 2.04 ECTS<br><br>Total student workload 100 h. that is 4.0 ECTS |
| Workload related to classes requiring the direct participation of an academic teacher | Lecture 15 h. 0.60 ECTS<br>Class 30 h. 1.20 ECTS<br>Consulting 2 h. 0.08 ECTS<br>Written exam 2 h. 0.08 ECTS<br><br>Total 49 h. that is 1.96 ECTS |
| Relation of course learning outcomes to the learning outcomes of the field of study | K1 – ZI_W01<br>K2 – ZI_W05<br>S1 - ZI_U07<br>SC1 – ZI_K03 |

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|---|---|
| The name of the field study | Management and Production Engineering |
| Course title | Management of drying processes |
| Language | English |
| Type of the course | obligatory |
| Level of study | Second-cycle studies |
| Form of study | S – full-time |
| Year of study | II |
| Semester of study | 2 |
| Number of ECTS credits (contact/non-contact) | 4 (2/2) |
| Academic title/degree, name and surname of the person responsible for the course | Professor dr. Dariusz Dziki |
| Didactic unit offering a course | Department of Thermal Technology and Food Process Engineering |
| Objective of the course | The objective of this course is to acquaint students with the characteristics of the drying process, food drying methods, alterations that occur in food during this process, the influence of drying on food quality, structural solutions of drying machinery and devices, as well as their computational specifications. |
| Learning outcomes<br>: | Knowledge: |
| | 1. Possesses fundamental knowledge in the field of the basic theory and techniques of food drying, essential for understanding the phenomena occurring during this process. |
| | 2. Familiar with basic methods, techniques, tools, and materials used to solve simple engineering tasks in the domain of food drying engineering. |
| | Skills: |
| | 1. Applies acquired knowledge to resolve and communicate regarding issues related to food drying. |
| | 2. Can prepare and deliver a brief presentation dedicated to solving a problematic task concerning food drying. |
| | Social competence: |
| | 1. Think and act in an entrepreneurial manner and understand the need to constantly learn and inspire others |
| Pre-requisites | Production management and services |
| Course contents | The lectures cover: Advanced drying methods: Foam drying, stem drying, dry aid drying. Heat and mass transfer in these drying methods. Modeling of the drying process. Using of ultrasounds and microwaves in drying. Drying machines calculation. Changes in food quality during dehydration. Optimal drying parameters. Comminution of dried products.<br><br>The classes include: Explore sorption and desorption isotherms through experiments, demonstrating how equilibrium is achieved during the drying process. Encourage collaborative projects where students can design and conduct experiments related to drying processes, fostering teamwork and problem-solving skills. o Analyze real-world case studies of drying applications in the food industry, discussing challenges, innovations, and the impact of drying on product quality. Provide practical insights into the structure and operation of various dryers, including convective dryers, contact dryers, freeze dryers, fluidized bed and spray dryers, radiative dryers, dielectric, and microwave dryers. |
| References | Drying Technologies for Foods Fundamentals and Applications, 1st Edition Edited By Prabhat K. Nema, Barjinder Pal Kaur, Arun S. Mujumdar 2019, ISBN 9781138733084. |

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| Teaching methods | - Lecture<br>- Discussion<br>- Problem-solving<br>- Utilizing instructional materials |
| Assessment methods | K1 - Written exam.<br>K2 - Written paper.<br>S1 - Presentation and performance assessment.<br>S2 – Calculation assessment<br>SC1 – Presentation assessment<br>Methods of documenting the achieved results: exams, instructor's journal, problem-solving assignments, presentations. |
| Elements and weighs affecting the final grade | Exam 60%<br>Project 10%<br>Test 30% |
| ECTS credits balance | **Contact**<br>**Number of hours ECTS**<br>Lecture 15 h 0.60<br>Classes 30 h 1.20<br>Consultation 2 h 0.08<br>Exam 3 h 0.12<br>**Total 50 h 2.00 ECTS**<br><br>**No-contact**<br>Preparation for exercises 35 h 1.40<br>Preparation for tests 15 h. 0.60<br><br>**Total 50 h 2.00 ECTS**<br><br>The total student workload is 100 hours, which corresponds to 4 ECTS credits |
| Workload related to classes requiring the direct participation of an academic teacher | Participation in lectures - 15 hours.<br>Participation in classes - 30 hours.<br>Participation in consultations - 2 hour.<br>Participation in exam - 3 hours.<br>In total, this amounts to 50 hours, which corresponds to 2.0 ECTS credits. |
| Relation of course learning outcomes to the learning outcomes of the field of study | K1 - ZI_W04<br>K2 – ZI_W02<br>S1 - ZI_U01<br>S2 - ZI_U02<br>SC1 –ZI_K05 |

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|---|---|
| The name of the field study | Management and Production Engineering |
| Course title | Cereal Processing Engineering |
| Language | English |
| Type of the course | obligatory |
| Level of study | Second -cycle studies |
| Form of study | S – full-time |
| Year of study | II |
| Semester of study | 2 |
| Number of ECTS credits (contact/non-contact) | 4 (1.84/2.16) |
| Academic title/degree, name and surname of the person responsible for the course | PhD Renata Różyło, associate professor |
| Didactic unit offering a course | Department of Food Engineering and Machines |
| Objective of the course | The aim of the course is to familiarize students with issues related to the engineering aspects of the production of innovative cereal products and develops procedures for controlling the production process. |
| Learning outcomes | Knowledge: |
| | 1. Is able to describe the properties of raw materials used in the production of innovative cereal products. |
| | 2. Has structured general knowledge of engineering issues related to the production of cereal products. |
| | Skills: |
| | 1. Is able to determine quality requirements for selected raw materials and innovative cereal products |
| | 2. Develops a procedure for controlling the production process of innovative cereal product |
| | Social competence: |
| | 1. Is aware of the importance of social, professional and ethical responsibility for the production of high-quality food |
| Pre-requisites | Organization of production systems, Safety and hygiene in food production |
| Course contents | Lectures: The importance of the production of cereal products in the food economy. Nutritional aspects of selected innovative raw materials. Characteristics of the production of special flours. The use of waste products from food production in the recipes of innovative cereal products<br>Classes: Creating a monitoring procedure for a innovative cereal product, including: defining quality requirements for raw materials and products; developing a flowchart of the production process indicating places of production monitoring; creation of a cleaning and disinfection program as well as monitoring and control cards for the production process; selection of methods, frequency, tools and equipment necessary to monitor production. |
| References | 1. Owens, G. (Ed.). (2001). *Cereals processing technology* (Vol. 53). CRC Press.<br>2. Hoseney, R. C. (1994). *Principles of cereal science and technology* (No. Ed. 2). American Association of Cereal Chemists (AACC).<br>3. Guiné, R. D. P. F., & dos Reis Correia, P. M. (Eds.). (2013). *Engineering aspects of cereal and cereal-based products*. CRC Press. |
| Teaching methods | - Illustrating a verbal message using (drawings, diagrams, charts, tables, films and photographs - multimedia projection)<br>- Demonstrations and explanations using instructional videos<br>- Short design tasks |
| Assessment methods | Knowledge 1, 2 – assessment of the student's work and assessment during the oral presentation of the project<br>Skills 1, 2 – assessment of the correctness of the project. |

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| | Social competence 1 – assessment student work and oral presentation<br>Forms of documenting the achievements - grades in the class journal and project evaluation |
| Elements and weights affecting the final grade | Passing exercises covering knowledge topics from the entire semester knowledge - grade weight:<br>Design task - 60%<br>Oral presentation - 20%<br>Activity in classes – 20% |
| ECTS credits balance | CONTACT<br>Form of classes — Number of hours — ECTS points<br>Lecture — 15 hours — 0.60 points ECTS<br>Classes — 30 hours — 1.20 points ECTS<br>Consultations — 1 hour — 0.04 points ECTS<br>Total contact time — 46 hours — 1.84 points ECTS<br><br>NON-CONTACT<br>Preparation project — 22 hours — 0.88 points ECTS<br>Preparation for passing the exercise — 20 hours — 0.80 points ECTS<br>Studying literature — 12 hours — 0.48 points ECTS<br>Total non-contact — 54 hours — 2.16 points ECTS<br>The total student workload is 100 hours, which corresponds to 4 points. ECTS |
| Workload related to classes requiring the direct participation of an academic teacher | Participation in lectures – 15 hours<br>Participation in classes – 30 hours<br>Participation in consultations – 1 hour.<br>Total 46 hours which is 1.84 points. ECTS |
| Relation of course learning outcomes to the learning outcomes of the field of study | Knowledge 1, 2 - ZI_W01<br>Skills 1 – ZI_U01<br>Skills 2 – ZI_U02, ZI_U07<br>Social competence 1 – ZI_K05 |

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| The name of the field study | Management and Production Engineering |
| Course title | Reliability and safety of industrial systems |
| Language | English |
| Type of the course | obligatory |
| Level of study | Second-cycle studies |
| Form of study | S – full-time |
| Year of study | II |
| Semester of study | 2 |
| Number of ECTS credits (contact/non-contact) | 4 (1.88/2.12) |
| Academic title/degree, name and surname of the person responsible for the course | Waldemar Samociuk, Dr Eng. |
| Didactic unit offering a course | Department of Mechanical Engineering and Automation |
| Objective of the course | This course addresses the reliability, risk, and safety issues of real industrial systems with application of the latest reliability and risk-based modeling. Related topics such as maintenance decision-making and risk and safety modeling are also addressed with the implementation of decision-making techniques. This course provides real-life studies on industrial operations along with solutions. It discusses modeling and optimization of reliability and safety aspects in industry and covers reliability maintenance issues in process industries. |
| Learning outcomes | Knowledge: |
| | 1. Has knowledge in the field of information techniques and technologies allowing to model (identify), modeling and optimization of reliability and safety aspects in industry and covers reliability maintenance issues in process industries. . |
| | 2. Demonstrates knowledge of the principles and knowledge in the implementation of integrated production processes in conditions of increasing degree of mechanization and safety of industrial processes. |
| | Skills: |
| | 1. The student has the ability to use modern information technologies to obtain and process information in the field of industrial production and the provision of services. Reliability, cost optimization, life cycle costing analysis, and multi-criteria decision making (MCDM) application for risk and safety analysis. |
| | 2. Statistical Modeling of Reliability Structures and Industrial Processes. Risk and safety modeling. |
| | Social competence: |
| | 1. The student is able to think and act in an entrepreneurial way and understands the need to constantly learn and inspire others. |
| Pre-requisites | Mathematics, Physics, Mechanics, Electrical Engineering |
| Course contents | Introduction and overview: the Poisson and the normal processes, life quality, risks, hazards and causes of failures, uncertainties in engineering modeling, robustness assessment of structures. Scenario identification and analysis. Systems reliability analysis and robustness: series and parallel system analysis, structural systems analysis, robustness assessment of structures. Risk based inspection and maintenance planning: the basic problem, modeling of degradation processes, inspection quality and the PoD concept, generic approaches to inspection planning. Optimal decision making and risk acceptance criteria: optimality in engineering decision making, the ALARP principle for acceptability, the Life Quality Index and acceptable life safety, societal life saving costs and willingness to pay. Functional safety for managers. Competency and competency management. Processes and procedures for the |

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| | SLC. SIS functional safety and mechanical integrity.. |
| References | 1. Rausand, M. (2014). Reliability of safety-critical systems: theory and applications. John Wiley & Sons.<br>2. Verma, A. K., Ajit, S., & Karanki, D. R. (2010). *Reliability and safety engineering* (Vol. 43, pp. 373-392). London: Springer.<br>3. Dilbagh Panchal, Mangey Ram, Prasenjit Chatterjee, Anish Kumar Sachdeva. Industrial Reliability and Safety Engineering Applications and Practices. Taylor & Francis Ltd., 2023<br>4. Ioannis S. Trianntafyllou, Mangey Ram. Statistical Modeling of Reliability Structures and Industrial Processes, 2022, CRC Press ISBN 9781032066257<br>5. Edited By Lirong Cui, Ilia Frenkel, Anatoly Lisnianski, Stochastic Models in Reliability Engineering, CRC Press, 2021.<br>6. Kołowrocki, K., & Soszyńska-Budny, J. (2011). *Reliability and Safety of Complex Technical Systems and Processes: Modeling–Identification–Prediction-Optimization*. Springer Science & Business Media. |
| Teaching methods | Lectures, laboratory exercises in the form of real experiments at laboratory stations (Matlab, Scilab) |
| Assessment methods | K1, K2 - written test.<br>S1, S2 - assessment of the exercise and report,<br>SC1 - assessment of the student's work as a leader and member of the team performing the exercise and report. |
| Elements and weights affecting the final grade | Detailed criteria for assessing works:<br>• sufficient (3.0) degree of knowledge or skills when he obtains from 51 to 60% of the total points determining the maximum level of knowledge or skills and, respectively,<br>• sufficient plus (3.5) – from 61 to 70%<br>• good (4.0) – from 71 to 80%<br>• plus good (4.5) – from 81 to 90%<br>• very good (5.0) – above 91%.<br>Final grade = 100% of the final grade from the classes. These conditions are presented in the first lesson of the module. |
| ECTS credits balance | Contact<br>• lecture (15 hours/0.6 ECTS),<br>• classes (30 hours/1.2 ECTS),<br>• consultations (2 hours/0.08 ECTS),<br>Total – 47 hours/1.88 ECTS<br><br>Non-contact<br>• preparation for classes (20 hours/0.80 ECTS),<br>• preparation for test (20 hours/0.80 ECTS),<br>• preparation of reports (13 hours/0.52 ECTS),<br><br>A total of 53 hours/2.12 ECTS |
| Workload related to classes requiring the direct participation of an academic teacher | participation in: lectures – 15 hours; in classes – 30 hours; in consultations – 2 hours |
| Relation of course learning outcomes to the learning outcomes of the field of study | K1 – ZI_W05, InzZI_W01<br>K1 – ZI_W05, InzZI_W04<br>S1 – ZI_U03, InzZI_U01<br>S2 – ZI_U07, InzZI_U01<br>SC1 – ZI_K01 |

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| The name of the field study | Management and Production Engineering |
| Course title | Strategic management<br>*Zarządzanie strategiczne* |
| Language | English |
| Type of the course | obligatory |
| Level of study | Second-cycle studies |
| Form of study | S – full-time |
| Year of study | II |
| Semester of study | 2 |
| Number of ECTS credits (contact/non-contact) | 2 (1.28/0.72) |
| Academic title/degree, name and surname of the person responsible for the course | PhD. Eng. Agnieszka Dudziak |
| Didactic unit offering a course | Department of Power Engineering and Transportation<br>Subdepartment of Logistics and Business Management |
| Objective of the course | The aim of the course is to provide students with basic knowledge in the field of strategic management, primarily in the context of using strategic analysis tools. Particular emphasis is placed on the issue of the organization as a market participant, which should analyze the internal and external environment. In addition, knowledge is provided regarding the strategic diagnosis of the enterprise, formulating a strategy on its basis and its implementation. Modern concepts and problems of strategic management are also presented. |
| Learning outcomes | Knowledge: |
| | 1. Knows the theoretical foundations and is able to define concepts and basic concepts of strategic management. Understands and is able to recognize processes and phenomena occurring in the organization's environment and characterize strategic management tools and methods. |
| | 2. Has the knowledge to define, describe and explain problems related to the application of various strategic management analyses, and describe areas subject to analysis, such as Porter's 5 forces method, BCG matrix, ADL matrix, strategic group map or PEST analysis. |
| | Skills: |
| | 1. Is able to indicate the stages of the strategic management process in an enterprise and classify them. Is able to access sources of knowledge related to strategic management, use the information obtained, and analyze the internal and external environment of the organization. |
| | 2. Has the ability to characterize the organization's goals in the context of making effective strategic decisions in the enterprise. |
| | Social competence: |
| | 1. Is aware of the importance of strategic management processes in the area of various types of business activities. |
| Pre-requisites | Completion of the course assumes having basic knowledge in the field of management, marketing and economics. |
| Course contents | Lectures include:<br>The subject covers issues related to strategic management of an enterprise. The essence of the basic concepts of strategic management is discussed, as well as issues related to the use of strategic tools and analyzes in the enterprise. Issues related to strategic planning and enterprise development strategy will also be discussed. |
| References | Basic literature:<br>1. Cornelis A de Kluyver, John A. Pearce II, *Strategic management*, Business Expert Press, 2021. |

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| | 2. Lynch Richard, *Strategic management*, Sage Publications, 2021.<br><br>Additional literature:<br>3. Cornelis A. de Kluyver, *Fundamentals of Global Strategy, A business Model Approach*, Business Expert Press, 2021. |
| Teaching methods | Discussing issues based on diagrams and illustrations, presenting selected phenomena using didactic models. |
| Assessment methods | Ways to verify the achieved learning outcomes:<br><br>Knowledge:<br>1. Final test knowledge of the subject<br>2. Final test to check knowledge of the subject and discussion during the lecture regarding understanding and knowledge of strategic management problems.<br>Skills:<br>1. Checking the ability to understand phenomena in the field of strategic management during lecture discussions.<br>2. Activity during the lecture.<br><br>Social competence:<br>1. Activity during the lecture, initiating discussions, observing the student's involvement.<br><br>Forms of documenting achieved results: Final test, instructor's diary. |
| Elements and weights affecting the final grade | Pass a subject – 60%<br>Assessment of activity during exercises – 40% |
| ECTS credits balance | **CONTACT**<br>**Form of classes - Number of hours/ECTS points**<br>- participation in lectures – 30 hours/1.2<br>- participation in consultations – 2 hours/0.08<br><br>**Total contact 32 hours 1.28 points ECTS**<br><br>**NON-CONTACT**<br>**Form of classes - Number of hours/ECTS points**<br>- preparation for classes – 8 hours/0.32<br>- studying literature – 5 hours/0.20<br>- preparation for the pass a subject – 5 hours/0.20<br><br>**Total non-contact 18 hours 0.72 points ECTS**<br><br>**The total student workload is 50 hours which corresponds to 2 points ECTS** |
| Workload related to classes requiring the direct participation of an academic teacher | - participation in lectures – 30 hours/1.2<br>- participation in consultations – 2 hours/0.08<br><br>**Total contact 32 hours 1.28 points ECTS** |
| Relation of course learning outcomes to the learning outcomes of the field of study | **Modular Effect Code – Directional Effect Code**<br><br>K1 - ZI_W02, ZI_W06<br>K2 - ZI_W02, ZI_W07<br>S1 - ZI_U01<br>S2 - ZI_U04<br>SC1 - ZI_K05 |

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| Field of study | Management and Food Engineering |
| Course title | Food Production Control |
| Language | English |
| Type of the course (obligatory/optional) | Obligatory |
| Level of the course | Second-cycle studies |
| Form of study | S – full-time |
| Year of study | II |
| Semester of study | 2 |
| ECTS credits (contact/non-contant classes) | 4 ECTS (1.88/2.12) |
| Name of lecturer | PhD Agnieszka Starek-Wójcicka, associate professor |
| Unit responsible for course of study | Department of Biological Bases of Food and Feed Technologies |
| Objective of the course | The aim of the course is to familiarize students with the threats occurring during food production, methods used to detect contamination of food products, regulatory provisions and systems ensuring food quality and safety. |
| Learning outcomes | Knowledge: |
| | 1. Knows and understands physical and chemical phenomena and processes as well as quality management systems in food industry engineering. |
| | 2. Knows and understands issues related to the impact of microorganisms on the quality of raw materials and products of the food industry; knows advanced methods of preservation and storage of biological materials. |
| | Skills: |
| | 1. Is able to use his knowledge to describe physical phenomena and simple and complex production processes. |
| | 2. Is able to independently plan and carry out experiments in compliance with research standards, including chemical and microbiological measurements and analyses, as well as correctly interpret the obtained results and draw conclusions. |
| | Social competence: |
| | 1. Is ready to take actions enabling the production of healthy food and makes efforts to provide such information to the public in a generally understandable way. |
| Pre-requisities | Basic knowledge of biology, physics and chemistry. |
| Course contents (min. 100 words) | The lecture includes: Basic concepts, classification of methods for detecting contaminants, sources of threats in the food industry, the impact of microorganisms on human health, threats related to the occurrence of parasites and pests, and methods of food preservation and production of contaminant-free food products. Additionally, the lecture will discuss anti-nutritional substances as well as the impact of some technological processes on the quality of food products.<br><br>The classes include research and analysis of methods for detecting food contamination and adulteration. Additionally, as part of the course, students prepare their own design of a technological line, taking into account potential threats and how to eliminate them. They also estimate the intake of harmful substances from food. |
| References | Required literature:<br>• Sikora T., Kołożyn-Krajewska D. 2010. Food safety management. Ed. C.H. Beck<br>• Andrejko M., Czarniecka-Skubina E., Andrejko D., Kluza F., Zawiślak K., Głuszak A., Pacek M. 2012. Threats to food |

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| | health safety. Publishing House of the University of Life Sciences in Lublin.<br>• Fortin, N. D. 2022. Food regulation: law, science, policy, and practice. John Wiley & Sons.<br><br>Recommended literature:<br>• Andrejko D., Andrejko M. 2009. Food contamination. Sources and impact on the human body. Publishing House of the University of Life Sciences in Lublin. |
| Teaching methods (forms/methods/acts) | Lectures will be conducted mainly using the problem method with elements of informative lecture. Discussing issues based on illustrations.<br>Auditorium and laboratory classes checking and consolidating knowledge in the field of data interpretation, techniques of stimulating creative thinking, work in small groups, individual presentations of students, confrontation of various research results. |
| Assesment and examination methods | Ways to verify the learning outcomes achieved:<br>Knowledge:<br>answers to introductory questions to the topic of exercises 1-2 tests checking the knowledge of problems in the field of hygiene and safety of food production.<br>Skills:<br>performing physico-chemical and microbiological tests (group work of three or four people), preparing home exercises, participating in group discussions; team interpretation of the results of physical, chemical and microbiological analyzes based on available standards.<br>Social competence:<br>participation in team exercises in class; answers to introductory questions to the topic of exercises; doing homework exercises and preparing for tests.<br><br>Forms of documenting achieved results:<br>teacher's diary, written assignments, test report. |
| Elements and weights affecting the final grade | The final assessment consists of:<br>– activity in class - 15%,<br>- presentation of reports - 15%,<br>- written work in the form of problem questions in the field of knowledge covering the entire content of the education module - 70%.<br><br>Percentage of knowledge required to obtain<br>the final grade is respectively:<br>very good 91% - 100%,<br>good plus 81% - 90%,<br>good 71% - 80%,<br>sufficient plus 61% - 70%,<br>sufficient 51% - 60%,<br>insufficient 50% and less. |
| ECTS points balance | **CONTACT**<br>**Form of classes** **Number of hours** **ECTS credits**<br>Lectures 15 0.60<br>Classes 30 1.20<br>Consultations 2 0.08<br>Total contact 47 hours 1.88 points ECTS<br><br>**NON-CONTACT** |

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| | **Form of classes Number of hours ECTS credits**<br>Preparation for classes 20 0.80<br>Studying literature 18 0.72<br>Preparation for the colloquium 15 0.60<br><br>Total non-contact 53 hours 2.12 points ECTS<br><br>**The total student workload is 100 hours.**<br>**which corresponds to 4 pts. ECTS** |
| Workload related to classes requiring the direct participation of an academic teacher | - participation in lectures - 15 hours,<br>- participation in auditorium and laboratory classes - 30 hours,<br>- consultations - 2 hours<br>**Total 47 hours which is 1.88 ECTS credits.** |
| Relation of modular learning outcomes to directional learning outcomes | **Modular effect code – directional effect code**<br>K1 – ZI_W04<br>K2 - ZI_W10<br>S1 - ZI_U04<br>S2 - ZI_U05<br>SC1 - ZI_K01 |

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| The name of the field study | Management and Production Engineering |
| Course title | **Water and wastewater management** |
| Language | English |
| Type of the course | obligatory |
| Level of study | Second-cycle studies |
| Form of study | S – full-time |
| Year of study | II |
| Semester of study | 2 |
| Number of ECTS credits (contact/non-contact) | 3 (1.28/1.72) |
| Academic title/degree, name and surname of the person responsible for the course | Professor Krzysztof Jóźwiakowski |
| Didactic unit offering a course | Department of Environmental Engineering and Geodesy |
| Objective of the course | The aim of the course is to provide knowledge about the construction, principles of operation, design and scope of application of sewage and water treatment devices. |
| Learning outcomes | Knowledge: |
| | 1. Knows the basic legal acts regarding the quality of water intended for drinking and purified sewage discharged into natural reservoirs. |
| | 2. Knows the course of water and sewage treatment processes (mechanical, biological and chemical). |
| | 3. Knows the main devices for conducting groundwater and surface water treatment processes as well as municipal sewage treatment, their technical parameters and how to interpret them. |
| | Skills: |
| | 1. Is able to design a technological system for the treatment of ground and surface waters and sewage for assumed conditions. |
| | 2. Is able to determine the operating parameters of devices and assess the effectiveness of their work. |
| | 3. Is able to make variant selection of devices based on their technical parameters. |
| | Social competence: |
| | 1. Is aware of how important it is to follow the principles of professional ethics and professionally design appropriate wastewater treatment technologies to protect the natural environment |
| | 2. Is aware of responsibility for his own work and is ready to comply with the principles of teamwork and take responsibility for jointly performed tasks |
| | 3. Able to think and act in an entrepreneurial manner and establish cooperation with specialists in other fields of knowledge |
| Pre-requisites | mathematics 1 i 2, chemistry, physics, information technology, mathematical statistics |
| Course contents | Determining the water and sewage balance in a small town. Basic requirements for water intended for drinking. Unit processes for surface and groundwater treatment. Technical characteristics of water treatment devices and principles of their dimensioning and design. Characteristics of the composition of raw sewage. Requirements for the quality of treated sewage discharged into the environment. Main processes and methods of municipal wastewater treatment. Technical characteristics, basics of dimensioning and design of devices for mechanical, biological and chemical wastewater treatment. |
| References | Obligatory literature:<br>1. Rumana Riffat, 2013. Fundamentals of Wastewater Treatment and Engineering, p. 400.<br>2. Chaubey Mritunjay, 2021. Wastewater Treatment Technologies, p.256 |

<table>
<tr><td></td><td colspan="3">Recommended literature:<br>3. The American Water Works Association (AWWA), The American Society of Civil Engineers (ASCE), 2012. Water Treatment Plant Design,</td></tr>
<tr><td>Teaching methods</td><td colspan="3">lectures, classes, group work, field work, projects, presentations</td></tr>
<tr><td>Assessment methods</td><td colspan="3">preparation of the project for evaluation, oral presentation of the project, written test<br>K1, K2, K3 – written test,<br>S1, S2, S3 – assessment of calculation and design tasks,<br>SC1, SC2, SC3 – assessment of the student's work as a leader and member of the team performing project tasks,</td></tr>
<tr><td>Elements and weights affecting the final grade</td><td colspan="3">During the exercises, computational tasks are performed and design, for which the student receives appropriate grades, depending on the correctness of their implementation. A written assessment taking into account the material presented during the lectures is the basis for assigning a grade for the lecture part. Assessment criteria for the final paper: satisfactory (3.0) – from 51 to 60% of the total points, sufficient plus (3.5) – from 61 to 70%, good (4.0) – from 71 to 80%, good plus (4.5) – from 81 to 90%, very good (5.0) – above 90%.<br>The final grade for the course is a weighted average calculated on the basis of the grades obtained by the student in the final written test – 50% and in the practical part – 50%. Additionally, the instructor may increase the final grade accordingly, taking into account the student's outstanding activity during classes.</td></tr>
<tr><td rowspan="12">ECTS credits balance</td><td colspan="3">CONTACT</td></tr>
<tr><td>Form of course</td><td>Number of hours</td><td>ECTS credits</td></tr>
<tr><td>Lectures</td><td>15</td><td>0.60</td></tr>
<tr><td>Classes</td><td>15</td><td>0.60</td></tr>
<tr><td>Consultations</td><td>2</td><td>0.08</td></tr>
<tr><td>Total contact</td><td>32</td><td>1.28</td></tr>
<tr><td colspan="3">NON-CONTACT</td></tr>
<tr><td>preparation for classes</td><td>10</td><td>0.40</td></tr>
<tr><td>preparation of reports</td><td>10</td><td>0.40</td></tr>
<tr><td>literature study</td><td>10</td><td>0.40</td></tr>
<tr><td>preparation for the credit</td><td>13</td><td>0.52</td></tr>
<tr><td>TOTAL non-contacts/ ECTS credits</td><td>43</td><td>1.72</td></tr>
<tr><td rowspan="4">Workload related to classes requiring the direct participation of an academic teacher</td><td>Lectures</td><td>15</td><td>0.60</td></tr>
<tr><td>Classes</td><td>15</td><td>0.60</td></tr>
<tr><td>Consultations</td><td>2</td><td>0.08</td></tr>
<tr><td>TOTAL with direct involvement of the teacher</td><td>32</td><td>1.28</td></tr>
<tr><td>Relation of course learning outcomes to the learning outcomes of the field of study</td><td colspan="3">K1, K2, K3: ZI_W03; ZI_W04; ZI_W07<br>S1, S2, S3: ZI_U04; ZI_U05; ZI_U07<br>SC1, SC2, SC3: ZI_K02; ZI_K03; ZI_K04; ZI_K05</td></tr>
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| The name of the field study | Management and Production Engineering |
| Course title | Quality management methods and techniques |
| Language | English |
| Type of the course | elective |
| Level of study | Second-cycle studies |
| Form of study | S – full-time |
| Year of study | II |
| Semester of study | 2 |
| Number of ECTS credits (contact/non-contact) | 4.00 (1.88/2.12) |
| Academic title/degree, name and surname of the person responsible for the course | Prof. Sławomir Kocira |
| Didactic unit offering a course | Department of Machinery Exploitation and Management of Production Processes |
| Objective of the course | The objective of teaching the course is to familiarize students with the methods and techniques used in quality management. The class will allow students to learn the principles of using various methods and techniques to help solve quality problems. |
| Learning outcomes | Knowledge: |
| | K1. Knows the principles of methods and techniques used in quality systems. |
| | Skills: |
| | S1. Able to assess the needs of an enterprise for quality management. |
| | S2. Is able to apply selected methods and techniques to support quality management. |
| | Social competence: |
| | Sc1. Understands the technical and non-technical aspects and consequences of engineering activities |
| Pre-requisites | No pre-requisites |
| Course contents | Quality management basics. The concept of quality. Classification of quality management principles, methods, techniques and tools. Tools supporting quality management (brainstorming, Ishikawa diagram, flow chart, check sheet, Pareto diagram). Methods supporting quality management (QFD, FMEA). |
| References | Goetsch, D. L., & Davis, S. B. (2016). Quality management for organizational excellence: Introduction to total quality. pearson.<br>Tricker, R. (2019). Quality management systems: A practical guide to standards implementation. Routledge.<br>Norms ISO 9001, 14000, 45001 |
| Teaching methods | lectures, classes, group work, practical work |
| Assessment methods | K1 – final test<br>S1 – final test, project<br>S2 – final test, project<br>Sc1 – final test |
| Elements and weights affecting the final grade | The average of the grades of the control paper and the written colloquium of the (exercises) 50%<br>written colloquium (lectures) 50% |
| ECTS credits balance | – Lecture – 15 hours,<br>– Classes - 30 hours.<br>– Consultation - 2 hours<br>– Classes preparation - 15 hours<br>– Literature studies - 15 hours<br>– Preparation for the colloquia - 23 hours<br>Total student workload is 100 hours which equals 4.00 ECTS credits |

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| Workload related to classes requiring the direct participation of an academic teacher | Attendance in lectures - 15 hours; in classes - 30 hours; consultations 2 hours. What amounts to 1.88 ECTS credits |
| Relation of course learning outcomes to the learning outcomes of the field of study | Code for the modular effect - code for the specific effect<br>K1 – ZI_W02,<br>S1 – ZI_U05, ZI_U08, ZI_U09<br>S2 – ZI_U05, ZI_U08, ZI_U09<br>Sc1 – ZI_K04 |

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|---|---|
| Field of study | Management and Production Engineering |
| Course title | **Computer systems in management and accountancy**<br>*Systemy informatyczne w zarządzaniu i rachunkowości* |
| Language | English |
| Type of the course | elective |
| Level of study | Second-cycle studies |
| Form of study | S – full-time |
| Year of study | 2 |
| Semester of study | II |
| Number of ECTS credits (contact/non-contact) | 4 (1.88/2.12) |
| Academic title/degree, name and surname of the person responsible for the course | Artur Kraszkiewicz, Associate professor |
| Didactic unit offering a course | Department of Machine Operation and Production Process Management |
| Objective of the course | The aim of the course is to provide knowledge of the operation and structure of IT systems used in management and accounting, as well as the functionality of the recording and analytical solutions used in them, as well as the prospects for standardization and development of accounting support systems in enterprises. |
| Learning outcomes | **Knowledge:** |
| | K1. Knows the structure of IT systems used in management and accounting. |
| | K2. Knows the functionality of recording and analytical solutions, as well as the possibilities of development and standardization used in management and accounting IT systems. |
| | **Skills:** |
| | S1. Is able to obtain the appropriate IT system for a given type of enterprise. |
| | S2. Is able to prepare the selected solution for work. |
| | **Social competences:** |
| | Sc1. Has competences to organize team work in the work environment. |
| | Sc2. Able to act in an entrepreneurial manner that motivates regular improvement. |
| Pre-requisites | Integrated management systems |
| Course contents | Lectures include: Computer systems used in accounting, characteristics and requirements of the Accounting Act. Substantive settings – chart of accounts. Substantive settings - balance sheet. Substantive settings – reporting. Records of economic events - own. Records of economic events - external. Data reporting. Financial analysis. Mandatory financial reporting. Implementation of IT systems – critical points. Implementation costs. Selection of accounting IT systems. Requirements for modern IT systems. The classes include: Introduction, program, terminology, IT systems as information systems. Practical classes in using the accounting system. Methods of calculating the costs of implementing IT systems. |
| References | Obligatory literature:<br>1. Symfonia Finance and Accounting program manual or ERP<br>Recommended literature:<br>1. Selected items of English-language professional literature presented during classes |
| Teaching methods | discussion, lecture, case studies |
| Assessment methods | Ways to verify the achieved learning outcomes:<br>K1 – written work,<br>K2 – written work, |

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| | S1 – assessment of the implementation of a given accounting model,<br>S2 – assessment of the implementation of a given accounting model,<br>Sc1 – assessment of the student's work as a leader and member of the team performing the classes,<br>Sc2 – assessment of the student's work as a leader and member of the team performing the classes.<br>Forms of documenting achieved results: tests, instructor's diary, pass grade. |
| Elements and weights affecting the final grade | Detailed criteria for assessing colloquiums and control works<br>1) the student demonstrates a sufficient (3.0) degree of knowledge or skills when he or she obtains from 51 to 60% of the total points determining the maximum level of knowledge or skills in a given subject (respectively, in the case of a partial pass - its part),<br>2) the student demonstrates a sufficient plus (3.5) degree of knowledge or skills when he or she obtains from 61 to 70% of the sum of points determining the maximum level of knowledge or skills in a given subject (respectively - its part),<br>3) the student demonstrates a good degree (4.0) of knowledge or skills when he obtains from 71 to 80% of the total points determining the maximum level of knowledge or skills in a given subject (respectively - its part),<br>4) the student demonstrates a plus good degree (4.5) of knowledge or skills when he or she obtains from 81 to 90% of the sum of points determining the maximum level of knowledge or skills in a given subject (respectively - its part),<br>5) a student demonstrates a very good degree (5.0) of knowledge or skills when he or she obtains more than 91% of the sum of points determining the maximum level of knowledge or skills in a given subject (respectively - its part).<br>Final grade – grade from the written pass grade 100% |
| ECTS credits balance | CONTACT<br>Form of classes Number of hours ECTS points<br>lectures 15<br>classes 30<br>consultations 2<br>Total contact time 47 hours 1.88 points ECTS<br><br>NON-CONTACT<br>Form of classes Number of hours ECTS points<br>preparation for classes 15<br>project preparation 5<br>studying literature 15<br>preparation for pass grade 18<br>Total non-contact 53 hours 2.12 points ECTS<br><br>The total student workload is 100 hours. which corresponds to 4 points. ECTS |
| Workload related to classes requiring the direct participation of an academic teacher | Participation in lectures – 15 hours<br>Participation in classes – 30 hours<br>Participation in consultations – 2 hours<br>Total 47 hours which is 1.88 points ECTS |
| Relation of course learning outcomes to the learning outcomes of the field of study | Modular Effect Code – Directional Effect Code:<br>K1 – ZI_W05, K2 – ZI_W08, S1 – ZI_U03, S2 – ZI_U05, Sc1 – ZI_K01, Sc2 – ZI_K05 |

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| The name of the field study | Management and Production Engineering |
| Course title | Diploma Seminar 1 |
| Language | English |
| Type of the course | obligatory |
| Level of study | Second-cycle studies |
| Form of study | S – full-time |
| Year of study | II |
| Semester of study | 2 |
| Number of ECTS credits (contact/non-contact) | 1 (0.68/0.32) |
| Academic title/degree, name and surname of the person responsible for the course | Vice-Dean of the Faculty of Production Engineering |
| Didactic unit offering a course | Faculty of Production Engineering |
| Objective of the course | The aim of the course is to familiarize students with the methodology of carrying out scientific and research work, in particular formulating the topic of work in relation to a specific research problem, defining research hypotheses, the main goal and specific objectives of the work, and selecting an appropriate research method. During the seminar, the latest achievements in the field of master's theses are presented in the aspect of the thesis topic corresponding to the field of study. |
| Learning outcomes | Knowledge: |
| | 1. he student knows advanced methods and tools for analyzing and presenting data in the field of management and production engineering. |
| | 2. Student knows extended development trends and research methods of individual areas of the company's activity. |
| | Skills: |
| | 1. The student is able to perform analyzes related to management and production engineering under the supervision of a research supervisor. |
| | 2. The student is able to prepare written works in the field of management and production engineering. |
| | Social competence: |
| | 1. The student is ready to work in a group, organize and manage the work of teams (project, task, etc.) and organization in the work environment. |
| | 2. The student understands the need to acquire knowledge independently. |
| Pre-requisites | Previously completed study program. |
| Course contents | Types and examples of diploma theses, rules for presenting theses of scientific works. Preparing a work plan. Describing the problem, defining key work terms and preparing a work outline. Searching for source materials (databases, citation rules). The most common basic mistakes when writing diploma theses. Presentation of an outline with elements of the work by the seminar participants and a joint discussion under the supervision of the lecturer on the vision of implementing the master's thesis. |
| References | 1. The literature includes items related to the topic of the diploma thesis.<br>2. The literature is agreed upon during consultations with the diploma thesis supervisor |
| Teaching methods | analysis and interpretation of the diploma thesis issues, discussion, presentation of outlines along with selected elements of the diploma thesis ines |
| Assessment methods | Ways of verifying the achieved learning outcomes:<br>Knowledge:<br>K1, K2 – knowledge presented during the seminar. |

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| | Skills:<br>S1, S2 – assessment of the master's thesis outline.<br>Social competence:<br>SC1, SC2 – assessment of students' work and oral statements.<br><br><u>Forms of documenting the achieved results:</u><br>Outlines of the master's thesis, elements of the master's thesis, teacher's journal |
| Elements and weights affecting the final grade | The basis for passing diploma seminar 1 is preparing an outline of the master's thesis together with selected elements of the work and the knowledge presented during the seminar - 100% |
| ECTS credits balance | - participation in classes – 15 hours / 0.60 ECTS<br>- participation in consultations – 2 hours / 0.08 ECTS<br>- preparing an outline – 3 hours / 0.12 ECTS<br>- studying literature – 5 hours / 0.20 ECTS<br>The total student workload is 25 hours which corresponds to 1 ECTS point. |
| Workload related to classes requiring the direct participation of an academic teacher | - participation in classes – 15 hours / 0.60 ECTS<br>- participation in consultations – 2 hours / 0.08 ECTS<br>Total 17 hours which is 0.68 ECTS points. |
| Relation of course learning outcomes to the learning outcomes of the field of study | K1 – ZI_W02<br>K2 – ZI_W08<br>S1 – ZI_U07<br>S2 – ZI_U10<br>SC1 – ZI_K01<br>SC2 – ZI_K05 |

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| The name of the field study | Management and Production Engineering |
| Course title | Business management in practice |
| Language | English |
| Type of the course | Elective – C block |
| Level of study | Second-cycle studies |
| Form of study | S – full-time |
| Year of study | II |
| Semester of study | 3 |
| Number of ECTS credits (contact/non-contact) | 2 (1.88/0.12) |
| Academic title/degree, name and surname of the person responsible for the course | PhD. Monika Stoma, associate professor |
| Didactic unit offering a course | Department of Power Engineering and Transportation/Subdepartment of Logistic and Business Management |
| Objective of the course | The aim of the course is to provide students with knowledge of contemporary trends in management. The aim is to effectively analyze difficult decision-making situations, formulate appropriate questions and conclusions, make the best decisions (situational method), guess and understand the positions of people involved on both sides of conflict situations and solve them through skilful negotiations, quick access and collection of appropriate data and information, their analysis and drawing conclusions to make optimal decisions (case analysis method). In addition, the aim is to develop the ability to use basic optimization tools in solving managerial problems and in formulating conclusions regarding ongoing economic processes, primarily strategic planning and decision-making. |
| Learning outcomes | Knowledge: |
| | 1. The student understands and is able to recognize the processes and phenomena taking place in the organization and characterize the processes of planning, decision-making, organizing work processes and the application of control processes, and use basic functions to simulate various solutions and decisions during management games. |
| | 2. The student has the knowledge to define, describe and explain management problems and is able to explain the basic issues of planning and decision-making in various operating conditions of modern organizations requiring an unconventional approach in accordance with the implemented simulation variant. |
| | Skills: |
| | 1. The student is able to use the information obtained, analyze the internal and external environment of the organization, indicate the goals of enterprises due to the specificity of the types of activities carried out. |
| | 2. The student has the ability to characterize the organization's goals in the context of making effective decisions in the case of various variants of managerial decisions. |
| | Social competence: |
| | 1. The student is able to communicate effectively with the environment and to convince people of their reasons - they can cooperate and work in a group, but also have the necessary analytical skills to implement assumptions in the enterprise management process. Is willing to express opinions and convey his knowledge using various media. |
| Pre-requisites | Completing the course assumes having basic knowledge of management, marketing and economics. |
| Course contents | The lectures include: |

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| | Issues related to contemporary trends in the field of organization management. First of all, modern management concepts in practice are presented, with emphasis on economic analysis tools supporting managerial decision-making in enterprises, including in conditions of uncertainty and incomplete information. The issues discussed concern the types of management games and the goals they pursue, as well as a description of the game's elements and participants. The methods of educating managers are defined, as well as the characteristics of the concept of simulation and simulation models.<br>The classes include:<br>During the exercises, students, divided into groups, play a selected game, which may be an instruction to perform a task, or a board on which, according to the instructions, specific actions, decisions or operations must be performed. Another form is exercises in the form of case studies or computer games. |
| References | 1. Riis J.O. Simulation Games and Learning in Production Management, 2016, Springer US<br>2. Adams E. Fundamentals of Construction and Simulation Game Design,, 2013, Pearson Education<br>3. Teachers' own materials<br>4. Game instructions licensed by GrowinGame.pl |
| Teaching methods | Discussing issues based on diagrams and illustrations, presenting selected phenomena using didactic models. Work in groups using boards, case studies or other dedicated teaching materials. Solving practical problems in the field of organization management, working in small groups, discussion in the forum of the entire exercise group. |
| Assessment methods | Ways of verifying the achieved learning outcomes:<br>Knowledge:<br>K1- Observation of the student and discussion of the result of his/her actions when solving decision-making problems,<br>K2 – Participation in a discussion during classes checking knowledge of the problems of contemporary managerial management.<br>Skills:<br>S1. Participation in group exercises, participation in group discussions.<br>S2. Class work, completed with a report on the management game - checking knowledge of contemporary management problems - carried out during each class ending the game stage.<br>Social competence:<br>SC1. Participation in team exercises during classes, oral answers during classes, activity.<br><br>Forms of documenting the achieved results:<br>Game reports, worksheets, teacher's journal |
| Elements and weights affecting the final grade | Game reports, worksheets – 60%<br>Activity during classes - 40% |
| ECTS credits balance | - participation in lectures – 15 hours / 0.60 ECTS<br>- participation in classes – 30 hours / 1.20 ECTS<br>- participation in consultations – 2 hours / 0.08 ECTS<br>- preparation for classes – 3 hours / 0.12 ECTS<br>The total student workload is 50 hours which corresponds to 2 ECTS points. |
| Workload related to classes requiring the direct participation of an academic teacher | - participation in lectures – 15 hours / 0.60 ECTS<br>- participation in classes – 30 hours / 1.20 ECTS<br>- participation in consultations – 2 hours / 0.08 ECTS |

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| | Total 47 hours which is 1.88 points. ECTS |
| Relation of course learning outcomes to the learning outcomes of the field of study | K1 - ZI_W02<br>K2 - ZI_W02<br>S1 - ZI_U01<br>S2 - ZI_U04, ZI_U09<br>SC1 - ZI_K03, ZI_K05 |

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| The name of the field study | Management and Production Engineering |
| Course title | Simulation management games |
| Language | English |
| Type of the course | elective |
| Level of study | Second-cycle studies |
| Form of study | S – full-time |
| Year of study | II |
| Semester of study | 3 |
| Number of ECTS credits (contact/non-contact) | 2 (1.88/0.12) |
| Academic title/degree, name and surname of the person responsible for the course | PhD. Monika Stoma, associate professor |
| Didactic unit offering a course | Department of Power Engineering and Transportation/Subdepartment of Logistic and Business Management |
| Objective of the course | The aim of the course is to provide students with knowledge of contemporary trends in management. The aim is to effectively analyze difficult decision-making situations, formulate appropriate questions and conclusions, make the best decisions (situational method), guess and understand the positions of people involved on both sides of conflict situations and solve them through skilful negotiations, quick access and collection of appropriate data and information, their analysis and drawing conclusions to make optimal decisions (case analysis method). In addition, the aim is to develop the ability to use basic optimization tools in solving managerial problems and formulating conclusions regarding ongoing economic processes, especially planning. |
| Learning outcomes | Knowledge: |
| | 1. The student understands and is able to recognize the processes and phenomena taking place in the organization and characterize the processes of planning, decision-making, organizing work processes and the use of control processes, and use basic functions to simulate various solutions and decisions during management games. |
| | 2. The student has the knowledge to define, describe and explain management problems and is able to explain the basic issues of planning and decision-making in various operating conditions of modern organizations requiring an unconventional approach in accordance with the implemented simulation variant. |
| | Skills: |
| | The student is able to use the information obtained, analyze the internal and external environment of the organization, indicate the goals of enterprises due to the specificity of the types of activities carried out. |
| | 2. The student has the ability to characterize the organization's goals in the context of making effective decisions in the case of various variants of managerial decisions. |
| | Social competence: |
| | 1. The student is able to communicate effectively with the environment and to convince people of their reasons - they can cooperate and work in a group, but also have the necessary analytical skills to implement assumptions in the enterprise management process. Is willing to express opinions and convey his knowledge using various media. |
| Pre-requisites | Completing the course assumes having basic knowledge of management, marketing and economics. |
| Course contents | The lectures include: |

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| | Issues related to contemporary trends in the field of organization management. First of all, modern management concepts in practice are presented, with emphasis on economic analysis tools supporting managerial decision-making in enterprises, including in conditions of uncertainty and incomplete information. The issues discussed concern the types of management games and the goals they pursue, as well as a description of the game's elements and participants. The methods of educating managers are defined, as well as the characteristics of the concept of simulation and simulation models. Classifications of management simulation games are presented, as well as the effectiveness of didactic simulation games.<br>The classes include:<br>During the exercises, students, divided into groups, play a selected game, which may be an instruction to perform a task, or a board on which, according to the instructions, specific actions, decisions or operations must be performed. Another form is exercises in the form of case studies or computer games. |
| References | 1. Riis J.O. Simulation Games and Learning in Production Management, 2016, Springer US<br>2. Adams E. Fundamentals of Construction and Simulation Game Design,, 2013, Pearson Education<br>3. Teachers' own materials<br>4. Game instructions licensed by GrowinGame.pl |
| Teaching methods | Discussing issues based on diagrams and illustrations, presenting selected phenomena using didactic models. Work in groups using boards, case studies or other dedicated teaching materials. Solving practical problems in the field of organization management, working in small groups, discussion in the forum of the entire exercise group. |
| Assessment methods | Ways of verifying the achieved learning outcomes:<br>Knowledge:<br>K1- Observation of the student and discussion of the result of his/her actions when solving decision-making problems,<br>K2 – Participation in a discussion during classes checking knowledge of the problems of contemporary managerial management.<br>Skills:<br>S1. Participation in group exercises, participation in group discussions.<br>S2. Class work, completed with a report on the management game - checking knowledge of contemporary management problems - carried out during each class ending the game stage.<br>Social competence:<br>SC1. Participation in team exercises during classes, oral answers during classes, activity.<br><br>Forms of documenting the achieved results:<br>Game reports, worksheets, teacher's journal |
| Elements and weights affecting the final grade | Game reports, worksheets – 60%<br>Activity during classes - 40% |
| ECTS credits balance | - participation in lectures – 15 hours / 0.60 ECTS<br>- participation in classes – 30 hours / 1.20 ECTS<br>- participation in consultations – 2 hours / 0.08 ECTS<br>- preparation for classes – 3 hours / 0.12 ECTS<br>The total student workload is 50 hours which corresponds to 2 ECTS points. |

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| Workload related to classes requiring the direct participation of an academic teacher | - participation in lectures – 15 hours / 0.60 ECTS<br>- participation in classes – 30 hours / 1.20 ECTS<br>- participation in consultations – 2 hours / 0.08 ECTS<br>Total 47 hours which is 1.88 points. ECTS |
| Relation of course learning outcomes to the learning outcomes of the field of study | K1 - ZI_W02<br>K2 - ZI_W02<br>S1 - ZI_U01<br>S2 - ZI_U04, ZI_U09<br>SC1 - ZI_K03, ZI_K05 |

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| The name of the field study | Management and Production Engineering |
| Course title | Quality Management System |
| Language | English |
| Type of the course | obligatory |
| Level of study | Second-cycle studies |
| Form of study | S – full-time |
| Year of study | II |
| Semester of study | 3 |
| Number of ECTS credits (contact/non-contact) | 3.00 (1.88/1.12) |
| Academic title/degree, name and surname of the person responsible for the course | Prof. Sławomir Kocira |
| Didactic unit offering a course | Department of Machinery Exploitation and Management of Production Processes |
| Objective of the course | The objective of the course is to familiarize students with the problems of implementing quality management systems in an organization. To learn the principles of selecting a quality management system and choosing the process of its implementation. |
| Learning outcomes | Knowledge: |
| | K1. Understands the principles related to the application of quality management systems in organizations. |
| | Skills: |
| | S1. Is able to select an appropriate quality management system for the organization. |
| | S2. Is able to define the organization's needs related to quality management systems. |
| | Social competence: |
| | SC1. Is ready to lead human teams and is aware of responsibilities and duties in this regard |
| Pre-requisites | No pre-requisites |
| Course contents | Introduction. Integrated quality control . Contemporary developments in the field of quality management . The role of quality control in the modern enterprise. Responsibility as a result of poor quality. Quality and standardization . The reasons for the introduction of standards for quality management systems. The development path of a series of ISO 9000 standards. Functional scheme of the company without / with the quality management system . Overview of the requirements of ISO 9000 , ISO 9001 and ISO 9004th The establishment of a quality management system. Prerequisites that a company must fulfill. Structure of the documentation. Implementation of documented system . Judgment and witnessing system. Internal judgment . The national system of accreditation. External independent judgment. |
| References | Goetsch, D. L., & Davis, S. B. (2016). Quality management for organizational excellence: Introduction to total quality. pearson.<br>Tricker, R. (2019). Quality management systems: A practical guide to standards implementation. Routledge.<br>Norms ISO 9001, 14000, 45001 |
| Teaching methods | lectures, classes, group work, practical work |
| Assessment methods | K1 – final test<br>S1 – final test, project<br>S2 – final test, project<br>Sc1 – final test |
| Elements and weights affecting the final grade | The average of the grades of the control paper and the written colloquium of the (classes) 50%<br>written colloquium (lectures) 50% |

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| ECTS credits balance | – Lecture – 15 hours,<br>– Classes - 30 hours.<br>– Consultation - 2 hours<br>– Classes preparation - 5 hours<br>– Literature studies - 10 hours<br>– Preparation for the colloquia - 13 hours<br>Total student workload is 75 hours which equals 3.00 ECTS credits |
| Workload related to classes requiring the direct participation of an academic teacher | Attendance in lectures - 15 hours; in classes - 30 hours; consultations 2 hours. What amounts to 1.88 ECTS credits |
| Relation of course learning outcomes to the learning outcomes of the field of study | Code for the modular effect - code for the specific effect<br>K1 – ZI_W02,<br>S1 – ZI_U05, ZI_U08, ZI_U09<br>S2 – ZI_U05, ZI_U08, ZI_U09<br>SC1 – ZI_K01 |

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| The name of the field study | Management and Production Engineering |
| Course title | Event marketing |
| Language | English |
| Type of the course | obligatory |
| Level of study | Second-cycle studies |
| Form of study | S – full-time |
| Year of study | II |
| Semester of study | 3 |
| Number of ECTS credits (contact/non-contact) | 4 (2/2) |
| Academic title/degree, name and surname of the person responsible for the course | Professor dr. Dariusz Dziki |
| Didactic unit offering a course | Department of Thermal Technology and Food Process Engineering |
| Objective of the course | Sharing knowledge about event marketing and organizing various types of events. |
| Learning outcomes | Knowledge: |
| | 1. Has knowledge of event marketing. |
| | 2. Is familiar with model solutions for organizing events. |
| | Skills: |
| | 1. Can organize events. |
| | 2. Can prepare an event project. |
| | Social competence: |
| | 1. Is ready to organize and lead team work. |
| Pre-requisites | Production management and services |
| Course contents | The lectures cover: Event marketing and event management. Types of events. Traditional business meetings and parties. Advanced business meetings and parties. Estimating the event budget. Preliminary plan and cost estimate. Organization and deadlines. Event location and transportation. Event design and scenography. SWOT analysis in relation to events. Invitations and staff. Local requirements. Sponsors. Event catering. Identifying potential threats. Competitive analysis. Code of conduct and formal standards. Reporting and analyzing results. Event cost sheets. Payment schedules. Psychology of events.<br><br>The classes include: Planning, execution, and presentation of the event project. |
| References | Obligatory literature:<br>Judy Allen. Event Planning: The Ultimate Guide To Successful Meetings, Corporate Events, Fundraising Galas, Conferences, Conventions, Incentives and Other Special Events 2nd Edition. 2000. |
| Teaching methods | - Lecture<br>- Discussion<br>- Problem-solving<br>- Utilizing instructional materials |
| Assessment methods | K1 - Written exam.<br>K2 - Written paper.<br>S1, S2 - Presentation and performance assessment.<br>SC1 - Presentation assessment<br>Methods of documenting the achieved results: exams, instructor's journal, problem-solving assignments, presentations. |
| Elements and weighs affecting the final grade | Exam 60%<br>Project 10%<br>Test 30% |

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| ECTS credits balance | **Contact**<br>**Form of lecture Number of hours ECTS**<br>Lecture 15 h 0.60<br>Classes 30 h 1.20<br>Consultation 2 h 0.08<br>Exam 3 h 0.12<br>**Total 50 h 2.00 ECTS**<br><br>**No-contact**<br>Preparation for exercises 35 h 1.40<br>Preparation for tests 15 h. 0.60<br>**Total 50 h 2.00 ECTS**<br><br>The total student workload is 100 hours, which corresponds to 4 ECTS credits |
| Workload related to classes requiring the direct participation of an academic teacher | Participation in lectures - 15 hours.<br>Participation in classes - 30 hours.<br>Participation in consultations - 2 hour.<br>Participation in quizzes - 3 hours.<br><br>In total, this amounts to 50 hours, which corresponds to 2.0 ECTS credits. |
| Relation of course learning outcomes to the learning outcomes of the field of study | K1 - ZI_W04<br>K2 – ZI_W01<br>S1, S2 – ZI_U07<br>SC1 – ZI_K01 |

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| The name of the field study | Management and Production Engineering |
| Course title | Risk analysis and management |
| Language | English |
| Type of the course | obligatory |
| Level of study | Second-cycle studies |
| Form of study | S – full-time |
| Year of study | II |
| Semester of study | 3 |
| Number of ECTS credits (contact/non-contact) | 4 (1.96/2.04) |
| Academic title/degree, name and surname of the person responsible for the course | Dr Leszek Rydzak, assistant professor |
| Didactic unit offering a course | Department of Biological Bases of Food and Feed Technologies |
| Objective of the course | The aim of the course is to provide knowledge that constitutes broadly understood risk analysis and its role in management. In particular, this applies to risk identification, its estimation, evaluation and planning of responses to its occurrence |
| Learning outcomes | Knowledge, the graduate knows and understands: |
| | 1. economic, legal and social issues that enable the description and analysis of the processes of production, in particular risk analysis. Student has the knowledge of risk management |
| | Skills: |
| | 1. evaluate processes taking into account many aspects and situations and is able to analyze risks and take actions to solve expected problems in the future |
| | Social competence: |
| | 1. act with awareness of the risk of various events occurring and is able to assess the effects of activities conducted in risky conditions |
| Pre-requisites | no entry requirements |
| Course contents | What is risk and what is the purpose of risk management. Risk management strategy. Risk diagnosis. Risk analysis and assessment. Risk monitoring. Risk register. Bad risk management practices. Good practices in risk management. |
| References | 1. D. Galai, R. Mark, The Essentials of Risk Management, 3e. MCGRAW HILL BOOK CO, 2023<br>2. D. Hillson, Risk Management Handbook. Kogan Page, 2016 |
| Teaching methods | lecture, discussion, case studies |
| Assessment methods | Learning outcomes:<br>Knowledge – exam<br>Skill – exam<br>Social competence - exam |
| Elements and weights affecting the final grade | Activity – 10%<br>Exam – 90% |
| ECTS credits balance | **<u>Contacts</u>**<br>Lectures - 15h – 0.6 ECTS credits<br>Classes – 30h – 1.2 ECTS credits<br>Consultations – 2h – 0.08 ECTS credits<br>Exam – 2h – 0.08 ECTS credits<br>**Total – 49h – 1.96 ECTS credits**<br><br>**<u>Non contacts</u>**<br>Literature study – 20h – 0.80 ECTS credits<br>Preparation for classes – 20h - 0.80 ECTS credits<br>Preparation for exam – 11h - 0.44 ECTS credits<br>**Total – 51h – 2.04 ECTS credits** |

| | **The total student workload is 100 hours. which corresponds to 4 ECTS credits** |
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| Workload related to classes requiring the direct participation of an academic teacher | Lectures - 15h<br>Classes – 30h<br>Consultations – 2h<br>Exam – 2h<br>**Total – 49h** |
| Relation of course learning outcomes to the learning outcomes of the field of study | Knowledge 1 – ZI_W02<br>Skills 1 – ZI_U09<br>Social competence 1 – ZI_K04 |

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| The name of the field study | Management and Production Engineering |
| Course title | Diploma Seminar 2 |
| Language | English |
| Type of the course | obligatory |
| Level of study | Second-cycle studies |
| Form of study | S – full-time |
| Year of study | II |
| Semester of study | 3 |
| Number of ECTS credits (contact/non-contact) | 2 (1.28/0.72) |
| Academic title/degree, name and surname of the person responsible for the course | Vice-Dean of the Faculty of Production Engineering |
| Didactic unit offering a course | Faculty of Production Engineering |
| Objective of the course | The aim of the course is to familiarize students with the methodology of carrying out scientific and research work, in particular formulating the topic of work in relation to a specific research problem, defining research hypotheses, the main goal and specific objectives of the work, and selecting an appropriate research method. During the seminar, the latest achievements in the field of master's theses are presented in the aspect of the thesis topic corresponding to the field of study. |
| Learning outcomes | Knowledge: |
| | 1. The student knows advanced methods and tools for analysing and presenting data in the field of management and production engineering in the scope of the subject of the master's thesis. |
| | 2. Student knows extended development trends and research methods of individual areas of the company's activity. |
| | Skills: |
| | 1. The student is able to perform analyses related to management and production engineering under the supervision of a research supervisor. |
| | 2. The student is able to prepare written works in the field of management and production engineering. |
| | Social competence: |
| | 1. The student is ready to work in a group, organize and manage the work of teams (project, task, etc.) and organization in the work environment. |
| | 2. The student understands the need to acquire knowledge independently. |
| Pre-requisites | Previously completed study program. |
| Course contents | Types and examples of diploma theses, rules for presenting theses of scientific works. Description of the problem, editing of the remaining chapters of the work. Searching for source materials (databases, citation rules). The most common basic mistakes when writing diploma theses. Presentation of chapters of the work by the seminar participants and joint discussion under the supervision of the lecturer on the vision of the implementation of the master's thesis. |
| References | 1. The literature includes items related to the topic of the diploma thesis.<br>2. The literature is agreed upon during consultations with the diploma thesis supervisor. |
| Teaching methods | analysis and interpretation of the diploma thesis issues, discussion, presentations of completed work stages |
| Assessment methods | Ways of verifying the achieved learning outcomes:<br>Knowledge:<br>K1, K2 – knowledge presented during the seminar.<br>Skills:<br>S1, S2 – assessment of master's thesis chapters. |

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| | Social competence:<br>SC1, SC2 – assessment of students' work and oral statements.<br><br><u>Forms of documenting the achieved results:</u><br>Master's thesis chapters, teacher's journal |
| Elements and weights affecting the final grade | The basis for passing diploma seminar 2 is preparing chapters of a master's thesis together with selected elements of the work and the knowledge presented during the seminar - 100% |
| ECTS credits balance | - participation in classes – 30 hours / 1.20 ECTS<br>- participation in consultations – 2 hours / 0.08 ECTS<br>- preparing chapters of a master's thesis – 13 hours / 0.52 ECTS<br>- studying literature – 5 hours / 0.20 ECTS<br>The total student workload is 50 hours which corresponds to 2 ECTS points. |
| Workload related to classes requiring the direct participation of an academic teacher | - participation in classes – 30 hours / 1.20 ECTS<br>- participation in consultations – 2 hours / 0.08 ECTS<br>Total 32 hours which is 1.28 ECTS points. |
| Relation of course learning outcomes to the learning outcomes of the field of study | K1 – ZI_W02<br>K2 – ZI_W08<br>S1 – ZI_U07<br>S2 – ZI_U10<br>SC1 – ZI_K01<br>SC2 – ZI_K05 |