

**Study programme****Part A) of the study programme****Learning outcomes**

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| <b>Faculty offering the field of study:</b>                                                                                                     |                                                                                                                                                                                         | <b>Faculty of Pharmacy</b>                                                                               |
| <b>Field of study:</b>                                                                                                                          |                                                                                                                                                                                         | <b>Pharmacy</b>                                                                                          |
| <b>Level of study:</b>                                                                                                                          |                                                                                                                                                                                         | <b>long-cycle studies</b>                                                                                |
| <b>Level of the Polish Qualifications Framework:</b>                                                                                            |                                                                                                                                                                                         | <b>level 7</b>                                                                                           |
| <b>Degree profile:</b>                                                                                                                          |                                                                                                                                                                                         | <b>general academic</b>                                                                                  |
| <b>Professional degree awarded to the graduate:</b>                                                                                             |                                                                                                                                                                                         | <b>magister farmacji</b>                                                                                 |
| <b>Allocation of the field of study within academic or artistic discipline(s), to which learning outcomes for a given field of study refer:</b> |                                                                                                                                                                                         | <b>Discipline: Pharmaceutical sciences (100%)</b><br><br><b>Main discipline: Pharmaceutical sciences</b> |
| <b>Symbol</b>                                                                                                                                   | <b>Upon completion the graduate achieves the learning outcomes specified below:</b>                                                                                                     |                                                                                                          |
| <b>KNOWLEDGE</b>                                                                                                                                |                                                                                                                                                                                         |                                                                                                          |
| <b>The graduate knows and understands:</b>                                                                                                      |                                                                                                                                                                                         |                                                                                                          |
| K_A.W1                                                                                                                                          | the anatomical structure of the human body and the fundamental relationships between structure and function in both health and disease;                                                 |                                                                                                          |
| K_A.W2                                                                                                                                          | the mechanisms governing the functioning of the human body at the molecular, cellular, tissue and systemic levels;                                                                      |                                                                                                          |
| K_A.W3                                                                                                                                          | the fundamentals of the pathophysiology of cells and systems in the human body;                                                                                                         |                                                                                                          |
| K_A.W4                                                                                                                                          | the structure, properties and biological functions of amino acids, proteins, nucleotides, nucleic acids, carbohydrates, lipids and vitamins;                                            |                                                                                                          |
| K_A.W5                                                                                                                                          | the structure and functions of biological membranes and the mechanisms of transport across membranes;                                                                                   |                                                                                                          |
| K_A.W6                                                                                                                                          | the main metabolic pathways and their interrelationships, the mechanisms regulating metabolism, and the effect of medicinal products on these processes;                                |                                                                                                          |
| K_A.W7                                                                                                                                          | the functioning of the human immune system and the mechanisms of the immune response;                                                                                                   |                                                                                                          |
| K_A.W8                                                                                                                                          | the principles of conducting immunological diagnostics, and the principles and methods of immunoprophylaxis and immunotherapy;                                                          |                                                                                                          |
| K_A.W9                                                                                                                                          | the molecular basis of cell cycle regulation, proliferation, apoptosis and tumour transformation;                                                                                       |                                                                                                          |
| K_A.W10                                                                                                                                         | the fundamentals of classical, population and molecular genetics;                                                                                                                       |                                                                                                          |
| K_A.W11                                                                                                                                         | functions and methods of studying the human genome and transcriptome, and the mechanisms regulating gene expression in areas fundamental to therapy, diagnostics and pharmacy practice; |                                                                                                          |
| K_A.W12                                                                                                                                         | molecular biology techniques in pharmaceutical biotechnology and gene therapy;                                                                                                          |                                                                                                          |
| K_A.W13                                                                                                                                         | the genetic mechanisms responsible for the development of drug resistance in microorganisms and cancer cells;                                                                           |                                                                                                          |

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| K_A.W14 | the characteristics of bacteria, viruses, fungi and parasites, as well as the basics of the aetiopathology of infectious diseases and the principles of microbiological diagnosis;      |
| K_A.W15 | the principles of disinfection and antiseptics, and the effect of antimicrobial agents on microorganisms and human health;                                                              |
| K_A.W16 | issues associated with hospital-acquired infections and the risks posed by high-alert pathogens;                                                                                        |
| K_A.W17 | pharmacopoeial requirements and methods for testing the microbiological purity and sterility of medicinal products;                                                                     |
| K_A.W18 | microbiological methods for testing the mutagenic potential of medicinal products;                                                                                                      |
| K_A.W19 | the morphological and anatomical characteristics of prokaryotes, fungi and plants that provide medicinal raw materials and substances used in pharmacy;                                 |
| K_B.W1  | the physical basis of physiological processes, including circulation, nerve conduction, gas exchange, movement and the exchange of substances;                                          |
| K_B.W2  | the impact of physical and chemical environmental factors on the human body;                                                                                                            |
| K_B.W3  | the biophysical basis of diagnostic and therapeutic techniques;                                                                                                                         |
| K_B.W4  | the properties of elements, including radioactive isotopes, in relation to their use in the diagnosis and treatment of diseases;                                                        |
| K_B.W5  | the mechanisms underlying the formation of chemical bonds and the types of chemical bonds, as well as the mechanisms of intermolecular interactions;                                    |
| K_B.W6  | types and properties of solutions, and methods for preparing them;                                                                                                                      |
| K_B.W7  | basic types of chemical reactions;                                                                                                                                                      |
| K_B.W8  | pharmacopoeial methods for the identification of inorganic substances;                                                                                                                  |
| K_B.W9  | pharmacopoeial methods of quantitative analysis;                                                                                                                                        |
| K_B.W10 | spectroscopic, electrochemical, chromatographic and mass spectrometric techniques used in pharmaceutical sciences;                                                                      |
| K_B.W11 | criteria for selecting an analytical method and principles for its validation;                                                                                                          |
| K_B.W12 | the fundamentals of thermodynamics and chemical kinetics;                                                                                                                               |
| K_B.W13 | the physical chemistry of multiphase systems and surface phenomena in the context of pharmaceutical technology;                                                                         |
| K_B.W14 | the structure and properties of organic compounds in the context of pharmaceutical technology, and the terminology used in this field;                                                  |
| K_B.W15 | types and mechanisms of chemical reactions involving organic compounds;                                                                                                                 |
| K_B.W16 | the structure, properties and methods of production of polymers used in pharmaceutical technology;                                                                                      |
| K_B.W17 | statistical methods used in the pharmaceutical sciences.                                                                                                                                |
| K_C.W1  | fundamental issues in philosophy (metaphysics, epistemology, axiology and ethics);                                                                                                      |
| K_C.W2  | psychological tools and principles of interpersonal communication with patients, their families or carers, doctors and other healthcare professionals;                                  |
| K_C.W3  | principles of knowledge transfer to others, and basic forms and methods of conveying information using teaching aids in the context of teaching, training and professional development; |
| K_C.W4  | the social determinants and limitations arising from illness and disability;                                                                                                            |
| K_C.W5  | the psychological and social aspects of attitudes and support activities;                                                                                                               |
| K_C.W6  | principles of motivating patients to adopt health-promoting behaviours;                                                                                                                 |
| K_C.W7  | the history of pharmacy and the profession of pharmacist;                                                                                                                               |
| K_C.W8  | basic concepts in ethics, professional ethics and bioethics, as well as issues relating to the professional ethics of pharmacists;                                                      |
| K_C.W9  | ethical principles of modern pharmaceutical marketing;                                                                                                                                  |
| K_C.W10 | patients' rights;                                                                                                                                                                       |
| K_C.W11 | principles of teamwork;                                                                                                                                                                 |

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| K_C.W12 | the concept of intellectual property, the sources of law and protection of intellectual property, the types of intellectual property protection, and the consequences of infringement;                                                           |
| K_D.W1  | the classification of medicinal substances according to the Anatomical Therapeutic Chemical (ATC) system;                                                                                                                                        |
| K_D.W2  | relationships between the chemical structure, physicochemical properties and mechanisms of action of substances;                                                                                                                                 |
| K_D.W3  | the structure of the pharmacopoeia and its significance for the quality of medicinal substances and products;                                                                                                                                    |
| K_D.W4  | methods used in the quality assessment of substances for pharmaceutical purposes and in the analysis of medicinal products, as well as procedures for validating these methods;                                                                  |
| K_D.W5  | the stability of active substances, their possible degradation reactions, and factors affecting their stability;                                                                                                                                 |
| K_D.W6  | issues related to falsified medicinal products;                                                                                                                                                                                                  |
| K_D.W7  | methods for the manufacture of representative active substances;                                                                                                                                                                                 |
| K_D.W8  | requirements concerning the description of the manufacturing process and the quality assessment of a medicinal substance in the documentation for marketing authorisation procedures;                                                            |
| K_D.W9  | methods for the preparation and separation of optically active medicinal substances, and methods for obtaining various polymorphic forms;                                                                                                        |
| K_D.W10 | methods for the discovery of new medicinal substances;                                                                                                                                                                                           |
| K_D.W11 | issues related to patent protection of substances for pharmaceutical purposes and medicinal products;                                                                                                                                            |
| K_D.W12 | the physicochemical and functional properties of basic excipients used in drug form technology;                                                                                                                                                  |
| K_D.W13 | conditions for the cultivation of living cells and organisms, as well as processes used in pharmaceutical biotechnology, including the purification of the resulting substances;                                                                 |
| K_D.W14 | methods for optimising process parameters in pharmaceutical biotechnology;                                                                                                                                                                       |
| K_D.W15 | forms of biopharmaceuticals and issues related to their stability;                                                                                                                                                                               |
| K_D.W16 | the requirements that biological medicinal products must meet, and the rules governing the placing on the market of biological medicinal products;                                                                                               |
| K_D.W17 | the characteristics of a biological medicinal product, and the classification of biopharmaceuticals, including recombinant human proteins, fusion proteins, monoclonal antibodies and antisense oligonucleotides;                                |
| K_D.W18 | the requirements for different drug forms of medicinal products and the principles governing the selection of a medicinal product's drug form depending on the properties of the active substance and the intended use of the medicinal product; |
| K_D.W19 | advanced therapy medicinal products;                                                                                                                                                                                                             |
| K_D.W20 | essential vaccines, guidelines for their use and storage;                                                                                                                                                                                        |
| K_D.W21 | basic blood-derived and blood substitute products and methods of their preparation;                                                                                                                                                              |
| K_D.W22 | nomenclature, composition and properties of individual drug forms;                                                                                                                                                                               |
| K_D.W23 | principles for selecting drug forms in enteral nutrition;                                                                                                                                                                                        |
| K_D.W24 | principles for the preparation and control of compounded medicines and their shelf life;                                                                                                                                                         |
| K_D.W25 | types of physicochemical incompatibilities between the components of pharmaceutical preparations;                                                                                                                                                |
| K_D.W26 | basic manufacturing processes and equipment used in the technology of drug forms;                                                                                                                                                                |
| K_D.W27 | methods for the preparation of liquid, semi-solid and solid drug forms on a laboratory and industrial scale, and the influence of manufacturing process parameters on the properties of drug forms;                                              |

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| K_D.W28 | methods of aseptic practice and ensuring the sterility of medicinal products, substances and materials;                                                                                                          |
| K_D.W29 | types of packaging and dispensing systems;                                                                                                                                                                       |
| K_D.W30 | the Good Manufacturing Practice requirements set out in the regulations issued pursuant to Article 39(5)(1) of the Act of 6 September 2001 – Pharmaceutical Law (Journal of Laws of 2025, item 750, as amended); |
| K_D.W31 | methods for testing the quality of a medicinal product form and the procedure for analysing a production batch;                                                                                                  |
| K_D.W32 | factors affecting the stability of a medicinal product form and methods for testing its stability;                                                                                                               |
| K_D.W33 | the scope of testing required for the documentation in marketing authorisation procedures;                                                                                                                       |
| K_D.W34 | the scope of application of risk analysis, quality by design and process-based technology in pharmaceutical manufacturing;                                                                                       |
| K_D.W35 | the principles of preparing homeopathic preparations;                                                                                                                                                            |
| K_D.W36 | elements, compounds and medicinal products labelled with isotopes, and methods for their control;                                                                                                                |
| K_D.W37 | methods for the ex tempore preparation of radiopharmaceuticals and their use in the diagnosis and treatment of diseases;                                                                                         |
| K_D.W38 | the potential applications of nanotechnology in pharmacy;                                                                                                                                                        |
| K_D.W39 | types and methods of production and quality assessment of plant-based preparations;                                                                                                                              |
| K_D.W40 | plant-based raw materials used in medicine and in the manufacture of medicinal products, medical devices and dietary supplements;                                                                                |
| K_D.W41 | groups of chemical compounds that determine the properties of plant-based raw materials and preparations;                                                                                                        |
| K_D.W42 | the main chemical compounds found in medicinal plants, their effects and their use in the treatment of diseases;                                                                                                 |
| K_D.W43 | selected methods for testing plant substances and preparations, as well as methods for isolating constituents from plant material;                                                                               |
| K_E.W1  | the processes to which a medicinal substance is subjected in the body, depending on the route and method of administration;                                                                                      |
| K_E.W2  | the structure and function of biological barriers in the body that influence the absorption and distribution of a medicinal substance;                                                                           |
| K_E.W3  | the effect of a medicinal product's formulation and route of administration on its absorption, as well as on the duration and effect of its action;                                                              |
| K_E.W4  | pharmacokinetic processes and their significance in medicinal product development and in the optimisation of pharmacotherapy;                                                                                    |
| K_E.W5  | parameters describing pharmacokinetic processes and methods for determining them;                                                                                                                                |
| K_E.W6  | physiological, pathophysiological and environmental factors influencing the course of pharmacokinetic and pharmacological processes;                                                                             |
| K_E.W7  | interactions between medicinal substances during the pharmacokinetic, pharmacodynamic and pharmaceutical phases;                                                                                                 |
| K_E.W8  | the principles of concentration-guided therapy and the guidelines for adjusting the dosage based on the patient's concentration measurement results;                                                             |
| K_E.W9  | methods for assessing pharmaceutical and bioavailability, as well as issues related to the correlation between in vitro and in vivo test results;                                                                |
| K_E.W10 | the significance of factors influencing the improvement of a medicinal product's pharmaceutical and bioavailability;                                                                                             |
| K_E.W11 | issues related to the biopharmaceutical evaluation of original and generic medicinal products, including methods for assessing bioequivalence;                                                                   |
| K_E.W12 | drug targets and mechanisms of action of active substances;                                                                                                                                                      |

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| K_E.W13 | the pharmacological properties of individual groups of medicines, including biological medicines;                                                                                                                                                                       |
| K_E.W14 | factors influencing the action of the active substance during the pharmacodynamic phase, including genetic factors, and the principles of personalised therapy;                                                                                                         |
| K_E.W15 | the basics of molecularly targeted therapy strategies and the mechanisms of drug resistance;                                                                                                                                                                            |
| K_E.W16 | routes of administration and methods of dosing for medicinal products;                                                                                                                                                                                                  |
| K_E.W17 | indications and contraindications for the use of a medicinal product, and the adverse effects of a medicinal product;                                                                                                                                                   |
| K_E.W18 | the classification and mechanisms of adverse effects of medicinal products;                                                                                                                                                                                             |
| K_E.W19 | the principles of correct combination of medicinal products, the types of interactions between them, and the factors influencing the occurrence of interactions and ways of avoiding them;                                                                              |
| K_E.W20 | basic concepts in pharmacogenetics and pharmacogenomics;                                                                                                                                                                                                                |
| K_E.W21 | basic concepts in toxicokinetics, toxicometry and toxicogenetics;                                                                                                                                                                                                       |
| K_E.W22 | the processes to which a xenobiotic is subjected in the body, taking into account biotransformation processes, depending on the route of administration or exposure;                                                                                                    |
| K_E.W23 | issues related to the type of exposure to toxins (acute toxicity, chronic toxicity, long-term effects);                                                                                                                                                                 |
| K_E.W24 | endogenous and exogenous factors that modify the activity of enzymes that metabolise xenobiotics;                                                                                                                                                                       |
| K_E.W25 | the toxic effects of selected medicinal substances, addictive substances, psychoactive substances and other chemical substances, as well as guidelines for managing cases of poisoning;                                                                                 |
| K_E.W26 | principles and methods for assessing the body's exposure to selected xenobiotics;                                                                                                                                                                                       |
| K_E.W27 | in vitro and in vivo methods used in xenobiotic toxicity research;                                                                                                                                                                                                      |
| K_E.W28 | principles of planning and research methodology required in the process of discovering new medicinal substances;                                                                                                                                                        |
| K_E.W29 | health risks and consequences associated with environmental pollution;                                                                                                                                                                                                  |
| K_E.W30 | basic nutrients, the body's requirements for them, their significance, bioavailability, dietary sources, and nutritional principles in selected disease conditions;                                                                                                     |
| K_E.W31 | methods for assessing the nutritional value and quality of food, including food products available in pharmacies, and methods for assessing the dietary habits of healthy and sick people;                                                                              |
| K_E.W32 | issues of food additives and food contaminants;                                                                                                                                                                                                                         |
| K_E.W33 | issues and requirements related to fortified foods, food supplements, foods for special medical purposes and enteral nutrition;                                                                                                                                         |
| K_E.W34 | the basics of drug–food interactions;                                                                                                                                                                                                                                   |
| K_E.W35 | principles for the design of complex herbal medicinal products;                                                                                                                                                                                                         |
| K_E.W36 | criteria for assessing the quality of herbal medicinal products;                                                                                                                                                                                                        |
| K_E.W37 | herbal medicinal products and substances of plant origin, their mechanisms of action, and the therapeutic indications for the use of these products and substances;                                                                                                     |
| K_E.W38 | the standardisation procedure for herbal medicinal products and its use in the marketing authorisation process;                                                                                                                                                         |
| K_F.W1  | legal regulations setting out the rules governing the operation of pharmacies and other entities authorised to trade in medicinal products, and the wholesale and retail trade in medicinal products in the Republic of Poland;                                         |
| K_F.W2  | the rules governing the issuing, recording and dispensing of prescriptions; the rules governing the dispensing of medicinal products, medical devices and foodstuffs for special nutritional purposes from pharmacies and pharmacy outlets, together with the provision |

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|         | of information and advice on the effects, use and storage of such products, medical devices or foodstuffs;                                                                                                                            |
| K_F.W3  | legal regulations setting out the rules governing the acquisition and practice of the profession of pharmacist, the continuing professional development of pharmacists, and the functioning of the professional body for pharmacists; |
| K_F.W4  | the principles governing the organisation and funding of the healthcare system in the Republic of Poland, and the role of the pharmacist within that system;                                                                          |
| K_F.W5  | the basics of business management;                                                                                                                                                                                                    |
| K_F.W6  | the importance of the proper management of medicinal products within the healthcare system;                                                                                                                                           |
| K_F.W7  | concepts relating to pharmaceutical care, in particular those concerning medication-related problems and needs regarding the use of medicinal products;                                                                               |
| K_F.W8  | principles for monitoring the efficacy and safety of a patient's pharmacotherapy as part of the pharmaceutical care process and the provision of pharmaceutical services, including clinical pharmacy services;                       |
| K_F.W9  | principles governing the provision of clinical pharmacy services;                                                                                                                                                                     |
| K_F.W10 | principles of personalised pharmacotherapy that take into account differences in the effects of medicinal products caused by pathophysiological factors;                                                                              |
| K_F.W11 | key scientific sources of information on medicinal products, substances, food supplements, medical devices and other products used in the treatment of diseases;                                                                      |
| K_F.W12 | selected treatment standards and evidence-based clinical practice guidelines;                                                                                                                                                         |
| K_F.W13 | rolę farmaceuty w zespołach interdyscyplinarnych;                                                                                                                                                                                     |
| K_F.W14 | risks and errors associated with patients using medicinal products on their own;                                                                                                                                                      |
| K_F.W15 | the issue of addiction to medicinal products and other substances, and the role of pharmacists in combating addiction;                                                                                                                |
| K_F.W16 | instructions for use of the medicinal product, depending on its form, as well as the type of packaging and dispensing system;                                                                                                         |
| K_F.W17 | legal regulations concerning the manufacture and marketing of medicinal products, medical devices, food supplements, foodstuffs for special nutritional purposes and cosmetics;                                                       |
| K_F.W18 | the basics of health economics and pharmacoeconomics;                                                                                                                                                                                 |
| K_F.W19 | methods and tools for assessing costs and outcomes for the purposes of pharmacoeconomic analyses;                                                                                                                                     |
| K_F.W20 | the legal, ethical and methodological aspects of conducting clinical trials and the role of the pharmacist in their conduct;                                                                                                          |
| K_F.W21 | the significance of population health indicators;                                                                                                                                                                                     |
| K_F.W22 | principles governing the conduct of epidemiological studies;                                                                                                                                                                          |
| K_F.W23 | the principles governing the individualised preparation and distribution of medicinal products in single doses for hospitalised patients;                                                                                             |
| K_F.W24 | rules on the post-marketing safety monitoring of medicinal products and the supervision of medical devices;                                                                                                                           |
| K_F.W25 | the principles of health promotion, its objectives, and the role of pharmacists in promoting a healthy lifestyle;                                                                                                                     |
| K_F.W26 | guidelines for carrying out selected diagnostic tests and assessing basic vital signs in pharmaceutical care;                                                                                                                         |
| K_F.W27 | the eligibility criteria for preventive vaccinations and the procedures for administering them;                                                                                                                                       |
| K_F.W28 | methods for assessing a person's vital signs when their health or life is at risk, and the principles of providing advanced first aid;                                                                                                |
| K_F.W29 | regulations and health and safety rules applicable in the workplace;                                                                                                                                                                  |

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| K_G.W1                                                                                                              | research methods and techniques used in the current research project.                                                                                                                                                                                       |
| <p style="text-align: center;"><b>SKILLS</b></p> <p style="text-align: center;"><b>The graduate is able to:</b></p> |                                                                                                                                                                                                                                                             |
| K_A.U1                                                                                                              | use anatomical terminology to describe a person's state of health;                                                                                                                                                                                          |
| K_A.U2                                                                                                              | describe the mechanisms underlying the functioning of the human body at the molecular, cellular, tissue and systemic levels;                                                                                                                                |
| K_A.U3                                                                                                              | describe the mechanisms underlying the development of functional disorders and interpret the pathophysiological basis for the development of diseases;                                                                                                      |
| K_A.U4                                                                                                              | apply biochemical knowledge to the assessment of physiological and pathological processes;                                                                                                                                                                  |
| K_A.U5                                                                                                              | describe and explain immunological mechanisms and processes in both healthy and diseased states;                                                                                                                                                            |
| K_A.U6                                                                                                              | to assess the genetic factors underlying the development of diseases in a population;                                                                                                                                                                       |
| K_A.U7                                                                                                              | apply basic techniques for working with microorganisms and the principles of aseptic practice;                                                                                                                                                              |
| K_A.U8                                                                                                              | to assess the activity of antimicrobial agents;                                                                                                                                                                                                             |
| K_A.U9                                                                                                              | carry out microbiological testing of medicinal products using pharmacopoeial methods;                                                                                                                                                                       |
| K_B.U1                                                                                                              | measure or determine physical, biophysical and physicochemical quantities using appropriate laboratory equipment, and carry out physical and chemical calculations;                                                                                         |
| K_B.U2                                                                                                              | analyse the physical phenomena and processes used in the diagnosis and treatment of diseases;                                                                                                                                                               |
| K_B.U3                                                                                                              | identify inorganic substances using pharmacopoeial methods;                                                                                                                                                                                                 |
| K_B.U4                                                                                                              | select an analytical method and validate it;                                                                                                                                                                                                                |
| K_B.U5                                                                                                              | carry out research into kinetic processes in pharmacy;                                                                                                                                                                                                      |
| K_B.U6                                                                                                              | analyse the physicochemical properties and processes underpinning the biological action of medicinal products and their pharmacokinetics;                                                                                                                   |
| K_B.U7                                                                                                              | evaluate and predict the properties of organic compounds on the basis of their structure, to plan the synthesis of selected organic compounds on a laboratory scale, and to identify them;                                                                  |
| K_B.U8                                                                                                              | use IT tools to analyse and present data;                                                                                                                                                                                                                   |
| K_C.U1                                                                                                              | to initiate and support group activities, assistance and remedial measures; to influence the development of attitudes; and to lead a team;                                                                                                                  |
| K_C.U2                                                                                                              | assess actions and moral dilemmas on the basis of ethical principles;                                                                                                                                                                                       |
| K_C.U3                                                                                                              | use psychological tools in interpersonal communication with patients, including geriatric patients, their families or carers, doctors and other healthcare professionals;                                                                                   |
| K_C.U4                                                                                                              | use verbal and non-verbal communication techniques and identify errors and barriers in the communication process;                                                                                                                                           |
| K_C.U5                                                                                                              | create the conditions for effective communication with patients and members of the patient care team, by providing feedback and support;                                                                                                                    |
| K_C.U6                                                                                                              | demonstrate responsibility for developing their own skills and passing on knowledge to others, and apply basic forms and methods of conveying information using teaching aids in the context of teaching, delivering training and professional development; |
| K_C.U7                                                                                                              | identify key ethical issues relating to modern medicine, the protection of life and patient health, and the conduct of scientific research;                                                                                                                 |
| K_C.U8                                                                                                              | comply with the principles of professional ethics, including the Code of Ethics for Pharmacists of the Republic of Poland;                                                                                                                                  |
| K_C.U9                                                                                                              | communicate with patients and healthcare staff in one of the foreign languages at B2+ level of the Common European Framework of Reference for Languages;                                                                                                    |

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| K_D.U1  | to assess, on the basis of their chemical structure, the properties of substances for pharmaceutical use;                                                                                                                  |
| K_D.U2  | use pharmacopoeias, guidelines and literature related to the quality assessment of substances for pharmaceutical use and medicinal products;                                                                               |
| K_D.U3  | plan quality control of substances for pharmaceutical use and medicinal products in accordance with pharmacopoeial requirements;                                                                                           |
| K_D.U4  | carry out identity and quality tests on the substance, analyse its content and detect its degradation products in the medicinal product using pharmacopoeial methods, including spectroscopic and chromatographic methods; |
| K_D.U5  | evaluate the results obtained from quality testing of substances for pharmaceutical use and medicinal products, and to confirm that the results obtained comply with the specification;                                    |
| K_D.U6  | detect defects in a medicinal product;                                                                                                                                                                                     |
| K_D.U7  | identify the critical stages and parameters in the synthesis of a medicinal substance and propose a method for purifying that substance;                                                                                   |
| K_D.U8  | analyse the stages and parameters of a biotechnological process;                                                                                                                                                           |
| K_D.U9  | to assess the quality and stability of the biotechnologically produced substance and propose its specifications;                                                                                                           |
| K_D.U10 | use pharmacopoeias, formulary manuals, manufacturing specifications, guidelines and literature on drug formulation technology, particularly in relation to compounded medicines;                                           |
| K_D.U11 | propose a suitable dosage form for the medicinal product, depending on the properties of the active substance and its intended use;                                                                                        |
| K_D.U12 | prepare compounded medicines used in modern practice, select appropriate packaging, and determine the shelf life of a compounded medicine and how it should be stored;                                                     |
| K_D.U13 | identify and resolve problems arising from the composition of a compounded medicine, monitor its dosage and verify its composition;                                                                                        |
| K_D.U14 | assess the functional properties of excipients for pharmaceutical use;                                                                                                                                                     |
| K_D.U15 | prepare specimens under aseptic conditions and select a sterilisation method;                                                                                                                                              |
| K_D.U16 | prepare mixtures for parenteral nutrition;                                                                                                                                                                                 |
| K_D.U17 | prepare cytotoxic medicinal products in a form ready for administration;                                                                                                                                                   |
| K_D.U18 | draw up records of the procedures carried out during the preparation of compounded and pharmacy-made medicines;                                                                                                            |
| K_D.U19 | plan the stages of manufacturing a medicinal product under industrial conditions, select the equipment and choose the control methods;                                                                                     |
| K_D.U20 | carry out tests to assess the quality of a medicinal product, operate the relevant testing and measuring equipment, and interpret the test results;                                                                        |
| K_D.U21 | assess the risk of poor quality in medicinal products and medical devices, as well as the clinical consequences;                                                                                                           |
| K_D.U22 | propose specifications for a medicinal product and to plan stability testing of the active substance and the medicinal product;                                                                                            |
| K_D.U23 | identify the factors affecting the shelf life of a medicinal product and select the appropriate storage conditions;                                                                                                        |
| K_D.U24 | assess the identity and quality of medicinal plant material on the basis of a pharmacopoeial monograph and to carry out its analysis;                                                                                      |
| K_D.U25 | carry out an analysis of a herbal medicinal product and identify the active substances it contains using pharmacopoeial methods;                                                                                           |
| K_D.U26 | prepare herbal preparations under laboratory conditions and assess their quality using pharmacopoeial methods;                                                                                                             |
| K_E.U1  | assess differences in the absorption of substances depending on the composition of the medicinal product, its dosage form, and physiological and pathological conditions;                                                  |

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| K_E.U2  | explain the significance of membrane transport in pharmacokinetic processes;                                                                                                                                                                               |
| K_E.U3  | calculate and interpret the pharmacokinetic parameters of a medicinal substance determined using pharmacokinetic models or other methods;                                                                                                                  |
| K_E.U4  | explain the significance, propose methodology and interpret the results of studies on pharmaceutical and biological availability and bioequivalence;                                                                                                       |
| K_E.U5  | make use of legislation, guidelines and scientific publications on bioavailability and bioequivalence studies of medicinal products;                                                                                                                       |
| K_E.U6  | to present and explain the blood concentration profiles of the active substance depending on the route of administration and the formulation of the medicinal product;                                                                                     |
| K_E.U7  | carry out a study of the pharmaceutical availability of the active substance in the oral dosage forms of a medicinal product in order to demonstrate the similarity of different medicinal products, using pharmacopoeial methods and apparatus;           |
| K_E.U8  | justify the possibility of exempting a medicinal product from in vivo bioequivalence studies on the basis of a biopharmaceutical classification system;                                                                                                    |
| K_E.U9  | anticipate the effects of changes in the pharmaceutical and biological availability of the active substance resulting from modifications to the formulation of the medicinal product;                                                                      |
| K_E.U10 | explain the causes and effects of interactions during the pharmacokinetic and pharmacodynamic phases, and identify ways of preventing such interactions;                                                                                                   |
| K_E.U11 | explain the pharmacological properties of a medicinal substance on the basis of its drug target and mechanism of action;                                                                                                                                   |
| K_E.U12 | justify the need to adjust the dosage of a medicinal product in accordance with physiological and pathological conditions and genetic factors;                                                                                                             |
| K_E.U13 | predict the adverse effects of specific groups of medicinal substances depending on the dose and mechanism of action;                                                                                                                                      |
| K_E.U14 | provide information on the indications and contraindications for the use of medicinal products, as well as on their correct dosage and administration;                                                                                                     |
| K_E.U15 | characterise the biotransformation of xenobiotics and assess its significance in metabolic activation and detoxification;                                                                                                                                  |
| K_E.U16 | predict the nature and severity of the toxic effects of a xenobiotic based on its chemical structure and the type of exposure;                                                                                                                             |
| K_E.U17 | describe food products belonging to different food categories in terms of their composition and nutritional value;                                                                                                                                         |
| K_E.U18 | explain the principles and role of proper nutrition in the prevention and management of diseases, as well as to assess clinical nutrition practices;                                                                                                       |
| K_E.U19 | explain the causes and effects of interactions between medicines and food, and to advise patients on such interactions;                                                                                                                                    |
| K_E.U20 | assess the quality of herbal medicinal products;                                                                                                                                                                                                           |
| K_E.U21 | assess the profile of a herbal medicinal product's action on the basis of its composition;                                                                                                                                                                 |
| K_E.U22 | advise patients on the use of herbal medicinal products, their interactions, side effects and contraindications;                                                                                                                                           |
| K_F.U1  | set out the rules for the management of medicinal products in hospitals, pharmacies and wholesalers;                                                                                                                                                       |
| K_F.U2  | process prescriptions for medicinal products and to lay down rules governing the organisation of the supply of medicinal products, foodstuffs for special nutritional purposes and medical devices in healthcare facilities, using the available IT tools; |
| K_F.U3  | define the scope of duties, supervise and organise the work of staff in the pharmacy and within the clinical pharmacy team;                                                                                                                                |
| K_F.U4  | specify the storage conditions for medicinal products, medical devices and food supplements, including the requirements for their storage, and to monitor those storage conditions;                                                                        |

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| K_F.U5  | plan, organise, deliver and document pharmaceutical care and clinical pharmacy services;                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| K_F.U6  | conduct pharmaceutical interviews and consultations as part of the process of pharmaceutical care and pharmaceutical counselling, medication reviews and other clinical pharmacy services;                                                                                                                                                                                                                                                                                                                                                         |
| K_F.U7  | collaborate with doctors and other healthcare professionals on optimising and rationalising pharmacotherapy, and on identifying and resolving medication-related problems;                                                                                                                                                                                                                                                                                                                                                                         |
| K_F.U8  | select over-the-counter medicines, medical devices or foodstuffs for special nutritional purposes for medical conditions that do not require a consultation with a doctor;                                                                                                                                                                                                                                                                                                                                                                         |
| K_F.U9  | prepare and implement a pharmacotherapy monitoring plan, setting out the methods and principles for assessing the efficacy and safety of treatment;                                                                                                                                                                                                                                                                                                                                                                                                |
| K_F.U10 | carry out and explain the individualisation of the dosage of a medicinal product for a patient in a clinical setting;                                                                                                                                                                                                                                                                                                                                                                                                                              |
| K_F.U11 | select the appropriate form of medicinal product for the patient, taking into account clinical recommendations, the route of administration, the patient's needs and the availability of medicinal products;                                                                                                                                                                                                                                                                                                                                       |
| K_F.U12 | advise on the correct way to manage the medicinal product throughout its use by the patient and provide information about that medicinal product;                                                                                                                                                                                                                                                                                                                                                                                                  |
| K_F.U13 | advise healthcare professionals on the correct way to manage the medicinal product and to provide information about it;                                                                                                                                                                                                                                                                                                                                                                                                                            |
| K_F.U14 | provide patient education related to the medicinal products used by the patient and to issues concerning their health and condition, and prepare personalised educational materials or programmes for the patient;                                                                                                                                                                                                                                                                                                                                 |
| K_F.U15 | use IT tools in their professional work;                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| K_F.U16 | predict the impact of various factors on the pharmacokinetic and pharmacodynamic properties of medicinal products and to address issues relating to the personalisation and optimisation of pharmacotherapy;                                                                                                                                                                                                                                                                                                                                       |
| K_F.U17 | monitor and report adverse reactions to medicinal products, medical incidents, adverse reactions to vaccines, suspected medical errors, confirmed cases of poisoning by a biocidal product, serious adverse reactions to a cosmetic product, suspected failure of a medicinal product to meet quality requirements and of a medical device to meet essential requirements; implement preventive measures; and provide information relating to complications of pharmacotherapy to healthcare professionals, patients and their families or carers; |
| K_F.U18 | identify the risks associated with pharmacotherapy in different patient groups and plan preventive measures;                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| K_F.U19 | assess and interpret epidemiological indicators;                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| K_F.U20 | identify the relevant pharmaceutical organisation or authority dealing with a given professional issue;                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| K_F.U21 | highlight the role of the pharmacist in multidisciplinary teams;                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| K_F.U22 | make use of various sources of information on medicinal products and pharmacotherapy, and to interpret this information critically;                                                                                                                                                                                                                                                                                                                                                                                                                |
| K_F.U23 | estimate the costs and outcomes of pharmacotherapy, calculate and interpret cost-effectiveness ratios, identify the most cost-effective procedure, and determine the impact of new medical technology on the financing of the healthcare system, using the relevant guidelines and recommendations;                                                                                                                                                                                                                                                |
| K_F.U24 | carry out a critical analysis of publications on the efficacy, safety and economic aspects of pharmacotherapy, as well as publications on professional practice and the pharmaceutical market;                                                                                                                                                                                                                                                                                                                                                     |
| K_F.U25 | recognise situations that pose a threat to human health or life and provide appropriate first aid in situations where health or life is at risk;                                                                                                                                                                                                                                                                                                                                                                                                   |

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| K_F.U26                                                                                            | carry out pre-vaccination assessments to rule out any contraindications to vaccination and administer the vaccine to adults;                                                                                                   |
| K_F.U27                                                                                            | carry out selected diagnostic tests and assess basic vital signs whilst providing pharmaceutical care;                                                                                                                         |
| K_G.U1                                                                                             | make use of specialist academic literature;                                                                                                                                                                                    |
| K_G.U2                                                                                             | plan a research study and discuss its aim and expected results;                                                                                                                                                                |
| K_G.U3                                                                                             | carry out a scientific study, interpret and document its results, and relate them to the current state of knowledge;                                                                                                           |
| K_G.U4                                                                                             | present the results of a research study.                                                                                                                                                                                       |
| <p style="text-align: center;"><b>SOCIAL COMPETENCES</b><br/> <b>The graduate is ready to:</b></p> |                                                                                                                                                                                                                                |
| K_K1                                                                                               | building relationships with patients and colleagues based on mutual trust and respect;                                                                                                                                         |
| K_K2                                                                                               | recognising and identifying one's own limitations, and carrying out a self-assessment of one's learning difficulties and educational needs;                                                                                    |
| K_K3                                                                                               | implementing the principles of professional collegueship and cooperation within an interdisciplinary team, including with representatives of other medical professions, also in a multicultural and multinational environment; |
| K_K4                                                                                               | compliance with confidentiality regarding patients' health, patients' rights and the principles of professional ethics;                                                                                                        |
| K_K5                                                                                               | demonstrating an ethical and moral stance consistent with ethical principles and acting in accordance with the Code of Ethics for Pharmacists of the Republic of Poland;                                                       |
| K_K6                                                                                               | promoting healthy lifestyles;                                                                                                                                                                                                  |
| K_K7                                                                                               | using objective sources of information;                                                                                                                                                                                        |
| K_K8                                                                                               | drawing conclusions from one's own measurements or observations;                                                                                                                                                               |
| K_K9                                                                                               | formulating opinions on various aspects of professional practice;                                                                                                                                                              |
| K_K10                                                                                              | accepting responsibility for decisions taken in the course of one's professional activities, including in relation to one's own safety and that of others.                                                                     |

## Description of the process resulting in the achievement of learning outcomes

### Part B) of the study programme

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| <b>Faculty offering the field of study:</b>                                                                                                     | <b>Faculty of Pharmacy</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Field of study:</b>                                                                                                                          | <b>Pharmacy</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Level of study:</b>                                                                                                                          | <b>long-cycle studies</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Level of the Polish Qualifications Framework:</b>                                                                                            | <b>level 7</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Degree profile:</b>                                                                                                                          | <b>general academic profile</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Allocation of the field of study within academic or artistic discipline(s), to which learning outcomes for a given field of study refer:</b> | <b>Pharmaceutical sciences (100%)</b><br><br><b>Main discipline: Pharmaceutical sciences</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Mode of study:</b>                                                                                                                           | <b>full-time studies</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Number of semesters:</b>                                                                                                                     | <b>10</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Number of ECTS required for the award of qualifications corresponding to the level:</b>                                                      | <b>304</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Total number of teaching hours:</b>                                                                                                          | <b>4842</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Professional degree awarded to the graduate:</b>                                                                                             | <b>magister farmacji</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>The relationship between the study programme and NCU mission and strategy:</b>                                                               | <p>The Pharmacy programme is consistent with the unity of science and didactics model. The high qualifications of the research and teaching staff of the Faculty of Pharmacy and their great commitment to the scientific activity in the field of pharmaceutical sciences guarantees the highest quality of education - one of the most important elements of the Faculty's mission. The programme based on the knowledge and experience of specialists in this field and access to multi-profile laboratories, which enables the improvement of practical skills, guarantees good preparation for the profession of pharmacist. Pharmaceutical education at the general academic profile is an activity consistent with the Development Strategy of the Nicolaus Copernicus University in Toruń for the years 2021-2026, adopted by the Senate NCU, whose main overarching goal is to strengthen</p> |

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|                                                              |         | the leading position of the Nicolaus Copernicus University in Poland and achieve significant places among European universities. The didactic and scientific activity conducted as part of the course will serve the development and dissemination of knowledge. The selection of appropriate scientific and didactic staff for individual subjects, in addition to the highest level of education, will also contribute to the implementation of major goals in the field of science, including strengthening the high position of the University among the highest-valued scientific institutions in the country and abroad. The prepared education programme, apart from improving the attractiveness of studies, creating conditions for achieving a greater degree of competitiveness of graduates on the labour market, is also aimed at transferring the latest knowledge, comprehensive development of social skills and competences, as well as care for the general level of culture and attachment to ethical values. |                                                                                                                                                                                                                                                             |                                                                                                                                                                                                |
| Courses/course modules along with expected learning outcomes |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                             |                                                                                                                                                                                                |
| Course Group                                                 | Course  | Expected learning outcomes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Forms and methods of teaching ensuring the achievement of learning outcomes                                                                                                                                                                                 | Methods of verifying and assessing expected learning outcomes achieved by the student                                                                                                          |
| Course Group A<br>Biomedical Basics of Pharmacy              | Anatomy | K_A.W1. the anatomical structure of the human body and the fundamental relationships between structure and function in both health and disease;<br>K_A.U1. use anatomical terminology to describe a person’s state of health;<br>K_K1. building relationships with patients and colleagues based on mutual trust and respect;<br>K_K5. demonstrating an ethical and moral stance consistent with ethical principles and acting in                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>Lectures:</b><br>- informative lecture with multimedia presentation<br><b>Laboratories (the use of):</b><br>- formalin-fixed specimens;<br>- anatomical models;<br>- dissection films;<br>- anatomical charts and slides;<br>- multimedia presentations. | Credit with a grade covering lecture and laboratory topics.<br>Knowledge: written or oral (≥60%)<br>Skills: written or oral (≥60%)<br>Competencies: extended observation, participation (≥50%) |

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|  |                      | <p>accordance with the Code of Ethics for Pharmacists of the Republic of Poland;</p> <p>K_K6. promoting healthy lifestyles;</p> <p>K_K7. using objective sources of information.</p>                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                            |
|  | General Biochemistry | <p>K_A.W4. the structure, properties and biological functions of amino acids, proteins, nucleotides, nucleic acids, carbohydrates, lipids and vitamins;</p> <p>K_A.W5. the structure and functions of biological membranes and the mechanisms of transport across membranes;</p> <p>K_A.W6. the main metabolic pathways and their interrelationships, the mechanisms regulating metabolism, and the effect of medicinal products on these processes;</p> <p>K_A.U4. apply biochemical knowledge to the assessment of physiological and pathological processes;</p> | <p><b>Lectures:</b></p> <ul style="list-style-type: none"> <li>- informative lecture assisted by multimedia techniques;</li> <li>- problem-based lecture with multimedia presentation</li> </ul> <p><b>Laboratories:</b></p> <ul style="list-style-type: none"> <li>- laboratory, observation and demonstration methods,</li> <li>- practical tasks, result analysis</li> </ul> | <p>Examination covering lecture and laboratory topics.</p> <p>Knowledge: written or oral (≥60%)</p> <p>Skills: written or oral (≥60%)</p> <p>Competencies: extended observation (≥50%)</p> |

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|  |                       | <p>K_K2. recognising and identifying one's own limitations, and carrying out a self-assessment of one's learning difficulties and educational needs;</p> <p>K_K6. promoting healthy lifestyles;</p> <p>K_K7. using objective sources of information;</p> <p>K_K8. drawing conclusions from one's own measurements or observations.</p>                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                         |
|  | Clinical Biochemistry | <p>K_A.W6. the main metabolic pathways and their interrelationships, the mechanisms regulating metabolism, and the effect of medicinal products on these processes;</p> <p>K_A.U4. apply biochemical knowledge to the assessment of physiological and pathological processes;</p> <p>K_K3. implementing the principles of professional colleagueship and cooperation within an interdisciplinary team, including with</p> | <p><b>Lectures:</b></p> <ul style="list-style-type: none"> <li>- informative lecture with multimedia presentation;</li> <li>- problem-based lecture;</li> <li>- conversational lecture.</li> </ul> <p><b>Laboratories:</b></p> <ul style="list-style-type: none"> <li>- observation method;</li> <li>- practical tasks;</li> <li>- expository methods (demonstration, multimedia presentation).</li> </ul> | <p>Credit with a grade covering lecture and laboratory topics.</p> <p>Knowledge: written or oral (<math>\geq 60\%</math>)</p> <p>Skills: written or oral (<math>\geq 60\%</math>)</p> <p>Competencies: extended observation, participation (<math>\geq 50\%</math>)</p> |

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|  |                          | <p>representatives of other medical professions, also in a multicultural and multinational environment;</p> <p>K_K6. promoting healthy lifestyles;</p> <p>K_K7. using objective sources of information;</p> <p>K_K8. drawing conclusions from one's own measurements or observations.</p>                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                         |
|  | Plant and Animal Biology | <p>K_A.W19. the morphological and anatomical characteristics of prokaryotes, fungi and plants that provide medicinal raw materials and substances used in pharmacy;</p> <p>K_K3. implementing the principles of professional colleagueship and cooperation within an interdisciplinary team, including with representatives of other medical professions, also in a multicultural and multinational environment;</p> | <p><b>Lectures:</b></p> <ul style="list-style-type: none"> <li>- expository methods – informative (conventional) methods with multimedia presentation</li> </ul> <p><b>Laboratories:</b></p> <ul style="list-style-type: none"> <li>- expository methods – conversational lecture with multimedia presentation;</li> <li>- inquiry methods – laboratory, observation.</li> </ul> <p><b>Tutorials:</b></p> <ul style="list-style-type: none"> <li>- expository methods – conversational lecture with multimedia presentation;</li> </ul> | <p>Examination covering lectures, tutorials, laboratory, and tutorials. Knowledge: written or oral (<math>\geq 60\%</math>)</p> <p>Skills: written, oral, and practical (<math>\geq 60\%</math>)</p> <p>Competencies: extended observation (<math>\geq 50\%</math>)</p> |

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|  |              | <p>K_K7. using objective sources of information;<br/>K_K8. drawing conclusions from one's own measurements or observations.</p>                                                                                                                                                                                                                                                                                                                                                                             | <p>- inquiry methods – expert panels, laboratory, observation.</p> <p><b>Practical classes:</b></p> <p>- inquiry methods - observation of plants in NCU CM Medicinal and Cosmetic Plants Garden and LPKiW Botanical Garden in Myślęcinek.</p> |                                                                                                                                                                                                           |
|  | Parasitology | <p>K_A.W14. the characteristics of bacteria, viruses, fungi and parasites, as well as the basics of the aetiopathology of infectious diseases and the principles of microbiological diagnosis;<br/>K_A.U7. apply basic techniques for working with microorganisms and the principles of aseptic practice;<br/>K_K2. recognising and identifying one's own limitations, and carrying out a self-assessment of one's learning difficulties and educational needs;<br/>K_K6. promoting healthy lifestyles;</p> | <p><b>Lectures:</b><br/>expository methods – informative lecture with multimedia presentation<br/><b>Laboratories:</b><br/>inquiry methods – practical tasks, workbook, projects, didactic discussion</p>                                     | <p>Credit with a grade covering lecture and laboratory topics.<br/>Knowledge: written or oral (≥60%)<br/>Skills: written, oral, and/or practical (≥60%)<br/>Competencies: extended observation (≥50%)</p> |

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|  |                   | K_K7. using objective sources of information.                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                          |
|  | Genetics          | <p>K_A.W10. the fundamentals of classical, population and molecular genetics;</p> <p>K_A.U6. to assess the genetic factors underlying the development of diseases in a population;</p> <p>K_K6. promoting healthy lifestyles;</p> <p>K_K7. using objective sources of information;</p> <p>K_K8. drawing conclusions from one's own measurements or observations.</p> | <p><b>Lectures:</b> expository methods – informative lecture with multimedia presentation</p> <p><b>Laboratories:</b> inquiry methods – practical tasks, workbook, projects, didactic discussion</p>                                      | <p>Credit with a grade covering lecture and laboratory topics.</p> <p>Knowledge: written or oral (<math>\geq 60\%</math>)</p> <p>Skills: written, oral, and/or practical (<math>\geq 60\%</math>)</p> <p>Competencies: extended observation (<math>\geq 50\%</math>)</p> |
|  | Molecular Biology | <p>K_A.W9. the molecular basis of cell cycle regulation, proliferation, apoptosis and tumour transformation;</p> <p>K_A.W11. functions and methods of studying the human genome and transcriptome, and the mechanisms regulating gene expression in areas fundamental to therapy,</p>                                                                                | <p><b>Lectures:</b> expository methods: informative (conventional) lecture, problem-based lecture, multimedia presentation</p> <p><b>Laboratories:</b> inquiry methods: laboratory methods, classic problem-based methods, case study</p> | <p>Credit with a grade covering lecture and laboratory topics.</p> <p>Knowledge: written or oral (<math>\geq 60\%</math>)</p> <p>Skills: written or oral (<math>\geq 60\%</math>)</p> <p>Competencies: extended observation, participation (<math>\geq 50\%</math>)</p>  |

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|  |            | <p>diagnostics and pharmacy practice;</p> <p>K_A.W12. molecular biology techniques in pharmaceutical biotechnology and gene therapy;</p> <p>K_A.W13. the genetic mechanisms responsible for the development of drug resistance in microorganisms and cancer cells;</p> <p>K_A.U2. describe the mechanisms underlying the functioning of the human body at the molecular, cellular, tissue and systemic levels;</p> <p>K_K7. using objective sources of information.</p> |                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                            |
|  | Physiology | <p>K_A.W2. the mechanisms governing the functioning of the human body at the molecular, cellular, tissue and systemic levels;</p> <p>K_A.U1. use anatomical terminology to describe a person's state of health;</p> <p>K_A.U2. describe the mechanisms underlying the functioning of the</p>                                                                                                                                                                            | <p><b>Lectures:</b></p> <ul style="list-style-type: none"> <li>- problem-based lecture with multimedia presentation,</li> <li>- informative (conventional) lecture</li> </ul> <p><b>Laboratories:</b></p> <ul style="list-style-type: none"> <li>- individual work,</li> <li>- team work,</li> <li>- classic problem-based method,</li> <li>- laboratories/computer simulations,</li> </ul> | <p>Examination covering lecture and laboratory topics.</p> <p>Knowledge: written or oral (≥60%)</p> <p>Skills: written or oral (≥60%)</p> <p>Competencies: extended observation (≥50%)</p> |

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|  |                 | <p>human body at the molecular, cellular, tissue and systemic levels;<br/> K_K3. implementing the principles of professional colleagueship and cooperation within an interdisciplinary team, including with representatives of other medical professions, also in a multicultural and multinational environment;<br/> K_K8. drawing conclusions from one's own measurements or observations.</p> | <ul style="list-style-type: none"> <li>- result analysis,</li> <li>- discussion</li> </ul>                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                             |
|  | Pathophysiology | <p>K_A.W2. the mechanisms governing the functioning of the human body at the molecular, cellular, tissue and systemic levels;<br/> K_A.U1. use anatomical terminology to describe a person's state of health;<br/> K_A.U2. describe the mechanisms underlying the functioning of the human body at the molecular, cellular, tissue and systemic levels;</p>                                      | <p><b>Lectures:</b><br/> expository methods – informative lecture assisted by multimedia techniques, problem-based lecture with multimedia presentation, interactive lecture<br/> <b>Laboratories:</b><br/> inquiry methods – observation, demonstration, tutorial, classic problem-based method, case study, test result analysis, discussion, films, multimedia presentations</p> | <p>Credit with a grade covering lecture and laboratory topics.<br/> Knowledge: written or oral (≥60%)<br/> Skills: written or oral (≥60%)<br/> Competencies: extended observation, participation (≥50%)</p> |

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|  |            | <p>K_K3. implementing the principles of professional colleagueship and cooperation within an interdisciplinary team, including with representatives of other medical professions, also in a multicultural and multinational environment;</p> <p>K_K8. drawing conclusions from one's own measurements or observations.</p>                                         |                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                    |
|  | Immunology | <p>K_A.W7. the functioning of the human immune system and the mechanisms of the immune response;</p> <p>K_A.W8. the principles of conducting immunological diagnostics, and the principles and methods of immunoprophylaxis and immunotherapy;</p> <p>K_A.U5. describe and explain immunological mechanisms and processes in both healthy and diseased states;</p> | <p><b>Lectures:</b></p> <ul style="list-style-type: none"> <li>- informative lecture with multimedia presentation,</li> <li>- problem-based lecture,</li> <li>- conversational lecture</li> </ul> <p><b>Laboratories:</b></p> <ul style="list-style-type: none"> <li>- observation,</li> <li>- practical tasks,</li> <li>- expository methods: film, demonstration,</li> <li>- discussion</li> </ul> | <p>Credit with a grade covering lecture and laboratory topics.</p> <p>Knowledge: written or oral (≥60%)</p> <p>Skills: written or oral (≥60%)</p> <p>Competencies: extended observation (≥50%)</p> |

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|  |              | K_K2. recognising and identifying one's own limitations, and carrying out a self-assessment of one's learning difficulties and educational needs;<br>K_K6. promoting healthy lifestyles.                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                            |
|  | Microbiology | K_A.W13. the genetic mechanisms responsible for the development of drug resistance in microorganisms and cancer cells;<br>K_A.W14. the characteristics of bacteria, viruses, fungi and parasites, as well as the basics of the aetiopathology of infectious diseases and the principles of microbiological diagnosis;<br>K_A.W15. the principles of disinfection and antiseptics, and the effect of antimicrobial agents on microorganisms and human health;<br>K_A.W16. issues associated with hospital-acquired infections and | <b>Lectures:</b> <ul style="list-style-type: none"> <li>- informative (conventional) lecture with multimedia presentation,</li> <li>- problem-based lecture,</li> <li>- conversational lecture.</li> </ul> <b>Laboratories:</b> <ul style="list-style-type: none"> <li>- observation,</li> <li>- practical tasks,</li> <li>- analysis of microbiological test results,</li> <li>- expository methods: film, demonstration,</li> <li>- classic problem-based method,</li> <li>- discussion</li> </ul> | Credit with a grade covering lecture and laboratory topics.<br><br>Knowledge: written or oral (≥60%)<br><br>Skills: written or oral (≥60%)<br><br>Competencies: extended observation, participation (≥50%) |

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|  |  | <p>the risks posed by high-alert pathogens;<br/>K_A.W17. pharmacopoeial requirements and methods for testing the microbiological purity and sterility of medicinal products;<br/>K_A.W18. microbiological methods for testing the mutagenic potential of medicinal products;<br/>K_A.U7. apply basic techniques for working with microorganisms and the principles of aseptic practice;<br/>K_A.U8. to assess the activity of antimicrobial agents;<br/>K_A.U9. carry out microbiological testing of medicinal products using pharmacopoeial methods;<br/>K_K2. recognising and identifying one's own limitations, and carrying out a self-assessment of one's learning difficulties and educational needs;</p> |  |  |
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|                                                                               |            | <p>K_K6. promoting healthy lifestyles;</p> <p>K_K7.using objective sources of information;</p> <p>K_K8. drawing conclusions from one's own measurements or observations.</p>                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                   |
| <p><b>Course Group B</b></p> <p><b>Physicochemical Basics of Pharmacy</b></p> | Biophysics | <p>K_B.W1. the physical basis of physiological processes, including circulation, nerve conduction, gas exchange, movement and the exchange of substances;</p> <p>K_B.W2. the impact of physical and chemical environmental factors on the human body;</p> <p>K_B.W3. the biophysical basis of diagnostic and therapeutic techniques;</p> <p>K_B.W10. spectroscopic, electrochemical, chromatographic and mass spectrometric techniques used in pharmaceutical sciences;</p> <p>K_B.W12. the fundamentals of thermodynamics and chemical kinetics;</p> | <p>Lectures:</p> <ol style="list-style-type: none"> <li>1. informative (conventional) lecture with multimedia presentation;</li> <li>2. problem-based lecture;</li> <li>3. conversational lecture.</li> </ol> <p>Laboratories:</p> <ol style="list-style-type: none"> <li>1. observation;</li> <li>2. practical tasks - carrying out measurements;</li> <li>3. calculations;</li> <li>4. discussion.</li> </ol> | <p>Credit with a grade covering lecture and laboratory topics.</p> <p>Knowledge: written or oral (≥50%)</p> <p>Skills: written or oral (≥50%)</p> <p>Competencies: extended observation, participation (≥50%)</p> |

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|  |                                 | <p>K_B.U1. measure or determine physical, biophysical and physicochemical quantities using appropriate laboratory equipment, and carry out physical and chemical calculations;</p> <p>K_B.U2. analyse the physical phenomena and processes used in the diagnosis and treatment of diseases;</p> <p>K_K7. using objective sources of information;</p> <p>K_K8. drawing conclusions from one's own measurements or observations.</p> |                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                            |
|  | Inorganic and General Chemistry | <p>K_B.W4. the properties of elements, including radioactive isotopes, in relation to their use in the diagnosis and treatment of diseases;</p> <p>K_B.W5. the mechanisms underlying the formation of chemical bonds and the types of chemical bonds, as well as the mechanisms</p>                                                                                                                                                | <p><b>Lectures:</b></p> <ul style="list-style-type: none"> <li>- expository methods – informative (conventional lecture), problem-based lecture, multimedia presentation.</li> </ul> <p><b>Laboratories:</b></p> <ul style="list-style-type: none"> <li>- inquiry methods: laboratory, observation, tutorial; result analysis</li> </ul> | <p>Examination covering lecture and laboratory topics.</p> <p>Knowledge: written, oral, and practical (<math>\geq 60\%</math>)</p> <p>Skills: written, oral, and practical (<math>\geq 60\%</math>)</p> <p>Competencies: extended observation (<math>\geq 50\%</math>)</p> |

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|  |                      | <p>of intermolecular interactions;<br/> K_B.W6. types and properties of solutions, and methods for preparing them;<br/> K_B.W7. basic types of chemical reactions;<br/> K_B.W8. pharmacopoeial methods for the identification of inorganic substances;<br/> K_B.U3. identify inorganic substances using pharmacopoeial methods;<br/> K_K2. recognising and identifying one's own limitations, and carrying out a self-assessment of one's learning difficulties and educational needs;<br/> K_K7. using objective sources of information;<br/> K_K8. drawing conclusions from one's own measurements or observations.</p> |                                                                                                                                                                                      |                                                                                                                                  |
|  | Analytical Chemistry | <p>K_B.W6. and properties of solutions, and methods for preparing them;</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <p><b>Lectures:</b></p> <ul style="list-style-type: none"> <li>- informative (conventional) lecture;</li> <li>- problem-based lecture;</li> <li>- multimedia presentation</li> </ul> | <p>Examination covering lecture and laboratory topics.<br/> Knowledge: written, oral, and practical (<math>\geq 60\%</math>)</p> |

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|  |  | <p>K_B.W9. pharmacopoeial methods of quantitative analysis;</p> <p>K_B.W10. spectroscopic, electrochemical, chromatographic and mass spectrometric techniques used in pharmaceutical sciences;</p> <p>K_B.W11. criteria for selecting an analytical method and principles for its validation;</p> <p>K_B.U4. select an analytical method and validate it;</p> <p>K_K1. building relationships with patients and colleagues based on mutual trust and respect;</p> <p>K_K2. recognising and identifying one's own limitations, and carrying out a self-assessment of one's learning difficulties and educational needs;</p> <p>K_K5. demonstrating an ethical and moral stance consistent with ethical principles and acting in accordance with the Code of Ethics for Pharmacists of the Republic of Poland;</p> | <p><b>Tutorials (laboratory):</b></p> <ul style="list-style-type: none"> <li>- methods: laboratory, observation, tutorial</li> <li>- Moodle platform</li> </ul> | <p>Skills: written, oral, and practical (<math>\geq 60\%</math>)</p> <p>Competencies: extended observation (<math>\geq 50\%</math>)</p> |
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|  |                    | K_K7. using objective sources of information;<br>K_K8. drawing conclusions from one's own measurements or observations.                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                         |
|  | Physical Chemistry | K_B.W12. the fundamentals of thermodynamics and chemical kinetics;<br>K_B.W13. the physical chemistry of multiphase systems and surface phenomena in the context of pharmaceutical technology;<br>K_B.U5. carry out research into kinetic processes in pharmacy;<br>K_B.U6. analyse the physicochemical properties and processes underpinning the biological action of medicinal products and their pharmacokinetics;<br>K_K2. recognising and identifying one's own limitations, and carrying out a self-assessment of one's learning difficulties and educational needs; | <b>Lectures:</b><br>1. Expository methods:<br>- description,<br>- chat.<br>2. Activation methods:<br>- case methods,<br>- discussion,<br>- informal discussion,<br>- "for" and "against" debate.<br>3. Problem-based methods:<br>- case exchange (brainstorming),<br>- classic problem-based methods<br>4. Expository methods:<br>- demonstrations of selected phenomena<br><b>Laboratories:</b><br>1. Tutorial and practical methods:<br>- practical tasks,<br>- measurements and observation,<br>- experiments<br>2. Expository methods:<br>- description, | Examination covering lectures, tutorials, and laboratories.<br>Knowledge: written or oral ( $\geq 51\%$ )<br>Skills: written, oral, and practical ( $\geq 51\%$ )<br>Competencies: extended observation ( $\geq 50\%$ ) |

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|  |                   | <p>K_K3. implementing the principles of professional collegueship and cooperation within an interdisciplinary team, including with representatives of other medical professions, also in a multicultural and multinational environment;</p> <p>K_K8. drawing conclusions from one's own measurements or observations;</p> <p>K_K10. accepting responsibility for decisions taken in the course of one's professional activities, including in relation to one's own safety and that of others.</p> | <p>- chat.</p> <p>3. Activation methods:</p> <ul style="list-style-type: none"> <li>- case methods,</li> <li>- discussion,</li> <li>- informal discussion,</li> <li>- "for" and "against" debate.</li> </ul> <p>4. Problem-based methods:</p> <ul style="list-style-type: none"> <li>- case exchange (brainstorming),</li> <li>- classic problem-based methods</li> </ul> <p><b>Tutorials:</b></p> <p>1. Expository methods:</p> <ul style="list-style-type: none"> <li>- description,</li> <li>- chat.</li> </ul> <p>2. Activation methods:</p> <ul style="list-style-type: none"> <li>- case methods,</li> <li>- discussion,</li> <li>- informal discussion,</li> <li>- "for" and "against" debate.</li> </ul> <p>3. Problem-based methods:</p> <ul style="list-style-type: none"> <li>- case exchange (brainstorming),</li> <li>- classic problem-based methods</li> </ul> |                                                                                                                                                        |
|  | Organic Chemistry | <p>K_B.W14. the structure and properties of organic compounds in the context of pharmaceutical technology, and the terminology used in this field;</p>                                                                                                                                                                                                                                                                                                                                             | <p><b>Lectures:</b></p> <ul style="list-style-type: none"> <li>- informative (conventional) lecture;</li> <li>- problem-based lecture with multimedia presentation</li> </ul> <p><b>Laboratory:</b></p> <ul style="list-style-type: none"> <li>- individual work,</li> <li>- laboratory classes,</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <p>Examination covering lecture and laboratory topics.</p> <p>Knowledge: written or oral (≥60%)</p> <p>Skills: written, oral, and practical (≥60%)</p> |

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|  |  | <p>K_B.W15. types and mechanisms of chemical reactions involving organic compounds;</p> <p>K_B.W16. the structure, properties and methods of production of polymers used in pharmaceutical technology;</p> <p>K_B.U7. evaluate and predict the properties of organic compounds on the basis of their structure, to plan the synthesis of selected organic compounds on a laboratory scale, and to identify them;</p> <p>K_K1. building relationships with patients and colleagues based on mutual trust and respect;</p> <p>K_K2. recognising and identifying one's own limitations, and carrying out a self-assessment of one's learning difficulties and educational needs;</p> <p>K_K3. implementing the principles of professional colleagueship and cooperation within an interdisciplinary team,</p> | <p>- result analysis,</p> <p>- activation and problem-based methods (discussion, case methods, classic problem-based method)</p> | <p>Competencies: extended observation (<math>\geq 50\%</math>)</p> |
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|  |                                         | <p>including with representatives of other medical professions, also in a multicultural and multinational environment;</p> <p>K_K7. using objective sources of information;</p> <p>K_K8. drawing conclusions from one's own measurements or observations;</p> <p>K_K10. accepting responsibility for decisions taken in the course of one's professional activities, including in relation to one's own safety and that of others.</p> |                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                          |
|  | Statistics with Elements of Mathematics | <p>K_B.W17. statistical methods used in the pharmaceutical sciences.</p> <p>K_K7. using objective sources of information;</p> <p>K_K8. drawing conclusions from one's own measurements or observations.</p>                                                                                                                                                                                                                            | <p><b>Lectures:</b></p> <ul style="list-style-type: none"> <li>- informative (conventional) lecture with multimedia presentation,</li> <li>- problem-based lecture</li> </ul> <p><b>Computer laboratories:</b></p> <ul style="list-style-type: none"> <li>- classic problem-based lecture using data analysis software.</li> </ul> <p><b>Seminar:</b></p> <ul style="list-style-type: none"> <li>- classic problem-based method</li> </ul> | <p>Credit with a grade covering lectures, seminars, and laboratories.</p> <p>Knowledge: written or oral (≥60%)</p> <p>Skills: written or oral (≥60%)</p> <p>Competencies: extended observation, participation (≥50%)</p> |

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|                                                                          | Information Technology | K_B.U8. use IT tools to analyse and present data<br>K_K7. using objective sources of information;<br>K_K8. drawing conclusions from one's own measurements or observations.                                                                                                                                                                                                                                                                                                                                                         | <b>Laboratories:</b><br>- tasks in a computer lab<br>- classic problem-based method<br>- discussion | Credit with a grade covering the laboratories topics.<br>Knowledge: written or oral (≥50%)<br>Skills: written or oral (≥50%)<br>Competencies: extended observation, participation (≥50%) |
| <b>Course Group C</b><br><b>Humanistic and Social Basics of Pharmacy</b> | Psychology             | K_C.W2. psychological tools and principles of interpersonal communication with patients, their families or carers, doctors and other healthcare professionals;<br>K_C.W3. principles of knowledge transfer to others, and basic forms and methods of conveying information using teaching aids in the context of teaching, training and professional development;<br>K_C.W4. the social determinants and limitations arising from illness and disability;<br>K_C.W11. principles of teamwork;<br>K_C.U3. use psychological tools in | Multimedia presentation, discussion, work in groups.                                                | Credit with a grade covering the topics covered in the tutorials.<br>Knowledge: written or oral (≥60%)<br>Skills, Competencies: extended observation (≥50%)                              |

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|  |  | <p>interpersonal communication with patients, including geriatric patients, their families or carers, doctors and other healthcare professionals;</p> <p>K_C.U4. use verbal and non-verbal communication techniques and identify errors and barriers in the communication process;</p> <p>K_C.U5. create the conditions for effective communication with patients and members of the patient care team, by providing feedback and support;</p> <p>K_C.U. demonstrate responsibility for developing their own skills and passing on knowledge to others, and apply basic forms and methods of conveying information using teaching aids in the context of teaching, delivering training and professional development;</p> |  |  |
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|  |                       | K_K1. building relationships with patients and colleagues based on mutual trust and respect;<br>K_K7. using objective sources of information.                                                                                                                                                                     |                                                                                                                                                                            |                                                                                                                                                                                                                                 |
|  | History of Philosophy | K_C.W1. fundamental issues in philosophy (metaphysics, epistemology, axiology and ethics);<br>K_K7. using objective sources of information;<br>K_K8. drawing conclusions from one's own measurements or observations.                                                                                             | <b>Tutorials:</b><br>- informative (conventional);<br>- problem-based lecture;<br>- seminar;<br>- essay;<br>- points;<br>- classic problem-based lecture;<br>- case study. | Credit with a grade covering the topics covered in the tutorials.<br>Knowledge, Competencies: written or oral ( $\geq 60\%$ )                                                                                                   |
|  | History of Pharmacy   | K_C.W7. history of pharmacy and the profession of pharmacist;<br>K_K1 building relationships with patients and colleagues based on mutual trust and respect;<br>K_K2. recognising and identifying one's own limitations, and carrying out a self-assessment of one's learning difficulties and educational needs; | <b>Tutorials:</b><br>- individual work,<br>- work in a group                                                                                                               | Credit with a grade covering the topics covered in the tutorials.<br>Knowledge: oral or written ( $\geq 60\%$ )<br>Skills: oral or written ( $\geq 60\%$ )<br>Competencies: extended observation, participation ( $\geq 50\%$ ) |

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|  |                     | K_K3.implementing the principles of professional colleagueship and cooperation within an interdisciplinary team, including with representatives of other medical professions, also in a multicultural and multinational environment.                                                                                                                                                                                                                                      |                                                                                                                                                                                                       |                                                                                                                                                                                                                                          |
|  | Professional Ethics | <p>K_C.W8. basic concepts in ethics, professional ethics and bioethics, as well as issues relating to the professional ethics of pharmacists;</p> <p>K_C.W9. ethical principles of modern pharmaceutical marketing;</p> <p>K_C.W10. patients' rights;</p> <p>K_C.U2. assess actions and moral dilemmas on the basis of ethical principles;</p> <p>K_C.U7. identify key ethical issues relating to modern medicine, the protection of life and patient health, and the</p> | <ul style="list-style-type: none"> <li>- informative lecture (conventional);</li> <li>- problem-based lecture;</li> <li>- seminar;</li> <li>- classic problem-based;</li> <li>- case study</li> </ul> | <p>Credit with a grade covering the topics covered in the tutorials.</p> <p>Knowledge: oral (<math>\geq 60\%</math>)</p> <p>Skills: oral (<math>\geq 60\%</math>)</p> <p>Competencies: extended observation (<math>\geq 50\%</math>)</p> |

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|  |  | <p>conduct of scientific research;</p> <p>K_C.U8. comply with the principles of professional ethics, including the Code of Ethics for Pharmacists of the Republic of Poland;</p> <p>K_K3. implementing the principles of professional collegueship and cooperation within an interdisciplinary team, including with representatives of other medical professions, also in a multicultural and multinational environment;</p> <p>K_K4. compliance with confidentiality regarding patients' health, patients' rights and the principles of professional ethics;</p> <p>K_K5. demonstrating an ethical and moral stance consistent with ethical principles and acting in accordance with the Code of Ethics for Pharmacists of the Republic of Poland;</p> <p>K_K6. promoting healthy lifestyles.</p> |  |  |
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|  | Sociology | <p>K_C.W3. principles of knowledge transfer to others, and basic forms and methods of conveying information using teaching aids in the context of teaching, training and professional development;</p> <p>K_C.W5. the psychological and social aspects of attitudes and support activities;</p> <p>K_C.W6. principles of motivating patients to adopt health-promoting behaviours;</p> <p>K_C.U1. to initiate and support group activities, assistance and remedial measures; to influence the development of attitudes; and to lead a team;</p> <p>K_K6. promoting healthy lifestyles;</p> <p>K_K10. accepting responsibility for decisions taken in the course of one's professional activities, including in relation to one's own safety and that of others.</p> | <ul style="list-style-type: none"> <li>- discussion in small groups</li> <li>- group project</li> </ul> | <p>Credit with a grade covering the topics covered in the tutorials.</p> <p>Knowledge: written and/or oral (<math>\geq 60\%</math>)</p> <p>Skills: written and/or oral (<math>\geq 60\%</math>)</p> <p>Competencies: extended observation, active participation (<math>\geq 50\%</math>)</p> |
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|  | Protection of Intellectual Property | <p>K_C.W12. the concept of intellectual property, the sources of law and protection of intellectual property, the types of intellectual property protection, and the consequences of infringement;</p> <p>K_K5. demonstrating an ethical and moral stance consistent with ethical principles and acting in accordance with the Code of Ethics for Pharmacists of the Republic of Poland;</p> <p>K_K7. using objective sources of information.</p> | - informative lecture with multimedia presentation                                                                                                                                                                                                                                                                                                                                                                                                                | <p>Credit with a grade covering lecture topics.</p> <p>Knowledge: written or oral (≥60%)</p> <p>Skills: written or oral (≥60%)</p> <p>Competencies: extended observation, participation (≥50%)</p>      |
|  | Foreign Language                    | <p>K_C.U9. communicate with patients and healthcare staff in one of the foreign languages at B2+ level of the Common European Framework of Reference for Languages;</p> <p>K_K1. building relationships with patients and colleagues based on mutual trust and respect;</p> <p>K_K2. recognising and identifying one's own limitations, and carrying</p>                                                                                          | <p><b>Language course</b> (depending on the selected language):</p> <ul style="list-style-type: none"> <li>- didactic discussion,</li> <li>- work in a small group (discussion, debate, role play, brainstorming),</li> <li>- case analysis,</li> <li>- computer assisted learning,</li> <li>- expository methods: film, demonstration,</li> <li>- text analysis: reading, translation, pronunciation,</li> <li>- presentations,</li> <li>- dialogues,</li> </ul> | <p>Examination covering the topics covered in the language courses.</p> <p>Knowledge: written or oral (≥60%)</p> <p>Skills: written or oral (≥60%)</p> <p>Competencies: extended observation (≥50%)</p> |

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|  |       | <p>out a self-assessment of one's learning difficulties and educational needs;</p> <p>K_K3. implementing the principles of professional collegueship and cooperation within an interdisciplinary team, including with representatives of other medical professions, also in a multicultural and multinational environment;</p> <p>K_K7. using objective sources of information;</p> <p>K_K8.drawing conclusions from one's own measurements or observations;</p> | <ul style="list-style-type: none"> <li>- conversations,</li> <li>- Internet multimedia techniques.</li> </ul>                                                                                                                                  |                                                                                                                                                                                                         |
|  | Latin | <p>The student:</p> <ul style="list-style-type: none"> <li>- is familiar with selected aspects of Latin grammar and syntax;</li> <li>- is familiar with selected Latin nomenclature in chemistry, botany and pharmacy;</li> </ul>                                                                                                                                                                                                                                | <p>Language course:</p> <ul style="list-style-type: none"> <li>-problem-based lecture with multimedia presentation,</li> <li>- conversations, discussions,</li> <li>- essays,</li> <li>- didactic games,</li> <li>- individual work</li> </ul> | <p>Examination covering the topics covered in the language courses.</p> <p>Knowledge: written or oral (≥60%)</p> <p>Skills: written or oral (≥60%)</p> <p>Competencies: extended observation (≥50%)</p> |

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|  |  | <ul style="list-style-type: none"><li>- is familiar with the names of certain chemical elements and compounds;</li><li>-is familiar with basic Latin terms and abbreviations used in pharmaceutical prescriptions.</li><li>- is familiar with the Latin names of selected medicinal and cosmetic plants.</li><li>- is familiar with the most common Latin expressions in contemporary use.</li><li>- is familiar with the rules of pronunciation in Latin.</li><li>- is able to read, write and translate a prescription.</li><li>- uses specialist Latin at a basic level and understands its application in professional literature.</li><li>- recognises and understands terms of Latin origin in modern</li></ul> |  |  |
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|                                                                         |                              | <p>languages, particularly in English.</p> <p>- uses Latin terms found in international pharmaceutical and medical nomenclature.</p> <p>K_K2. recognising and identifying one's own limitations, and carrying out a self-assessment of one's learning difficulties and educational needs;</p> <p>K_K3. implementing the principles of professional collegueship and cooperation within an interdisciplinary team, including with representatives of other medical professions, also in a multicultural and multinational environment.</p> |                                                                                                                                                                         |                                                                                                  |
| <b>Course Group D</b><br><b>Drug Analysis, Synthesis and Technology</b> | Pharmaceutical Biotechnology | K_D.W13. conditions for the cultivation of living cells and organisms, as well as processes used in pharmaceutical                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>Lectures:</b> <ul style="list-style-type: none"> <li>- informative (conventional) lecture with multimedia presentation,</li> <li>- problem-based lecture,</li> </ul> | Credit with a grade covering lecture and laboratory topics.<br>Knowledge: written or oral (≥60%) |

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|  | <p>biotechnology, including the purification of the resulting substances;<br/> K_D.W14. methods for optimising process parameters in pharmaceutical biotechnology;<br/> K_D.W15. forms of biopharmaceuticals and issues related to their stability;<br/> K_D.W16. the requirements that biological medicinal products must meet, and the rules governing the placing on the market of biological medicinal products;<br/> K_D.W17. the characteristics of a biological medicinal product, and the classification of biopharmaceuticals, including recombinant human proteins, fusion proteins, monoclonal antibodies and antisense oligonucleotides;<br/> K_D.W18. the requirements for different</p> | <p>- conversational lecture<br/> <b>Laboratories:</b><br/> - observation,<br/> - individual work,<br/> - laboratory classes,<br/> - analysis of research findings related to cell culture,<br/> - expository methods: demonstration,<br/> - classic problem-based lecture,<br/> - discussion.</p> | <p>Skills: written or oral (≥60%)<br/> Competencies: extended observation, self-assessment (≥50%)</p> |
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|  |                | <p>drug forms of medicinal products and the principles governing the selection of a medicinal product's drug form depending on the properties of the active substance and the intended use of the medicinal product;</p> <p>K_D.W19. advanced therapy medicinal products;</p> <p>K_D.W20. essential vaccines, guidelines for their use and storage;</p> <p>K_D.W21. basic blood-derived and blood substitute products and methods of their preparation.</p> |                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                |
|  | Drug Chemistry | <p>K_D.W1. the classification of medicinal substances according to the Anatomical Therapeutic Chemical (ATC) system;</p> <p>K_D.W2. relationships between the chemical structure, physicochemical properties and</p>                                                                                                                                                                                                                                        | <p><b>Lectures:</b></p> <ul style="list-style-type: none"> <li>- informative (conventional) lecture;</li> <li>- problem-based lecture with multimedia presentation</li> </ul> <p><b>Tutorials:</b></p> <ul style="list-style-type: none"> <li>- classroom-based tasks with a multimedia presentation;</li> <li>- conversational lecture;</li> <li>- individual and group work</li> </ul> | <p>Examination covering lecture and tutorial topics.</p> <p>Knowledge: written or oral (<math>\geq 60\%</math>)</p> <p>Skills: written or oral (<math>\geq 60\%</math>)</p> <p>Competencies: extended observation (<math>\geq 50\%</math>)</p> |

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|  |  | <p>mechanisms of action of substances;</p> <p>K_D.W5. the stability of active substances, their possible degradation reactions, and factors affecting their stability;</p> <p>K_D.W6. issues related to falsified medicinal products;</p> <p>K_D.W36. elements, compounds and medicinal products labelled with isotopes, and methods for their control;</p> <p>K_D.U1. to assess, on the basis of their chemical structure, the properties of substances for pharmaceutical use;</p> <p>K_D.U6. detect defects in a medicinal product;</p> <p>K_K1. building relationships with patients and colleagues based on mutual trust and respect;</p> <p>K_K2. recognising and identifying one's own limitations, and carrying out a self-assessment of one's learning difficulties and educational needs;</p> |  |  |
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|  |               | <p>K_K3. implementing the principles of professional colleagueship and cooperation within an interdisciplinary team, including with representatives of other medical professions, also in a multicultural and multinational environment;</p> <p>K_K7. using objective sources of information;</p> <p>K_K8. drawing conclusions from one's own measurements or observations;</p> <p>K_K10. accepting responsibility for decisions taken in the course of one's professional activities, including in relation to one's own safety and that of others.</p> |                                                                                                                                                                                                         |                                                                                                                                    |
|  | Drug Analysis | <p>K_D.W3. the structure of the pharmacopoeia and its significance for the quality of medicinal substances and products;</p> <p>K_D.W4. methods used in the quality assessment of</p>                                                                                                                                                                                                                                                                                                                                                                    | <p><b>Laboratories:</b></p> <ul style="list-style-type: none"> <li>- laboratory classes,</li> <li>- carrying out qualitative and quantitative analyses;</li> <li>- individual and team work;</li> </ul> | <p>Credit with a grade covering the topics covered in the tutorials and laboratories.</p> <p>Knowledge: written or oral (≥60%)</p> |

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|  |  | <p>substances for pharmaceutical purposes and in the analysis of medicinal products, as well as procedures for validating these methods;</p> <p>K_D.W5. the stability of active substances, their possible degradation reactions, and factors affecting their stability;</p> <p>K_D.U3 plan quality control of substances for pharmaceutical use and medicinal products in accordance with pharmacopoeial requirements;</p> <p>K_D.U4. carry out identity and quality tests on the substance, analyse its content and detect its degradation products in the medicinal product using pharmacopoeial methods, including spectroscopic and chromatographic methods;</p> <p>K_D.U5. evaluate the results obtained from quality testing of substances for pharmaceutical use and</p> | <ul style="list-style-type: none"> <li>– carrying out measurements, compiling and interpreting results;</li> <li>– analysing pharmacopoeial monographs and analytical procedures;</li> <li>– resolving analytical problems;</li> <li>– assessing students' knowledge through written or oral examinations.</li> </ul> <p><b>Tutorials:</b></p> <ul style="list-style-type: none"> <li>– problem-based tasks;</li> <li>– multimedia presentation;</li> <li>– conversational lecture;</li> <li>– analysis and discussion of issues relating to the determination of medicinal substances and their metabolites in biological material, the analysis of medicinal products, and quality control;</li> <li>– analysis of pharmacopoeial monographs, quality specifications and example analytical procedures;</li> <li>– solving analytical tasks and problems;</li> <li>– case studies;</li> <li>– moderated discussion;</li> <li>– ongoing assessment of students' knowledge.</li> </ul> | <p>Skills: written or oral (≥60%)</p> <p>Competencies: extended observation (≥50%)</p> |
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|  |               | <p>medicinal products, and to confirm that the results obtained comply with the specification;</p> <p>K_K7. using objective sources of information;</p> <p>K_K8. drawing conclusions from one's own measurements or observations;</p> <p>K_K10 accepting responsibility for decisions taken in the course of one's professional activities, including in relation to one's own safety and that of others.</p> |                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                     |
|  | Pharmacognosy | <p>K_D.W39. types and methods of production and quality assessment of plant-based preparations;</p> <p>K_D.W40. plant-based raw materials used in medicine and in the manufacture of medicinal products, medical devices and dietary supplements;</p> <p>K_D.W41. groups of chemical compounds that determine the properties of plant-based raw</p>                                                           | <p><b>Lectures:</b> expository methods: - informative lecture, problem-based lecture with multimedia presentation</p> <p><b>Seminars:</b> activation methods: didactic discussion, work in groups (case study method),</p> <p><b>Laboratories:</b> activation methods – didactic discussion, demonstration</p> | <p>Examination covering topics covered in lectures, seminars, and laboratories.</p> <p>Knowledge: written or oral (≥60%)</p> <p>Skills: written or oral (≥60%)</p> <p>Competencies: extended observation (≥50%)</p> |

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|  |  | <p>materials and preparations;<br/> K_D.W42. the main chemical compounds found in medicinal plants, their effects and their use in the treatment of diseases;<br/> K_D.W43. selected methods for testing plant substances and preparations, as well as methods for isolating constituents from plant material;<br/> K_D.U24. assess the identity and quality of medicinal plant material on the basis of a pharmacopoeial monograph and to carry out its analysis;<br/> K_D.U25. carry out an analysis of a herbal medicinal product and identify the active substances it contains using pharmacopoeial methods;<br/> K_D.U26. prepare herbal preparations under laboratory conditions and</p> |  |  |
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|  |                                                | <p>assess their quality using pharmacopoeial methods;<br/> K_K2. recognising and identifying one's own limitations, and carrying out a self-assessment of one's learning difficulties and educational needs;<br/> K_K6. promoting healthy lifestyles;<br/> K_K7. using objective sources of information;<br/> K_K8. drawing conclusions from one's own measurements or observations.</p> |                                                                                                                                                                                                               |                                                                                                                                                                                                                              |
|  | Synthesis and Technology of Therapeutic Agents | <p>K_D.W7. methods for the manufacture of representative active substances;<br/> K_D.W8. requirements concerning the description of the manufacturing process and the quality assessment of a medicinal substance in the documentation for marketing authorisation procedures;<br/> K_D.W9. methods for the preparation and separation of optically active</p>                           | <p><b>Lectures:</b><br/> - problem-based lecture with multimedia presentation<br/> <b>Laboratories:</b><br/> - experiments and problem analysis<br/> <b>Seminars:</b><br/> - presentations and discussion</p> | <p>Examination covering topics covered in lectures, seminars, and laboratories.<br/> Knowledge: written or oral (≥60%)<br/> Skills: written or oral (≥60%)<br/> Competencies: extended observation, participation (≥50%)</p> |

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|  |                        | <p>medicinal substances, and methods for obtaining various polymorphic forms;</p> <p>K_D.W10. methods for the discovery of new medicinal substances;</p> <p>K_D.W11. issues related to patent protection of substances for pharmaceutical purposes and medicinal products.</p>                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                  |
|  | Drug Form Technology 1 | <p>K_D.W3. the structure of the pharmacopoeia and its significance for the quality of medicinal substances and products;</p> <p>K_D.W12. the physicochemical and functional properties of basic excipients used in drug form technology;</p> <p>K_D.W18. the requirements for different drug forms of medicinal products and the principles governing the selection of a medicinal product's drug form depending on the properties of the active substance and the intended</p> | <p><b>Lectures:</b></p> <ul style="list-style-type: none"> <li>- informative (conventional) lecture);</li> <li>- problem-based lecture with multimedia presentation</li> </ul> <p><b>Laboratories and practical classes:</b></p> <ul style="list-style-type: none"> <li>- individual work;</li> <li>- classic problem-based lecture;</li> <li>- laboratory method</li> </ul> | <p>Examination covering lectures, laboratories, and tutorials.</p> <p>Knowledge: written or oral (<math>\geq 60\%</math>)</p> <p>Skills: written, oral, and practical (<math>\geq 60\%</math>)</p> <p>Competencies: extended observation, practical (<math>\geq 50\%</math>)</p> |

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|  |  | <p>use of the medicinal product;</p> <p>K_D.W22. nomenclature, composition and properties of individual drug forms;</p> <p>K_D.W24. principles for the preparation and control of compounded medicines and their shelf life;</p> <p>K_D.W25. types of physicochemical incompatibilities between the components of pharmaceutical preparations;</p> <p>K_D.W26. basic manufacturing processes and equipment used in the technology of drug forms</p> <p>K_D.W27. methods for the preparation of liquid, semi-solid and solid drug forms on a laboratory and industrial scale, and the influence of manufacturing process parameters on the properties of drug forms;</p> <p>K_D.W28. methods of aseptic practice and ensuring the sterility of</p> |  |  |
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|  |  | <p>medicinal products, substances and materials;<br/>K_D.W29. types of packaging and dispensing systems;<br/>K_D.W31. methods for testing the quality of a medicinal product form and the procedure for analysing a production batch;<br/>K_D.W32. factors affecting the stability of a medicinal product form and methods for testing its stability;<br/>K_D.U2. use pharmacopoeias, guidelines and literature related to the quality assessment of substances for pharmaceutical use and medicinal products;<br/>K_D.U10. use pharmacopoeias, formulary manuals, manufacturing specifications, guidelines and literature on drug formulation technology, particularly in relation to compounded medicines;</p> |  |  |
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|  |  | <p>K_D.U11. propose a suitable dosage form for the medicinal product, depending on the properties of the active substance and its intended use;</p> <p>K_D.U12. prepare compounded medicines used in modern practice, select appropriate packaging, and determine the shelf life of a compounded medicine and how it should be stored;</p> <p>K_D.U13. identify and resolve problems arising from the composition of a compounded medicine, monitor its dosage and verify its composition;</p> <p>K_D.U14. assess the functional properties of excipients for pharmaceutical use;</p> <p>K_D.U15. prepare specimens under aseptic conditions and select a sterilisation method;</p> <p>K_D.U18. draw up records of the procedures carried out during the preparation of</p> |  |  |
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|  |                         | <p>compounded and pharmacy-made medicines;</p> <p>K_D.U20. carry out tests to assess the quality of a medicinal product, operate the relevant testing and measuring equipment, and interpret the test results;</p> <p>K_D.U21. assess the risk of poor quality in medicinal products and medical devices, as well as the clinical consequences;</p> <p>K_D.U23. identify the factors affecting the shelf life of a medicinal product and select the appropriate storage conditions;</p> <p>K_K7. using objective sources of information;</p> <p>K_K8. drawing conclusions from one's own measurements or observations.</p> |                                                                                                                                                                                                    |                                                                                                             |
|  | Drug Form Technology II | <p>K_D.W3. the structure of the pharmacopoeia and its significance for the quality of medicinal substances and products;</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <p><b>Lectures:</b></p> <ul style="list-style-type: none"> <li>- informative (conventional) lecture;</li> <li>- problem-based lecture</li> </ul> <p><b>Laboratories and practical classes:</b></p> | <p>Examination covering lectures, laboratories, and tutorials.</p> <p>Knowledge: written or oral (≥60%)</p> |

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|  |  | <p>K_D.W12. the physicochemical and functional properties of basic excipients used in drug form technology;</p> <p>K_D.W18. the requirements for different drug forms of medicinal products and the principles governing the selection of a medicinal product's drug form depending on the properties of the active substance and the intended use of the medicinal product;</p> <p>K_D.W21. basic blood-derived and blood substitute products and methods of their preparation;</p> <p>K_D.W22. nomenclature, composition and properties of individual drug forms;</p> <p>K_D.W23. principles for selecting drug forms in enteral nutrition;</p> <p>K_D.W25. types of physicochemical incompatibilities between the components of</p> | <ul style="list-style-type: none"> <li>- individual work;</li> <li>- laboratory classes;</li> <li>- result analysis</li> </ul> | <p>Skills: written, oral, and practical (<math>\geq 60\%</math>)</p> <p>Competencies: extended observation (<math>\geq 50\%</math>)</p> |
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|  |  | <p>pharmaceutical preparations;<br/>K_D.W26. basic manufacturing processes and equipment used in the technology of drug forms<br/>K_D.W27. methods for the preparation of liquid, semi-solid and solid drug forms on a laboratory and industrial scale, and the influence of manufacturing process parameters on the properties of drug forms;<br/>K_D.W28. methods of aseptic practice and ensuring the sterility of medicinal products, substances and materials;<br/>K_D.W29. types of packaging and dispensing systems;<br/>K_D.W30. the Good Manufacturing Practice requirements set out in the regulations issued pursuant to Article 39(5)(1) of the Act of 6 September 2001 – Pharmaceutical Law (Journal of Laws of 2025, item 750, as amended);</p> |  |  |
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|  |  | <p>K_D.W31. methods for testing the quality of a medicinal product form and the procedure for analysing a production batch;</p> <p>K_D.W32. factors affecting the stability of a medicinal product form and methods for testing its stability;</p> <p>K_D.W33. the scope of testing required for the documentation in marketing authorisation procedures;</p> <p>K_D.W34. the scope of application of risk analysis, quality by design and process-based technology in pharmaceutical manufacturing;</p> <p>K_D.W35. the principles of preparing homeopathic preparations;</p> <p>K_D.W37. methods for the ex tempore preparation of radiopharmaceuticals and their use in the diagnosis and treatment of diseases;</p> |  |  |
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|  |  | <p>K_D.U2. use pharmacopoeias, guidelines and literature related to the quality assessment of substances for pharmaceutical use and medicinal products;</p> <p>K_D.U10. use pharmacopoeias, formulary manuals, manufacturing specifications, guidelines and literature on drug formulation technology, particularly in relation to compounded medicines;</p> <p>K_D.U11. propose a suitable dosage form for the medicinal product, depending on the properties of the active substance and its intended use;</p> <p>K_D.U12. prepare compounded medicines used in modern practice, select appropriate packaging, and determine the shelf life of a compounded medicine and how it should be stored;</p> <p>K_D.U13. identify and resolve problems arising</p> |  |  |
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|  |  | <p>from the composition of a compounded medicine, monitor its dosage and verify its composition;</p> <p>K_D.U14. assess the functional properties of excipients for pharmaceutical use;</p> <p>K_D.U15. prepare specimens under aseptic conditions and select a sterilisation method;</p> <p>K_D.U16. prepare mixtures for parenteral nutrition;</p> <p>K_D.U17. prepare cytotoxic medicinal products in a form ready for administration;</p> <p>K_D.U18. draw up records of the procedures carried out during the preparation of compounded and pharmacy-made medicines;</p> <p>K_D.U19. plan the stages of manufacturing a medicinal product under industrial conditions, select the equipment and choose the control methods;</p> |  |  |
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|  |  | <p>K_D.U20. carry out tests to assess the quality of a medicinal product, operate the relevant testing and measuring equipment, and interpret the test results;</p> <p>K_D.U21. assess the risk of poor quality in medicinal products and medical devices, as well as the clinical consequences;</p> <p>K_D.U22. propose specifications for a medicinal product and to plan stability testing of the active substance and the medicinal product;</p> <p>K_D.U23. identify the factors affecting the shelf life of a medicinal product and select the appropriate storage conditions;</p> <p>K_K3. implementing the principles of professional colleagueship and cooperation within an interdisciplinary team, including with representatives of other medical professions, also in a multicultural and</p> |  |  |
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|                                                                       |             | <p>multinational environment;<br/> K_K7. using objective sources of information;<br/> K_K8. drawing conclusions from one's own measurements or observations.</p>                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                 |
| <p><b>Course Group E</b><br/> <b>Biopharmacy and Drug Effects</b></p> | Biopharmacy | <p>K_E.W2. the structure and function of biological barriers in the body that influence the absorption and distribution of a medicinal substance;<br/> K_E.W3. the effect of a medicinal product's formulation and route of administration on its absorption, as well as on the duration and effect of its action;<br/> K_E.W7. interactions between medicinal substances during the pharmacokinetic, pharmacodynamic and pharmaceutical phases;<br/> K_E.W9. methods for assessing pharmaceutical and bioavailability, as well as issues related to the correlation between in</p> | <p><b>Laboratories:</b></p> <ul style="list-style-type: none"> <li>- laboratory tasks;</li> <li>- didactic discussion with multimedia presentation;</li> <li>- computer-assisted learning;</li> <li>- result analysis;</li> <li>- expository methods: film</li> </ul> | <p>Examination covering lecture and laboratory topics.<br/> Knowledge: written or oral (≥60%)<br/> Skills: written or oral, practical (≥60%)<br/> Competencies: extended observation (≥50%)</p> |

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|  |  | <p>vitro and in vivo test results;</p> <p>K_E.W10. the significance of factors influencing the improvement of a medicinal product's pharmaceutical and bioavailability;</p> <p>K_E.W11. issues related to the biopharmaceutical evaluation of original and generic medicinal products, including methods for assessing bioequivalence;</p> <p>K_E.U1. assess differences in the absorption of substances depending on the composition of the medicinal product, its dosage form, and physiological and pathological conditions;</p> <p>K_E.U4. explain the significance, propose methodology and interpret the results of studies on pharmaceutical and biological availability and bioequivalence;</p> |  |  |
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|  |  | <p>K_E.U5. make use of legislation, guidelines and scientific publications on bioavailability and bioequivalence studies of medicinal products;</p> <p>K_E.U7. carry out a study of the pharmaceutical availability of the active substance in the oral dosage forms of a medicinal product in order to demonstrate the similarity of different medicinal products, using pharmacopoeial methods and apparatus;</p> <p>K_E.U8. justify the possibility of exempting a medicinal product from in vivo bioequivalence studies on the basis of a biopharmaceutical classification system;</p> <p>K_E.U9. anticipate the effects of changes in the pharmaceutical and biological availability of the active substance resulting from modifications to the formulation of the medicinal product;</p> |  |  |
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|  |             | <p>K_K3. implementing the principles of professional colleagueship and cooperation within an interdisciplinary team, including with representatives of other medical professions, also in a multicultural and multinational environment;</p> <p>K_K7. using objective sources of information;</p> <p>K_K8. drawing conclusions from one's own measurements or observations.</p> |                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                   |
|  | Bromatology | <p>K_E.W30. basic nutrients, the body's requirements for them, their significance, bioavailability, dietary sources, and nutritional principles in selected disease conditions;</p> <p>K_E.W31. methods for assessing the nutritional value and quality of food, including food products available in pharmacies, and methods for assessing</p>                                 | <p><b>Lectures:</b></p> <ul style="list-style-type: none"> <li>- informative with multimedia presentation;</li> <li>- problem-based;</li> <li>- conversational</li> </ul> <p><b>Laboratories:</b></p> <ul style="list-style-type: none"> <li>- experiments and problem analysis</li> </ul> | <p>Examination covering lecture and laboratory topics.</p> <p>Knowledge: written or oral, practical (<math>\geq 65\%</math>)</p> <p>Skills: written or oral (<math>\geq 65\%</math>)</p> <p>Competencies: extended observation, active participation (<math>\geq 50\%</math>)</p> |

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|  |  | <p>the dietary habits of healthy and sick people;<br/>K_E.W32. issues of food additives and food contaminants;<br/>K_E.W33. issues and requirements related to fortified foods, food supplements, foods for special medical purposes and enteral nutrition;<br/>K_E.W34. the basics of drug–food interactions;<br/>K_E.U17. describe food products belonging to different food categories in terms of their composition and nutritional value;<br/>K_E.U18. explain the principles and role of proper nutrition in the prevention and management of diseases, as well as to assess clinical nutrition practices;<br/>K_E.U19. explain the causes and effects of interactions between medicines and food, and to advise patients on such interactions;</p> |  |  |
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|  |                  | <p>K_E.U20. assess the quality of herbal medicinal products;</p> <p>K_K1. building relationships with patients and colleagues based on mutual trust and respect;</p> <p>K_K2. recognising and identifying one's own limitations, and carrying out a self-assessment of one's learning difficulties and educational needs;</p> <p>K_K6. promoting healthy lifestyles;</p> <p>K_K7. using objective sources of information;</p> <p>K_K8. drawing conclusions from one's own measurements or observations.</p> |  |                                                                                                                                                                                            |
|  | Pharmacokinetics | <p>K_E.W4. pharmacokinetic processes and their significance in medicinal product development and in the optimisation of pharmacotherapy;</p> <p>K_E.W5. parameters describing pharmacokinetic processes and methods for determining them;</p>                                                                                                                                                                                                                                                               |  | <p>Examination covering lecture and laboratory topics.</p> <p>Knowledge: written or oral (≥60%)</p> <p>Skills: written or oral (≥60%)</p> <p>Competencies: extended observation (≥50%)</p> |

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|  |  | <p>K_E.W6. physiological, pathophysiological and environmental factors influencing the course of pharmacokinetic and pharmacological processes;</p> <p>K_E.W8. the principles of concentration-guided therapy and the guidelines for adjusting the dosage based on the patient's concentration measurement results;</p> <p>K_E.W9. methods for assessing pharmaceutical and bioavailability, as well as issues related to the correlation between in vitro and in vivo test results;</p> <p>K_E.U1. assess differences in the absorption of substances depending on the composition of the medicinal product, its dosage form, and physiological and pathological conditions;</p> <p>K_E.U2. explain the significance of membrane transport in</p> |  |  |
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|  |  | <p>pharmacokinetic processes;<br/>K_E.U3. calculate and interpret the pharmacokinetic parameters of a medicinal substance determined using pharmacokinetic models or other methods;<br/>K_E.U6. to present and explain the blood concentration profiles of the active substance depending on the route of administration and the formulation of the medicinal product;<br/>K_E.U10. explain the causes and effects of interactions during the pharmacokinetic and pharmacodynamic phases, and identify ways of preventing such interactions;<br/>K_K3. implementing the principles of professional colleagueship and cooperation within an interdisciplinary team, including with representatives of other medical professions, also</p> |  |  |
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|  |                                     | in a multicultural and multinational environment;<br>K_K8. drawing conclusions from one's own measurements or observations.                                                                                                                                                                                                                                                                                                                                                                                                              |  |                                                                                                                                                                                         |
|  | Pharmacology and Pharmacodynamics I | K_E.W13. the pharmacological properties of individual groups of medicines, including biological medicines;<br>K_E.W14. factors influencing the action of the active substance during the pharmacodynamic phase, including genetic factors, and the principles of personalised therapy;<br>K_E.W15. the basics of molecularly targeted therapy strategies and the mechanisms of drug resistance;<br>K_E.W16. routes of administration and methods of dosing for medicinal products;<br>K_E.W17. indications and contraindications for the |  | Credit with a grade covering lectures and tutorials.<br>Knowledge: written or oral (≥60%)<br>Skills: written or oral (≥60%)<br>Competencies: extended observation, participation (≥50%) |

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|  |  | <p>use of a medicinal product, and the adverse effects of a medicinal product;</p> <p>K_E.W18. the classification and mechanisms of adverse effects of medicinal products;</p> <p>K_E.W19. the principles of correct combination of medicinal products, the types of interactions between them, and the factors influencing the occurrence of interactions and ways of avoiding them;</p> <p>K_E.W20. basic concepts in pharmacogenetics and pharmacogenomics;</p> <p>K_E.U11. explain the pharmacological properties of a medicinal substance on the basis of its drug target and mechanism of action;</p> <p>K_E.U12. justify the need to adjust the dosage of a medicinal product in accordance with physiological and</p> |  |  |
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|  |  | <p>pathological conditions and genetic factors;</p> <p>K_E.U13. predict the adverse effects of specific groups of medicinal substances depending on the dose and mechanism of action;</p> <p>K_E.U14. provide information on the indications and contraindications for the use of medicinal products, as well as on their correct</p> <p>K_K3. implementing the principles of professional colleagueship and cooperation within an interdisciplinary team, including with representatives of other medical professions, also in a multicultural and multinational environment; usage and administration;</p> |  |  |
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|  |                                      | <p>K_K6. promoting healthy lifestyles;</p> <p>K_K7. using objective sources of information.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                            |
|  | Pharmacology and Pharmacodynamics II | <p>K_E.W12. drug targets and mechanisms of action of active substances;</p> <p>K_E.W13. the pharmacological properties of individual groups of medicines, including biological medicines;</p> <p>K_E.W14. factors influencing the action of the active substance during the pharmacodynamic phase, including genetic factors, and the principles of personalised therapy;</p> <p>K_E.W15. the basics of molecularly targeted therapy strategies and the mechanisms of drug resistance;</p> <p>K_E.W16. routes of administration and methods of dosing for medicinal products;</p> | <p><b>Lectures:</b></p> <ul style="list-style-type: none"> <li>- informative lecture (conventional) with multimedia presentation);</li> <li>- problem-based lecture;</li> <li>- lecture with multimedia presentation</li> </ul> <p><b>Laboratories:</b></p> <ul style="list-style-type: none"> <li>- observation;</li> <li>- practical tasks;</li> <li>- expository methods: film, demonstration;</li> <li>- case study;</li> <li>- learning assisted by multimedia presentation;</li> <li>- scientific publications' review</li> </ul> | <p>Examination covering lecture and laboratory topics.</p> <p>Knowledge: written or oral (≥60%)</p> <p>Skills: written or oral (≥60%)</p> <p>Competencies: extended observation (≥50%)</p> |

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|  |  | <p>K_E.W17. indications and contraindications for the use of a medicinal product, and the adverse effects of a medicinal product;</p> <p>K_E.W18. the classification and mechanisms of adverse effects of medicinal products;</p> <p>K_E.W19. the principles of correct combination of medicinal products, the types of interactions between them, and the factors influencing the occurrence of interactions and ways of avoiding them;</p> <p>K_E.W20. basic concepts in pharmacogenetics and pharmacogenomics;</p> <p>K_E.U11. explain the pharmacological properties of a medicinal substance on the basis of its drug target and mechanism of action;</p> <p>K_E.U12. justify the need to adjust the dosage of a medicinal product in accordance with</p> |  |  |
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|  |  | <p>physiological and pathological conditions and genetic factors;<br/>K_E.U13. predict the adverse effects of specific groups of medicinal substances depending on the dose and mechanism of action;<br/>K_E.U14. provide information on the indications and contraindications for the use of medicinal products, as well as on their correct dosage and administration;<br/>K_K2. recognising and identifying one's own limitations, and carrying out a self-assessment of one's learning difficulties and educational needs;<br/>K_K6 promoting healthy lifestyles;<br/>K_K7. using objective sources of information;<br/>K_K8. drawing conclusions from one's own measurements or observations;<br/>K_K9.formulating opinions on various</p> |  |  |
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|  |                 | aspects of professional practice.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                          |
|  | Plant Medicines | <p>K_E.W35. principles for the design of complex herbal medicinal products;</p> <p>K_E.W36. criteria for assessing the quality of herbal medicinal products;</p> <p>K_E.W37. herbal medicinal products and substances of plant origin, their mechanisms of action, and the therapeutic indications for the use of these products and substances;</p> <p>K_E.W38. the standardisation procedure for herbal medicinal products and its use in the marketing authorisation process;</p> <p>K_E.U20. assess the quality of herbal medicinal products;</p> <p>K_E.U21. assess the profile of a herbal medicinal product's action on the basis of its composition;</p> <p>K_E.U22. advise patients on the use of herbal</p> | <p><b>Lectures:</b></p> <ul style="list-style-type: none"> <li>- informative (conventional) lecture;</li> <li>- problem-based lecture with multimedia presentation</li> </ul> <p><b>Seminars:</b></p> <ul style="list-style-type: none"> <li>- activation and problem-based methods: discussion, case studies</li> </ul> <p><b>Laboratories:</b></p> <ul style="list-style-type: none"> <li>- individual work;</li> <li>- case study;</li> <li>- laboratory classes;</li> <li>- result analysis</li> </ul> | <p>Credit with a grade covering lectures, seminars, and laboratories.</p> <p>Knowledge: written or oral (≥60%)</p> <p>Skills: written or oral (≥60%)</p> <p>Competencies: extended observation, participation (≥50%)</p> |

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|  |                                                                      | <p>medicinal products, their interactions, side effects and contraindications;</p> <p>K_K1. building relationships with patients and colleagues based on mutual trust and respect;</p> <p>K_K2. recognising and identifying one's own limitations, and carrying out a self-assessment of one's learning difficulties and educational needs;</p> <p>K_K6. promoting healthy lifestyles;</p> <p>K_K7. using objective sources of information.</p> |                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                             |
|  | Analytical Metrology and Chemometrics in the Pharmaceutical Sciences | <p>K_E.W36. criteria for assessing the quality of herbal medicinal products;</p> <p>K_E.W38. the standardisation procedure for herbal medicinal products and its use in the marketing authorisation process;</p> <p>K_E.U20, assess the quality of herbal medicinal products.</p>                                                                                                                                                               | <p><b>Lectures:</b></p> <ul style="list-style-type: none"> <li>- informative (conventional) lecture;</li> <li>- problem-based lecture;</li> <li>- multimedia presentation</li> </ul> <p><b>Tutorials:</b></p> <ul style="list-style-type: none"> <li>- practical calculation exercises, with the use of documentation;</li> <li>- work in groups (workshops);</li> <li>- case study</li> </ul> | <p>Credit with a grade covering lectures and tutorials.</p> <p>Knowledge: written or oral (≥60%)</p> <p>Skills: written or oral (≥60%)</p> <p>Competencies: extended observation (≥50%)</p> |

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|  | Toxicology | <p>K_E.W21. basic concepts in toxicokinetics, toxicometry and toxicogenetics;</p> <p>K_E.W22. the processes to which a xenobiotic is subjected in the body, taking into account biotransformation processes, depending on the route of administration or exposure;</p> <p>K_E.W23. issues related to the type of exposure to toxins (acute toxicity, chronic toxicity, long-term effects);</p> <p>K_E.W24. endogenous and exogenous factors that modify the activity of enzymes that metabolise xenobiotics;</p> <p>K_E.W25. the toxic effects of selected medicinal substances, addictive substances, psychoactive substances and other chemical substances, as well as guidelines for managing cases of poisoning;</p> <p>K_E.W26. principles and methods for assessing the</p> | <p><b>Lectures:</b></p> <ul style="list-style-type: none"> <li>- informative lecture;</li> <li>- problem-based lecture with multimedia presentation</li> </ul> <p><b>Laboratories:</b></p> <ul style="list-style-type: none"> <li>- practical tutorials;</li> <li>- measurements and analysis of results</li> </ul> | <p>Examination covering lecture and laboratories topics.</p> <p>Knowledge: written or oral (≥60%)</p> <p>Skills: written or oral (≥60%)</p> <p>Competencies: extended observation (≥50%)</p> |
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|  |  | <p>body's exposure to selected xenobiotics;</p> <p>K_E.W27. in vitro and in vivo methods used in xenobiotic toxicity research;</p> <p>K_E.W28. principles of planning and research methodology required in the process of discovering new medicinal substances;</p> <p>K_E.W29. health risks and consequences associated with environmental pollution;</p> <p>K_E.U15. characterise the biotransformation of xenobiotics and assess its significance in metabolic activation and detoxification;</p> <p>K_E.U16. predict the nature and severity of the toxic effects of a xenobiotic based on its chemical structure and the type of exposure;</p> <p>K_K3. implementing the principles of professional colleagueship and cooperation within an interdisciplinary team, including with</p> |  |  |
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|                                                         |                     | <p>representatives of other medical professions, also in a multicultural and multinational environment;</p> <p>K_K8. drawing conclusions from one's own measurements or observations;</p> <p>K_K9. formulating opinions on various aspects of professional practice.</p>                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                               |
| <b>Course Group F</b><br><b>Pharmaceutical Practice</b> | Pharmaceutical Care | <p>K_F.W7. concepts relating to pharmaceutical care, in particular those concerning medication-related problems and needs regarding the use of medicinal products;</p> <p>K_F.W8. principles for monitoring the efficacy and safety of a patient's pharmacotherapy as part of the pharmaceutical care process and the provision of pharmaceutical services, including clinical pharmacy services;</p> <p>K_F.W10. principles of personalised pharmacotherapy that take</p> | <p><b>Lectures:</b></p> <ul style="list-style-type: none"> <li>- problem-based lecture;</li> <li>- informative lecture;</li> <li>- multimedia presentation</li> </ul> <p><b>Laboratories:</b></p> <ul style="list-style-type: none"> <li>- case study;</li> <li>- working with guidelines and sources of information on medicines;</li> <li>- drawing up a pharmaceutical care plan;</li> <li>- documentation of the medication review and pharmaceutical services</li> </ul> <p><b>Practical classes:</b></p> <ul style="list-style-type: none"> <li>- simulated pharmaceutical consultation;</li> <li>- patient history;</li> <li>- patient education;</li> </ul> | <p>Examination covering lectures, laboratories, and tutorials.</p> <p>Knowledge: written, oral, and practical (<math>\geq 60\%</math>)</p> <p>Skills: written, oral, and practical (<math>\geq 60\%</math>)</p> <p>Competencies: practical, extended observation (<math>\geq 50\%</math>)</p> |

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|  |  | <p>into account differences in the effects of medicinal products caused by pathophysiological factors;</p> <p>K_F.W11. key scientific sources of information on medicinal products, substances, food supplements, medical devices and other products used in the treatment of diseases;</p> <p>K_F.W12. selected treatment standards and evidence-based clinical practice guidelines;</p> <p>K_F.W13. rolę farmaceuty w zespołach interdyscyplinarnych;</p> <p>K_F.W14. risks and errors associated with patients using medicinal products on their own;</p> <p>K_F.W15.the issue of addiction to medicinal products and other substances, and the role of pharmacists in combating addiction;</p> <p>K_F.W25. the principles of health promotion, its objectives, and the role of</p> | <ul style="list-style-type: none"> <li>- measurement and interpretation of basic parameters;</li> <li>- assessment of eligibility for vaccination;</li> <li>- carrying out selected procedures in simulated conditions.</li> </ul> |  |
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|  |  | <p>pharmacists in promoting a healthy lifestyle;<br/>K_F.W26. guidelines for carrying out selected diagnostic tests and assessing basic vital signs in pharmaceutical care;<br/>K_F.W27. the eligibility criteria for preventive vaccinations and the procedures for administering them;<br/>K_F.U5. plan, organise, deliver and document pharmaceutical care and clinical pharmacy services;<br/>K_F.U6. conduct pharmaceutical interviews and consultations as part of the process of pharmaceutical care and pharmaceutical counselling, medication reviews and other clinical pharmacy services;<br/>K_F.U7. collaborate with doctors and other healthcare professionals on optimising and rationalising pharmacotherapy, and on identifying and resolving</p> |  |  |
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|  |  | <p>medication-related problems;<br/>K_F.U8. select over-the-counter medicines, medical devices or foodstuffs for special nutritional purposes for medical conditions that do not require a consultation with a doctor;<br/>K_F.U9. prepare and implement a pharmacotherapy monitoring plan, setting out the methods and principles for assessing the efficacy and safety of treatment;<br/>K_F.U10. carry out and explain the individualisation of the dosage of a medicinal product for a patient in a clinical setting;<br/>K_F.U14. provide patient education related to the medicinal products used by the patient and to issues concerning their health and condition, and prepare personalised educational materials or</p> |  |  |
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|  |  | <p>programmes for the patient;</p> <p>K_F.U16. predict the impact of various factors on the pharmacokinetic and pharmacodynamic properties of medicinal products and to address issues relating to the personalisation and optimisation of pharmacotherapy;</p> <p>K_F.U18. identify the risks associated with pharmacotherapy in different patient groups and plan preventive measures;</p> <p>K_F.U21. highlight the role of the pharmacist in multidisciplinary teams;</p> <p>K_F.U22. make use of various sources of information on medicinal products and pharmacotherapy, and to interpret this information critically;</p> <p>K_F.U26. carry out pre-vaccination assessments to rule out any contraindications to</p> |  |  |
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|  |  | <p>vaccination and administer the vaccine to adults;<br/>K_F.U27. carry out selected diagnostic tests and assess basic vital signs whilst providing pharmaceutical care;<br/>K_K1. building relationships with patients and colleagues based on mutual trust and respect;<br/>K_K2. recognising and identifying one's own limitations, and carrying out a self-assessment of one's learning difficulties and educational needs;<br/>K_K3. implementing the principles of professional colleagueship and cooperation within an interdisciplinary team, including with representatives of other medical professions, also in a multicultural and multinational environment;<br/>K_K4. compliance with confidentiality regarding patients' health, patients' rights and the principles of professional ethics;</p> |  |  |
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|  |                   | <p>K_K5. demonstrating an ethical and moral stance consistent with ethical principles and acting in accordance with the Code of Ethics for Pharmacists of the Republic of Poland;</p> <p>K_K6. promoting healthy lifestyles;</p> <p>K_K7. using objective sources of information;</p> <p>K_K8. drawing conclusions from one's own measurements or observations;</p> <p>K_K9. formulating opinions on various aspects of professional practice;</p> <p>K_K10. accepting responsibility for decisions taken in the course of one's professional activities, including in relation to one's own safety and that of others.</p> |                                                                                                                                                     |                                                                                                          |
|  | Clinical Pharmacy | <p>K_F.W8. principles for monitoring the efficacy and safety of a patient's pharmacotherapy as part of the pharmaceutical care</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <p><b>Lectures:</b></p> <ul style="list-style-type: none"> <li>- informative lecture</li> <li>- didactic lecture</li> </ul> <p><b>Seminars:</b></p> | <p>Credit with a grade covering lectures, seminars, and tutorials. Knowledge: written or oral (≥60%)</p> |

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|  |  | <p>process and the provision of pharmaceutical services, including clinical pharmacy services;</p> <p>K_F.W9. principles governing the provision of clinical pharmacy services;</p> <p>K_F.W12. selected treatment standards and evidence-based clinical practice guidelines;</p> <p>K_F.W13. the role of the pharmacist in multidisciplinary teams;</p> <p>K_F.U5. plan, organise, deliver and document pharmaceutical care and clinical pharmacy services;</p> <p>K_F.U7. collaborate with doctors and other healthcare professionals on optimising and rationalising pharmacotherapy, and on identifying and resolving medication-related problems;</p> <p>K_F.U10. carry out and explain the individualisation of the dosage of a medicinal</p> | <p>- didactic discussion, text analysis</p> <p><b>Practical classes:</b></p> <p>- practical classes with patients, case studies</p> | <p>Skills: written, oral, or practical (<math>\geq 60\%</math>)</p> <p>Competencies: practical, extended observation (<math>\geq 50\%</math>)</p> |
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|  |  | <p>product for a patient in a clinical setting;</p> <p>K_F.U11. select the appropriate form of medicinal product for the patient, taking into account clinical recommendations, the route of administration, the patient's needs and the availability of medicinal products;</p> <p>K_F.U13. advise healthcare professionals on the correct way to manage the medicinal product and to provide information about it;</p> <p>K_F.U21. highlight the role of the pharmacist in multidisciplinary teams;</p> <p>K_K2. recognising and identifying one's own limitations, and carrying out a self-assessment of one's learning difficulties and educational needs;</p> <p>K_K4. compliance with confidentiality regarding patients' health, patients' rights and the principles of professional ethics;</p> |  |  |
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|  |                   | K_K7. using objective sources of information.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                  |
|  | Pharmacy Practice | <p>K_F.W2. the rules governing the issuing, recording and dispensing of prescriptions; the rules governing the dispensing of medicinal products, medical devices and foodstuffs for special nutritional purposes from pharmacies and pharmacy outlets, together with the provision of information and advice on the effects, use and storage of such products, medical devices or foodstuffs;</p> <p>K_F.W6. the importance of the proper management of medicinal products within the healthcare system;</p> <p>K_F.W16. instructions for use of the medicinal product, depending on its form, as well as the type of packaging and dispensing system;</p> <p>K_F.W24. rules on the post-marketing safety monitoring of medicinal</p> | <p><b>Lectures:</b></p> <ul style="list-style-type: none"> <li>- problem-based lecture</li> <li>- informative lecture</li> <li>- multimedia presentations</li> </ul> <p><b>Seminars:</b></p> <ul style="list-style-type: none"> <li>- case analysis</li> <li>- moderated discussion work in groups</li> <li>- analysis of documentation and information sources</li> </ul> <p><b>Laboratories:</b></p> <ul style="list-style-type: none"> <li>- practical tasks using pharmacy software;</li> <li>- dispensing prescriptions;</li> <li>- analysing documentation;</li> <li>- working with the Summary of Product Characteristics (SPC), patient information leaflets, the URPL/EMA databases and safety notices</li> </ul> <p><b>Practical classes:</b></p> <ul style="list-style-type: none"> <li>- simulation of a pharmacy dispensing procedure;</li> <li>- consultation with a patient;</li> <li>- providing information to patients and medical staff;</li> <li>- reporting incidents, and carrying out tasks in conditions similar to those encountered in professional practice.</li> </ul> | <p>Examination covering topics covered in lectures, seminars, laboratories, and tutorials.</p> <p>Knowledge: written or oral (<math>\geq 60\%</math>)</p> <p>Skills: written, oral, or practical (<math>\geq 60\%</math>)</p> <p>Competencies: extended observation (<math>\geq 50\%</math>)</p> |

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|  |  | <p>products and the supervision of medical devices;</p> <p>K_F.U1. set out the rules for the management of medicinal products in hospitals, pharmacies and wholesalers;</p> <p>K_F.U2. process prescriptions for medicinal products and to lay down rules governing the organisation of the supply of medicinal products, foodstuffs for special nutritional purposes and medical devices in healthcare facilities, using the available IT tools;</p> <p>K_F.U3. define the scope of duties, supervise and organise the work of staff in the pharmacy and within the clinical pharmacy team;</p> <p>K_F.U4. specify the storage conditions for medicinal products, medical devices and food supplements, including the requirements for their storage, and to monitor those storage conditions;</p> |  |  |
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|  |  | <p>K_F.U11. select the appropriate form of medicinal product for the patient, taking into account clinical recommendations, the route of administration, the patient's needs and the availability of medicinal products;</p> <p>K_F.U12. advise on the correct way to manage the medicinal product throughout its use by the patient and provide information about that medicinal product;</p> <p>K_F.U13. advise healthcare professionals on the correct way to manage the medicinal product and to provide information about it;</p> <p>K_F.U17. monitor and report adverse reactions to medicinal products, medical incidents, adverse reactions to vaccines, suspected medical errors, confirmed cases of poisoning by a biocidal product, serious adverse reactions to a cosmetic</p> |  |  |
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|  |  | <p>product, suspected failure of a medicinal product to meet quality requirements and of a medical device to meet essential requirements; implement preventive measures; and provide information relating to complications of pharmacotherapy to healthcare professionals, patients and their families or carers;</p> <p>K_K1. building relationships with patients and colleagues based on mutual trust and respect;</p> <p>K_K2. recognising and identifying one's own limitations, and carrying out a self-assessment of one's learning difficulties and educational needs;</p> <p>K_K3. implementing the principles of professional colleagueship and cooperation within an interdisciplinary team, including with representatives of other medical professions, also in a multicultural and</p> |  |  |
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|  |                   | <p>multinational environment;<br/> K_K4. compliance with confidentiality regarding patients' health, patients' rights and the principles of professional ethics;<br/> K_K7. using objective sources of information;<br/> K_K8. drawing conclusions from one's own measurements or observations;<br/> K_K10. accepting responsibility for decisions taken in the course of one's professional activities, including in relation to one's own safety and that of others.</p> |                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                      |
|  | Pharmacoeconomics | <p>K_F.W4. principles governing the organisation and funding of the healthcare system in the Republic of Poland, and the role of the pharmacist within that system;<br/> K_F.W5. the basics of business management;</p>                                                                                                                                                                                                                                                    | <p><b>Lectures:</b></p> <ul style="list-style-type: none"> <li>- problem-based with multimedia presentation</li> <li>- a discussion of examples of HTA (Health Technology Assessment)</li> </ul> <p><b>Tutorials:</b></p> <ul style="list-style-type: none"> <li>- case analysis</li> <li>- calculating costs and benefits;</li> <li>- interpreting ICER/CER;</li> <li>- working with a spreadsheet;</li> </ul> | <p>Credit with a grade covering lectures and tutorials.<br/> Knowledge: written or oral (≥60%)<br/> Skills: written or oral (≥60%)<br/> Competencies: extended observation, participation (≥50%)</p> |

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|  |  | <p>K_F.W18. the basics of health economics and pharmacoeconomics;</p> <p>K_F.W19. methods and tools for assessing costs and outcomes for the purposes of pharmacoeconomic analyses;</p> <p>K_F.U23. estimate the costs and outcomes of pharmacotherapy, calculate and interpret cost-effectiveness ratios, identify the most cost-effective procedure, and determine the impact of new medical technology on the financing of the healthcare system, using the relevant guidelines and recommendations;</p> <p>K_F.U24. carry out a critical analysis of publications on the efficacy, safety and economic aspects of pharmacotherapy, as well as publications on professional practice and the pharmaceutical market;</p> | <p>- moderated discussion.</p> |  |
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|  |                      | K_K7. using objective sources of information;<br>K_K9. formulating opinions on various aspects of professional practice.                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                    |
|  | Pharmacoepidemiology | K_F.W13. the role of the pharmacist in multidisciplinary teams;<br>K_F.W15. the issue of addiction to medicinal products and other substances, and the role of pharmacists in combating addiction;<br>K_F.W21. the significance of population health indicators;<br>K_F.W22. principles governing the conduct of epidemiological studies;<br>K_F.U19. assess and interpret epidemiological indicators;<br>K_F.U21. highlight the role of the pharmacist in multidisciplinary teams;<br>K_F.U24. carry out a critical analysis of publications on the efficacy, safety and economic aspects of | <b>Lectures:</b> <ul style="list-style-type: none"> <li>- informative (conventional) lecture</li> <li>- problem-based lecture with multimedia presentation</li> </ul> <b>Tutorials:</b> <ul style="list-style-type: none"> <li>- individual work</li> <li>- discussion and problem analysis</li> </ul> | Credit with a grade covering lectures and tutorials.<br>Knowledge: written or oral ( $\geq 60\%$ )<br>Skills: written or oral ( $\geq 60\%$ )<br>Competencies: extended observation, participation ( $\geq 50\%$ ) |

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|  |                 | <p>pharmacotherapy, as well as publications on professional practice and the pharmaceutical market;</p> <p>K_F.U25. recognise situations that pose a threat to human health or life and provide appropriate first aid in situations where health or life is at risk;</p> <p>K_K7. using objective sources of information;</p> <p>K_K8. drawing conclusions from one's own measurements or observations.</p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                |
|  | Pharmacotherapy | <p>K_F.W14. risks and errors associated with patients using medicinal products on their own;</p> <p>K_F.W15. the issue of addiction to medicinal products and other substances, and the role of pharmacists in combating addiction;</p> <p>K_F.W23. the principles governing the individualised preparation and distribution of</p>                                                                         | <p><b>Lectures:</b></p> <ul style="list-style-type: none"> <li>- informative (conventional) lecture with multimedia presentation</li> <li>- problem-based lecture</li> </ul> <p><b>Tutorials:</b></p> <ul style="list-style-type: none"> <li>- learning assisted by multimedia presentation</li> <li>- didactic discussion</li> <li>- case analysis</li> <li>- text analysis and discussion</li> </ul> <p><b>Practical classes at a hospital ward:</b></p> <ul style="list-style-type: none"> <li>- case analysis</li> </ul> | <p>Credit with a grade covering lectures, tutorials, and practical classes.</p> <p>Knowledge: written or oral (≥60%)</p> <p>Skills: written or oral (≥60%)</p> <p>Competencies: extended observation, participation (≥50%)</p> |

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|  |  | <p>medicinal products in single doses for hospitalised patients;<br/> K_F.U9. prepare and implement a pharmacotherapy monitoring plan, setting out the methods and principles for assessing the efficacy and safety of treatment;<br/> K_F.U10. carry out and explain the individualisation of the dosage of a medicinal product for a patient in a clinical setting;<br/> K_F.U16. predict the impact of various factors on the pharmacokinetic and pharmacodynamic properties of medicinal products and to address issues relating to the personalisation and optimisation of pharmacotherapy;<br/> K_K1. building relationships with patients and colleagues based on mutual trust and respect;<br/> K_K2. recognising and identifying one's own</p> | - didactic discussion |  |
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|  |                  | <p>limitations, and carrying out a self-assessment of one's learning difficulties and educational needs;</p> <p>K_K3. implementing the principles of professional collegueship and cooperation within an interdisciplinary team, including with representatives of other medical professions, also in a multicultural and multinational environment;</p> <p>K_K7. using objective sources of information.</p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                    |
|  | Drug Information | <p>K_F.W11. key scientific sources of information on medicinal products, substances, food supplements, medical devices and other products used in the treatment of diseases;</p> <p>K_F.U22. make use of various sources of information on medicinal products and pharmacotherapy, and to interpret this information critically;</p>                                                                          | <p><b>Lectures:</b></p> <ul style="list-style-type: none"> <li>- informative (conventional) lecture with multimedia presentation</li> <li>- problem-based lecture</li> </ul> <p><b>Tutorials:</b></p> <ul style="list-style-type: none"> <li>- learning assisted by multimedia presentation</li> <li>- didactic discussion</li> <li>- case analysis</li> <li>- text analysis and discussion</li> <li>- individual and group work</li> </ul> <p><b>Laboratories:</b></p> <ul style="list-style-type: none"> <li>- learning assisted by multimedia presentation;</li> </ul> | <p>Examination covering lectures, tutorials, and laboratories.</p> <p>Knowledge: written or oral (≥60%)</p> <p>Skills: written or oral (≥60%)</p> <p>Competencies: extended observation (≥50%)</p> |

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|  |  | <p>K_K2. recognising and identifying one's own limitations, and carrying out a self-assessment of one's learning difficulties and educational needs;</p> <p>K_K3. implementing the principles of professional colleagueship and cooperation within an interdisciplinary team, including with representatives of other medical professions, also in a multicultural and multinational environment;</p> <p>K_K7. using objective sources of information;</p> <p>K_K9. formulating opinions on various aspects of professional practice;</p> <p>K_K10. accepting responsibility for decisions taken in the course of one's professional activities, including in relation to one's own safety and that of others.</p> | <p>analysis of sources of information on medicines</p> <ul style="list-style-type: none"> <li>- case analysis</li> <li>- didactic discussion; individual and group work</li> </ul> |  |
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|  | Pharmaceutical Law | <p>K_D.W16. the requirements that biological medicinal products must meet, and the rules governing the placing on the market of biological medicinal products;</p> <p>K_F.W1. legal regulations setting out the rules governing the operation of pharmacies and other entities authorised to trade in medicinal products, and the wholesale and retail trade in medicinal products in the Republic of Poland;</p> <p>K_F.W3. legal regulations setting out the rules governing the acquisition and practice of the profession of pharmacist, the continuing professional development of pharmacists, and the functioning of the professional body for pharmacists;</p> <p>K_F.W17. legal regulations concerning the manufacture and marketing of medicinal</p> | <p><b>Lectures:</b></p> <ul style="list-style-type: none"> <li>- informative and problem-based lecture</li> <li>- multimedia presentation</li> <li>- analysis of selected legal acts</li> </ul> <p><b>Tutorials:</b></p> <ul style="list-style-type: none"> <li>- legal cases</li> <li>- document analysis</li> <li>- working with the text of a legal act; a moderated discussion.</li> </ul> | <p>Examination covering lecture and tutorial topics.</p> <p>Knowledge: written or oral (≥60%)</p> <p>Skills: written or oral (≥60%)</p> <p>Competencies: extended observation (≥50%)</p> |
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|  |  | <p>products, medical devices, food supplements, foodstuffs for special nutritional purposes and cosmetics;</p> <p>K_F.W20. the legal, ethical and methodological aspects of conducting clinical trials and the role of the pharmacist in their conduct;</p> <p>K_F.U20. identify the relevant pharmaceutical organisation or authority dealing with a given professional issue;</p> <p>K_K4. compliance with confidentiality regarding patients' health, patients' rights and the principles of professional ethics;</p> <p>K_K5. demonstrating an ethical and moral stance consistent with ethical principles and acting in accordance with the Code of Ethics for Pharmacists of the Republic of Poland;</p> <p>K_K7. using objective sources of information;</p> <p>K_K9. formulating opinions on various</p> |  |  |
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|  |                          | aspects of professional practice;<br>K_K10. accepting responsibility for decisions taken in the course of one's professional activities, including in relation to one's own safety and that of others.                                                                                                                                                                                  |                                                                                                                                                                                                                   |                                                                                                                                                                                             |
|  | Public Health            | K_F.W4. the principles governing the organisation and funding of the healthcare system in the Republic of Poland, and the role of the pharmacist within that system;<br>K_F.W21. the significance of population health indicators;<br>K_F.U19. assess and interpret epidemiological indicators;<br>K_K6. promoting healthy lifestyles;<br>K_K7. using objective sources of information. | <b>Lectures:</b><br>- information and problem-based lecture with multimedia presentation<br><b>Seminars:</b><br>- population data analysis<br>- problem-based discussion<br>- working with public health reports. | Credit with a grade covering lecture and seminar topics.<br>Knowledge: written or oral (≥60%)<br>Skills: written or oral (≥60%)<br>Competencies: extended observation, participation (≥50%) |
|  | Introduction to Pharmacy | K_F.W3. legal regulations setting out the rules governing the acquisition and practice of the                                                                                                                                                                                                                                                                                           | <b>Lectures:</b><br>- informative (conventional) lecture                                                                                                                                                          | Credit with a grade covering lecture and seminar topics.                                                                                                                                    |

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|  |                    | <p>profession of pharmacist, the continuing professional development of pharmacists, and the functioning of the professional body for pharmacists;</p> <p>K_D.U20. carry out tests to assess the quality of a medicinal product, operate the relevant testing and measuring equipment, and interpret the test results;</p> <p>K_K2. recognising and identifying one's own limitations, and carrying out a self-assessment of one's learning difficulties and educational needs;</p> <p>K_K7. using objective sources of information.</p> | <p>- problem-based lecture with multimedia presentation</p> <p><b>Seminars:</b></p> <ul style="list-style-type: none"> <li>- moderated discussion</li> <li>- analysis of professional documents</li> <li>- analysis of reliable sources of information</li> <li>- short problem-based tasks</li> </ul>                                                                                                                                        | <p>Knowledge: written or oral (≥60%)</p> <p>Skills: written or oral (≥60%)</p> <p>Competencies: extended observation, participation (≥50%)</p>                                               |
|  | Advanced First Aid | <p>K_F.W28. methods for assessing a person's vital signs when their health or life is at risk, and the principles of providing advanced first aid;</p> <p>K_F.U25. recognise situations that pose a threat to human health or life and provide appropriate first aid in</p>                                                                                                                                                                                                                                                              | <p><b>Lectures:</b></p> <ul style="list-style-type: none"> <li>- informative lecture</li> <li>- problem-based lecture</li> <li>- conversational lecture</li> <li>- didactic discussion</li> </ul> <p><b>Laboratories:</b></p> <ul style="list-style-type: none"> <li>- practical exercises, either individually or in pairs;</li> <li>- role-play scenarios</li> <li>- teacher's presentation</li> <li>- Power Point presentations</li> </ul> | <p>Credit with a grade covering lecture and laboratory topics.</p> <p>Knowledge: written or oral (≥60%)</p> <p>Skills: practical (≥60%)</p> <p>Competencies: extended observation (≥60%)</p> |

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|  |                             | <p>situations where health or life is at risk;<br/> K_K4. compliance with confidentiality regarding patients' health, patients' rights and the principles of professional ethics;<br/> K_K10. accepting responsibility for decisions taken in the course of one's professional activities, including in relation to one's own safety and that of others.</p>                                      | <p>- demonstration films</p>                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                      |
|  | Basics of Pharmacy Practice | <p>K_F.W2. the rules governing the issuing, recording and dispensing of prescriptions; the rules governing the dispensing of medicinal products, medical devices and foodstuffs for special nutritional purposes from pharmacies and pharmacy outlets, together with the provision of information and advice on the effects, use and storage of such products, medical devices or foodstuffs;</p> | <p><b>Lectures:</b></p> <ul style="list-style-type: none"> <li>- informative lecture</li> <li>- multimedia presentation</li> <li>- examples review</li> </ul> <p><b>Tutorials:</b></p> <ul style="list-style-type: none"> <li>- case study</li> <li>- work with documentation and pharmacy software</li> <li>- simulation of the dispensing of a prescription;</li> <li>- problem-based tasks</li> </ul> | <p>Credit with a grade covering lectures and tutorials.<br/> Knowledge: written or oral (≥60%)<br/> Skills: written or oral (≥60%)<br/> Competencies: extended observation, participation (≥50%)</p> |

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|                                                                 |                 | <p>K_F.W29. regulations and health and safety rules applicable in the workplace;</p> <p>K_F.U2. process prescriptions for medicinal products and to lay down rules governing the organisation of the supply of medicinal products, foodstuffs for special nutritional purposes and medical devices in healthcare facilities, using the available IT tools;</p> <p>K_F.U15. use IT tools in their professional work;</p> <p>K_K7. using objective sources of information;</p> <p>K_K10. accepting responsibility for decisions taken in the course of one's professional activities, including in relation to one's own safety and that of others.</p> |                                                             |                                                                                                                     |
| <b>Course Group G</b><br><b>Scientific Research Methodology</b> | Master's Thesis | <p>K_G.W1. research methods and techniques used in the current research project</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>Seminars:</b><br>activation didactic methods, discussion | Credit with a grade covering the seminar topics.<br>Knowledge: oral ( $\geq 60\%$ )<br>Skills: oral ( $\geq 60\%$ ) |

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|  |                                                | <p>K_G.U1. make use of specialist academic literature;</p> <p>K_G.U2. plan a research study and discuss its aim and expected results;</p> <p>K_G.U3. carry out a scientific study, interpret and document its results, and relate them to the current state of knowledge;</p> <p>K_G.U4. present the results of a research study</p> <p>K_K7. using objective sources of information;</p> <p>K_K8. drawing conclusions from one's own measurements or observations.</p> |                                                              | Competencies: extended observation, active participation ( $\geq 50\%$ )                                                                                                                                                                      |
|  | Specialised Tutorials and Research Methodology | <p>K_G.W1. research methods and techniques used in the current research project</p> <p>K_G.U1. make use of specialist academic literature;</p> <p>K_G.U2. plan a research study and discuss its aim and expected results;</p> <p>K_G.U3. carry out a scientific study, interpret</p>                                                                                                                                                                                    | <b>Tutorials:</b><br>activation didactic methods, discussion | <p>Credit with a grade covering the seminar topics.</p> <p>Knowledge: oral (<math>\geq 60\%</math>)</p> <p>Skills: oral (<math>\geq 60\%</math>)</p> <p>Competencies: extended observation, active participation (<math>\geq 50\%</math>)</p> |

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|                                                |                                                                   | <p>and document its results, and relate them to the current state of knowledge;</p> <p>K_G.U4. present the results of a research study</p> <p>K_K7. using objective sources of information;</p> <p>K_K8. drawing conclusions from one's own measurements or observations.</p>                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                          |
| <b>Course Group H</b><br><b>Work Placement</b> | <p>Work Placement in a Community Pharmacy (3rd year of study)</p> | <p>K_D.W24. principles for the preparation and control of compounded medicines and their shelf life;</p> <p>K_F.W2. the rules governing the issuing, recording and dispensing of prescriptions; the rules governing the dispensing of medicinal products, medical devices and foodstuffs for special nutritional purposes from pharmacies and pharmacy outlets, together with the provision of information and advice on the effects, use and storage of such</p> | <p>Observation and assessment of practical skills by a supervisor, a pharmacy staff member or a Master of Pharmacy (mgr farmacji).</p> <p>Observation, consultation and assessment of practical skills by an academic teacher supervising the placement on behalf of the university.</p> | <p>Credit.</p> <p>Knowledge: practical (<math>\geq 60\%</math>)</p> <p>Skills: practical (<math>\geq 60\%</math>)</p> <p>Competencies: extended observation (<math>\geq 50\%</math>)</p> |

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|  |  | <p>products, medical devices or foodstuffs;<br/> K_D.U10. use pharmacopoeias, formulary manuals, manufacturing specifications, guidelines and literature on drug formulation technology, particularly in relation to compounded medicines;<br/> K_D.U11. propose a suitable dosage form for the medicinal product, depending on the properties of the active substance and its intended use;<br/> K_D.U12. prepare compounded medicines used in modern practice, select appropriate packaging, and determine the shelf life of a compounded medicine and how it should be stored;<br/> K_D.U13. identify and resolve problems arising from the composition of a compounded medicine, monitor its dosage and verify its composition;</p> |  |  |
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|  |  | <p>K_D.U15. prepare specimens under aseptic conditions and select a sterilisation method;</p> <p>K_D.U18. draw up records of the procedures carried out during the preparation of compounded and pharmacy-made medicines;</p> <p>K_D.U23. identify the factors affecting the shelf life of a medicinal product and select the appropriate storage conditions;</p> <p>K_K1. building relationships with patients and colleagues based on mutual trust and respect;</p> <p>K_K2. recognising and identifying one's own limitations, and carrying out a self-assessment of one's learning difficulties and educational needs;</p> <p>K_K3. implementing the principles of professional colleagueship and cooperation within an interdisciplinary team, including with representatives of other</p> |  |  |
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|  |  | <p>medical professions, also in a multicultural and multinational environment;</p> <p>K_K4. compliance with confidentiality regarding patients' health, patients' rights and the principles of professional ethics;</p> <p>K_K5. demonstrating an ethical and moral stance consistent with ethical principles and acting in accordance with the Code of Ethics for Pharmacists of the Republic of Poland;</p> <p>K_K6. promoting healthy lifestyles;</p> <p>K_K7. using objective sources of information;</p> <p>K_K8. drawing conclusions from one's own measurements or observations;</p> <p>K_K9. formulating opinions on various aspects of professional practice;</p> <p>K_K10. accepting responsibility for decisions taken in the course of one's professional activities,</p> |  |  |
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|                                                           | including in relation to one's own safety and that of others.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                          |
| Work Placement in a Hospital Pharmacy (4th year of study) | <p>K_D.W24. principles for the preparation and control of compounded medicines and their shelf life;</p> <p>K_F.W2. the rules governing the issuing, recording and dispensing of prescriptions; the rules governing the dispensing of medicinal products, medical devices and foodstuffs for special nutritional purposes from pharmacies and pharmacy outlets, together with the provision of information and advice on the effects, use and storage of such products, medical devices or foodstuffs;</p> <p>K_D.U12. prepare compounded medicines used in modern practice, select appropriate packaging, and determine the shelf life of a compounded medicine and how it should be stored;</p> | <p>Observation and assessment of practical skills by a supervisor, a pharmacy staff member or a Master of Pharmacy (mgr farmacji).</p> <p>Observation, consultation and assessment of practical skills by an academic teacher supervising the placement on behalf of the university.</p> | <p>Credit.</p> <p>Knowledge: practical (<math>\geq 60\%</math>)</p> <p>Skills: practical (<math>\geq 60\%</math>)</p> <p>Competencies: extended observation (<math>\geq 50\%</math>)</p> |

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|  |  | <p>K_D.U18. draw up records of the procedures carried out during the preparation of compounded and pharmacy-made medicines;</p> <p>K_K1. building relationships with patients and colleagues based on mutual trust and respect;</p> <p>K_K2. recognising and identifying one's own limitations, and carrying out a self-assessment of one's learning difficulties and educational needs;</p> <p>K_K3. implementing the principles of professional colleagueship and cooperation within an interdisciplinary team, including with representatives of other medical professions, also in a multicultural and multinational environment;</p> <p>K_K4. compliance with confidentiality regarding patients' health, patients' rights and the principles of professional ethics;</p> |  |  |
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|  |                                                                                                         | <p>K_K5. demonstrating an ethical and moral stance consistent with ethical principles and acting in accordance with the Code of Ethics for Pharmacists of the Republic of Poland;</p> <p>K_K7. using objective sources of information;</p> <p>K_K8. drawing conclusions from one's own measurements or observations;</p> <p>K_K9. formulating opinions on various aspects of professional practice;</p> <p>K_K10. accepting responsibility for decisions taken in the course of one's professional activities, including in relation to one's own safety and that of others.</p> |                                                                                                                                                                                                               |                                                                                                                                                                                          |
|  | Work Placement in a Community Pharmacy, Hospital Pharmacy or Institutional Pharmacy (5th year of study) | <p>K_D.W24. principles for the preparation and control of compounded medicines and their shelf life;</p> <p>K_F.W2. the rules governing the issuing,</p>                                                                                                                                                                                                                                                                                                                                                                                                                         | <p>Observation and assessment of practical skills by a supervisor, a pharmacy staff member or a Master of Pharmacy (mgr farmacji).</p> <p>Observation, consultation and assessment of practical skills by</p> | <p>Credit.</p> <p>Knowledge: practical (<math>\geq 60\%</math>)</p> <p>Skills: practical (<math>\geq 60\%</math>)</p> <p>Competencies: extended observation (<math>\geq 50\%</math>)</p> |

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|  |  | <p>recording and dispensing of prescriptions; the rules governing the dispensing of medicinal products, medical devices and foodstuffs for special nutritional purposes from pharmacies and pharmacy outlets, together with the provision of information and advice on the effects, use and storage of such products, medical devices or foodstuffs;</p> <p>K_D.U10. use pharmacopoeias, formulary manuals, manufacturing specifications, guidelines and literature on drug formulation technology, particularly in relation to compounded medicines;</p> <p>K_D.U11. propose a suitable dosage form for the medicinal product, depending on the properties of the active substance and its intended use;</p> <p>K_D.U12. prepare compounded medicines used in modern practice,</p> | <p>an academic teacher supervising the placement on behalf of the university.</p> |  |
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|  |  | <p>select appropriate packaging, and determine the shelf life of a compounded medicine and how it should be stored;</p> <p>K_D.U13. identify and resolve problems arising from the composition of a compounded medicine, monitor its dosage and verify its composition;</p> <p>K_D.U15. prepare specimens under aseptic conditions and select a sterilisation method;</p> <p>K_D.U18. draw up records of the procedures carried out during the preparation of compounded and pharmacy-made medicines;</p> <p>K_D.U23. identify the factors affecting the shelf life of a medicinal product and select the appropriate storage conditions;</p> <p>K_K1. building relationships with patients and colleagues based on mutual trust and respect;</p> <p>K_K2. recognising and identifying one's own</p> |  |  |
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|  |  | <p>limitations, and carrying out a self-assessment of one's learning difficulties and educational needs;</p> <p>K_K3. implementing the principles of professional collegueship and cooperation within an interdisciplinary team, including with representatives of other medical professions, also in a multicultural and multinational environment;</p> <p>K_K4. compliance with confidentiality regarding patients' health, patients' rights and the principles of professional ethics;</p> <p>K_K5. demonstrating an ethical and moral stance consistent with ethical principles and acting in accordance with the Code of Ethics for Pharmacists of the Republic of Poland;</p> <p>K_K6. promoting healthy lifestyles;</p> <p>K_K7. using objective sources of information;</p> <p>K_K8. drawing conclusions from one's</p> |  |  |
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|                                                                                              |                                                                | <p>own measurements or observations;</p> <p>K_K9. formulating opinions on various aspects of professional practice;</p> <p>K_K10. accepting responsibility for decisions taken in the course of one's professional activities, including in relation to one's own safety and that of others.</p>                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                    |
| <p><b>Course Selection Group supplementing knowledge and skills in course groups D–F</b></p> | <p>Pharmaceutical Entrepreneurship and Pharmacy Management</p> | <p>K_F.W4. the principles governing the organisation and funding of the healthcare system in the Republic of Poland, and the role of the pharmacist within that system;</p> <p>K_F.W5. the basics of business management;</p> <p>K_F.W6. the importance of the proper management of medicinal products within the healthcare system;</p> <p>K_F.W25. the principles of health promotion, its objectives, and the role of</p> | <p><b>Lectures:</b></p> <ul style="list-style-type: none"> <li>- informative (conventional) lecture</li> <li>- problem-based lecture with multimedia presentation</li> </ul> <p><b>Tutorials:</b></p> <ul style="list-style-type: none"> <li>- individual work</li> <li>- classic problem-based method</li> <li>- didactic discussion</li> <li>- case analysis</li> </ul> | <p>Credit with a grade covering lectures and tutorials.</p> <p>Knowledge: written or oral (≥60%)</p> <p>Skills: written or oral (≥60%)</p> <p>Competencies: extended observation, teamwork assessment, self-assessment, peer assessment (≥50%)</p> |

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|  |  | <p>pharmacists in promoting a healthy lifestyle;<br/>K_F.U1. set out the rules for the management of medicinal products in hospitals, pharmacies and wholesalers;<br/>K_F.U5. plan, organise, deliver and document pharmaceutical care and clinical pharmacy services;<br/>K_F.U23. estimate the costs and outcomes of pharmacotherapy, calculate and interpret cost-effectiveness ratios, identify the most cost-effective procedure, and determine the impact of new medical technology on the financing of the healthcare system, using the relevant guidelines and recommendations;<br/>K_F.U24. carry out a critical analysis of publications on the efficacy, safety and economic aspects of pharmacotherapy, as well as publications on professional practice and</p> |  |  |
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|  |                                                                     | <p>the pharmaceutical market;</p> <p>K_K1. building relationships with patients and colleagues based on mutual trust and respect;</p> <p>K_K5. demonstrating an ethical and moral stance consistent with ethical principles and acting in accordance with the Code of Ethics for Pharmacists of the Republic of Poland;</p> <p>K_K6 promoting healthy lifestyles;</p>              |                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                          |
|  | <p>Basics of Computer-Aided Drug Design and Molecular Modelling</p> | <p>K_D.W2. relationships between the chemical structure, physicochemical properties and mechanisms of action of substances;</p> <p>K_D.W10. methods for the discovery of new medicinal substances;</p> <p>K_E.W12. drug targets and mechanisms of action of active substances;</p> <p>K_E.U11. explain the pharmacological properties of a medicinal substance on the basis of</p> | <p><b>Lectures:</b></p> <ul style="list-style-type: none"> <li>- informative (conventional) lecture</li> <li>- problem-bases lecture with multimedia presentation</li> </ul> <p><b>Tutorials:</b></p> <ul style="list-style-type: none"> <li>- individual work</li> <li>- classic problem-based method</li> <li>- didactic discussion</li> <li>- computer tasks</li> <li>- data analysis</li> <li>- project</li> </ul> | <p>Credit with a grade covering lectures and tutorials.</p> <p>Knowledge: written or oral (<math>\geq 60\%</math>)</p> <p>Skills: written or oral (<math>\geq 60\%</math>)</p> <p>Competencies: extended observation, teamwork assessment, self-assessment, peer assessment (<math>\geq 50\%</math>)</p> |

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|  |                                                              | its drug target and mechanism of action;<br>K_F.U15. use IT tools in their professional work;<br>K_K2. recognising and identifying one's own limitations, and carrying out a self-assessment of one's learning difficulties and educational needs;<br>K_K7. using objective sources of information;<br>K_K8. drawing conclusions from one's own measurements or observations. |                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                         |
|  | Quality by Design (QbD) – Tools and Applications in Pharmacy | K_D.W34. the scope of application of risk analysis, quality by design and process-based technology in pharmaceutical manufacturing;<br>K_E.W3. the effect of a medicinal product's formulation and route of administration on its absorption, as well as on the duration and effect of its action;<br>K_D.U19. plan the stages of manufacturing a                             | <b>Lectures:</b><br>- informative lecture with multimedia presentation<br>- problem-based lecture<br>- analysis of examples of QbD implementation in the pharmaceutical industry<br><b>Tutorials:</b><br>- projects<br>- individual and team work on the QbD report<br>- case study<br>- interpretation of experimental results and risk analysis<br>- presentations and discussions of project results | Credit with a grade covering lectures and tutorials.<br>Knowledge: written or oral (≥60%)<br>Skills: written or oral (≥60%)<br>Competencies: extended observation, participation (≥50%) |

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|  |  | <p>medicinal product under industrial conditions, select the equipment and choose the control methods;</p> <p>K_E.U4. explain the significance, propose methodology and interpret the results of studies on pharmaceutical and biological availability and bioequivalence;</p> <p>K_K3. implementing the principles of professional colleagueship and cooperation within an interdisciplinary team, including with representatives of other medical professions, also in a multicultural and multinational environment;</p> <p>K_K7. using objective sources of information;</p> <p>K_K10. accepting responsibility for decisions taken in the course of one's professional activities, including in relation to one's own safety and that of others.</p> |  |  |
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|  | Clinical Trials – Basics and Organisation | <p>K_E.W28. principles of planning and research methodology required in the process of discovering new medicinal substances;</p> <p>K_F.W17. legal regulations concerning the manufacture and marketing of medicinal products, medical devices, food supplements, foodstuffs for special nutritional purposes and cosmetics;</p> <p>K_F.W20. the legal, ethical and methodological aspects of conducting clinical trials and the role of the pharmacist in their conduct;</p> <p>K_F.W24. rules on the post-marketing safety monitoring of medicinal products and the supervision of medical devices;</p> <p>K_F.U7. collaborate with doctors and other healthcare professionals on optimising and rationalising</p> | <p><b>Lectures:</b></p> <ul style="list-style-type: none"> <li>- informative (conventional) lecture</li> <li>- problem-based lecture with multimedia presentation</li> </ul> <p><b>Tutorials:</b></p> <ul style="list-style-type: none"> <li>- practical exercises involving documentation;</li> <li>- group work (workshop-style);</li> <li>- case studies;</li> <li>- guided discussion;</li> <li>- student presentations (in groups or individually)</li> </ul> | <p>Credit with a grade covering lectures and tutorials.</p> <p>Knowledge: written or oral (≥60%)</p> <p>Skills: written or oral (≥60%)</p> <p>Competencies: extended observation, participation (≥50%)</p> |

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|  |                                                                         | <p>pharmacotherapy, and on identifying and resolving medication-related problems;</p> <p>K_K3. implementing the principles of professional collegueship and cooperation within an interdisciplinary team, including with representatives of other medical professions, also in a multicultural and multinational environment;</p> <p>K_K4. compliance with confidentiality regarding patients' health, patients' rights and the principles of professional ethics;</p> <p>K_K10. accepting responsibility for decisions taken in the course of one's professional activities, including in relation to one's own safety and that of others.</p> |                                                                  |                                                                                   |
|  | Systematic Reviews and Meta-analyses in the Evaluation of Drug Efficacy | K_F.W11. key scientific sources of information on medicinal products, substances, food                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>Laboratories:</b><br>– exercises using computers/calculators; | Credit with a grade covering laboratory topics. Knowledge: written or oral (≥60%) |

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|  |  | <p>supplements, medical devices and other products used in the treatment of diseases;</p> <p>K_F.U24. carry out a critical analysis of publications on the efficacy, safety and economic aspects of pharmacotherapy, as well as publications on professional practice and the pharmaceutical market;</p> <p>K_K2. recognising and identifying one's own limitations, and carrying out a self-assessment of one's learning difficulties and educational needs;</p> <p>K_K3. implementing the principles of professional colleagueship and cooperation within an interdisciplinary team, including with representatives of other medical professions, also in a multicultural and multinational environment.</p> | <ul style="list-style-type: none"> <li>– working with a research article (case study);</li> <li>– didactic discussion;</li> <li>– group work</li> </ul> | <p>Skills: written or oral (≥60%)</p> <p>Competencies: extended observation, participation (≥50%)</p> |
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|  | <p>Biostatistics in Clinical Trials</p> | <p>K_F.W20. the legal, ethical and methodological aspects of conducting clinical trials and the role of the pharmacist in their conduct;<br/> K_F.U24. carry out a critical analysis of publications on the efficacy, safety and economic aspects of pharmacotherapy, as well as publications on professional practice and the pharmaceutical market;<br/> K_K2. recognising and identifying one's own limitations, and carrying out a self-assessment of one's learning difficulties and educational needs;<br/> K_K3. implementing the principles of professional colleagueship and cooperation within an interdisciplinary team, including with representatives of other medical professions, also in a multicultural and</p> | <p><b>Laboratories:</b></p> <ul style="list-style-type: none"> <li>– exercises using computers/calculators;</li> <li>– working with a research article (case study);</li> <li>– didactic discussion;</li> <li>– group work;</li> <li>- peer assessment</li> </ul> | <p>Credit with a grade covering the laboratory topics.<br/> Knowledge: written or oral (≥60%)<br/> Skills: written or oral (≥60%)<br/> Competencies: peer-review, extended observation (≥50%)</p> |
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|                                                                                                                                   |                    | multinational environment.                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                               |
| <b>Course Selection Group, e.g. university-wide courses not related to the programme, or courses offered in another programme</b> | Elective Course 1  | Depending on the educational offer of the units                                                                                                                                                                                                                                                                                           | Lectures<br>Tutorials                                                                                                                                                                                                                                                                                                                                                                                                                              | Credit with a grade<br>Colloquium                                                                                                             |
|                                                                                                                                   | Elective Course 2  |                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                               |
|                                                                                                                                   | Elective Course 3  |                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                               |
|                                                                                                                                   | Elective Course 4  |                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                               |
|                                                                                                                                   | Elective Course 5  |                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                               |
|                                                                                                                                   | Elective Course 6  | Depending on the educational offer of the units – elective courses supplementing knowledge and skills in course groups D–F                                                                                                                                                                                                                | Lectures<br>Tutorials                                                                                                                                                                                                                                                                                                                                                                                                                              | Credit with a grade<br>Colloquium                                                                                                             |
|                                                                                                                                   | Elective Course 7  |                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                               |
|                                                                                                                                   | Elective Course 8  |                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                               |
|                                                                                                                                   | Elective Course 9  |                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                               |
| <b>Physical Education</b>                                                                                                         | Physical Education | <p>The student:</p> <ul style="list-style-type: none"> <li>- has knowledge of the principles of health promotion;</li> <li>- has knowledge of human physical development, health and the principles of hardening;</li> <li>- has the ability to work as part of a team;</li> <li>- is able to use various forms of activity to</li> </ul> | <p>Visual methods (demonstration with commentary, film)<br/>Verbal methods (description, explanation, clarification)<br/>Methods of teaching movement: analytical, synthetic and global<br/>Methods for teaching technique in sports games: repetition,<br/>Methods used in the development of motor skills:</p> <ul style="list-style-type: none"> <li>- repetition,</li> <li>- low and medium intensity,</li> <li>- circuit training,</li> </ul> | <p>Credit.</p> <p>Knowledge: oral (≥60%)<br/>Skills: practical (≥60%)<br/>Competencies: extended observation, active participation (≥50%)</p> |

|               |                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                         |
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|               |                                                           | <p>promote a healthy lifestyle;</p> <ul style="list-style-type: none"> <li>- is aware of the need for continuous professional development in various aspects of the field, including maintaining their own fitness;</li> <li>- is able to support communities in promoting health and physical activity.</li> </ul>                                                                                                                                            | <p>- circuit-station training,<br/>Forms of exercise:</p> <ul style="list-style-type: none"> <li>- group</li> <li>- frontal</li> <li>- individual</li> </ul> <p>Forms of teaching sports games:</p> <ul style="list-style-type: none"> <li>- strict,</li> <li>- game segments,</li> <li>- training game,</li> <li>- actual game</li> </ul> |                                                                                                                                                                         |
| <b>Others</b> | Elements of Occupational Health and Safety and Ergonomics | <p>K_B.W2. the impact of physical and chemical environmental factors on the human body;</p> <p>K_F.W28. methods for assessing a person's vital signs when their health or life is at risk, and the principles of providing advanced first aid;</p> <p>K_F.U25. recognise situations that pose a threat to human health or life and provide appropriate first aid in situations where health or life is at risk;</p> <p>K_K6. promoting healthy lifestyles.</p> | <b>E-learning lectures:</b> problem-based lecture with multimedia presentation                                                                                                                                                                                                                                                             | <p>Credit.</p> <p>Knowledge: written (<math>\geq 65\%</math>)</p> <p>Skills: written (<math>\geq 65\%</math>)</p> <p>Competencies: written (<math>\geq 65\%</math>)</p> |

|  |                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                        |                                                                                                                                                                         |
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|  | Library Orientation | <p>The student:</p> <ul style="list-style-type: none"> <li>- is familiar with medical databases and the library and information system of the Collegium Medicum Medical Library</li> <li>- follows the development of new medical advances based on the available literature</li> <li>- is able to use the IT tools supporting the Nicolaus Copernicus University library and information system</li> <li>- is able to self-assess their knowledge and development needs and plan educational activities using medical literature</li> <li>- is able to analyse medical literature, including that in a foreign language, and draw conclusions based on the literature available in the Medical Library's bibliographic and information system</li> <li>- is able to use bibliographic and full-text databases and search for</li> </ul> | <p><b>Lectures:</b></p> <ul style="list-style-type: none"> <li>- programme text</li> </ul> <p><b>Tutorials:</b></p> <ul style="list-style-type: none"> <li>- methods for presenting content</li> </ul> | <p>Credit.</p> <p>Knowledge: written (<math>\geq 70\%</math>)</p> <p>Skills: written (<math>\geq 70\%</math>)</p> <p>Competencies: written (<math>\geq 70\%</math>)</p> |
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|                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <p>the required information using the available tools</p> <ul style="list-style-type: none"> <li>- is able to use specialist scientific literature from Poland and abroad available at the Medical Library</li> <li>- has the ability and habit of continuous learning and professional development using objective sources of scientific information.</li> </ul> |  |  |
| <b>Work Placement*</b>                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                   |  |  |
| <b>Diploma Thesis and/or Diploma Examination**</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                   |  |  |
| <b>Work Placement*</b>                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                   |  |  |
| <b>Duration of the work placement</b>              | <p>Work placements are carried out as part of the course group H. The total duration of work placements for Pharmacy students is 960 hours and comprises: 160 hours of work placement in a community pharmacy in the third year of study, 160 hours of work placement in a hospital pharmacy in the fourth year of study, and 640 hours of work placement in a community pharmacy, a hospital pharmacy or institutional pharmacy in the fifth year of study.</p> |                                                                                                                                                                                                                                                                                                                                                                   |  |  |
| <b>Form of work placement</b>                      | <p>In the third year of study, students undertake a one-month (160-hour) placement in a community pharmacy.</p> <p>In the fourth year of study, students undertake a one-month (160-hour) placement in a hospital pharmacy.</p> <p>In the fifth year of study, having passed all the courses included in the programme from groups A–F, students undertake a four-month placement in a community pharmacy, a hospital pharmacy or institutional pharmacy.</p>    |                                                                                                                                                                                                                                                                                                                                                                   |  |  |
| <b>Regulations of work placement</b>               | <p>Work placement in a pharmacy is an integral part of the education process and takes place in accordance with Article 5 (1)(1) and Article 12 (1-5) of the Act of 10 December 2020 on the profession of pharmacist (Journal of Laws of 2025, item 608) and regulations issued on the basis of Article 12 (6) of this Act. Work placement enables the acquisition of skills in the following areas:</p> <p>1) organising work in the pharmacy;</p>              |                                                                                                                                                                                                                                                                                                                                                                   |  |  |

|                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |        |     |
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|                                                                     | 2) preparing, storing, and dispensing prescription and pharmacy medications and medicinal products;<br>3) conducting pharmaceutical research and selecting over-the-counter medicinal products;<br>4) providing pharmaceutical care;<br>5) providing clinical pharmacy services;<br>6) providing information about medicinal products, medical devices, dietary supplements, and other products dispensed in the pharmacy;<br>7) applying the principles of professional ethics and applicable law.<br>Work placement in a community pharmacy, hospital pharmacy, or an institutional pharmacy completed in the 5th year of study may begin after completing all courses in groups A–F of the study programme. A 4-month work placement in the 5th year of study cannot be completed partially in a community pharmacy, hospital pharmacy, or an institutional pharmacy. The work placement is designed to achieve selected learning outcomes – in accordance with the syllabus. Detailed rules for completing and crediting work placement are specified in the Regulations for Completing and Crediting Work Placements. |        |     |
| Detailed allocation of ECTS credits                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |        |     |
| Academic or artistic disciplines, to which learning outcomes refer: |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |        |     |
|                                                                     | Artistic or academic discipline                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | ECTS   |     |
|                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Number | %   |
| 1.                                                                  | Pharmaceutical sciences                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 304    | 100 |
|                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |        |     |

| Course Group                                    | Course                   | ECTS credits | No of ECTS credits in the discipline:<br>(enter names of disciplines)*** |  |  |  | No. of ECTS credits for course selection | No. of ECTS credits obtained by the student in classes conducted with direct contact with the teacher or tutor | The number of ECTS credits obtained by a student through:<br>courses related to the university's research activities in the discipline or disciplines to which the degree programme is assigned**** / courses designed to develop practical skills ***** |
|-------------------------------------------------|--------------------------|--------------|--------------------------------------------------------------------------|--|--|--|------------------------------------------|----------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                 |                          |              | Pharmaceutical sciences                                                  |  |  |  |                                          |                                                                                                                |                                                                                                                                                                                                                                                          |
| Course Group A<br>Biomedical Basics of Pharmacy | Anatomy                  | 2            |                                                                          |  |  |  |                                          |                                                                                                                |                                                                                                                                                                                                                                                          |
|                                                 | General Biochemistry     | 6            |                                                                          |  |  |  |                                          |                                                                                                                |                                                                                                                                                                                                                                                          |
|                                                 | Clinical Biochemistry    | 2            |                                                                          |  |  |  |                                          |                                                                                                                |                                                                                                                                                                                                                                                          |
|                                                 | Plant and Animal Biology | 6            |                                                                          |  |  |  |                                          |                                                                                                                |                                                                                                                                                                                                                                                          |
|                                                 | Parasitology             | 1            |                                                                          |  |  |  |                                          |                                                                                                                |                                                                                                                                                                                                                                                          |
|                                                 | Genetics                 | 1            |                                                                          |  |  |  |                                          |                                                                                                                |                                                                                                                                                                                                                                                          |
|                                                 | Molecular Biology        | 2            |                                                                          |  |  |  |                                          |                                                                                                                |                                                                                                                                                                                                                                                          |

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|                                                                    | Physiology                              | 4  |  |  |  |  |  |  |  |
|                                                                    | Pathophysiology                         | 4  |  |  |  |  |  |  |  |
|                                                                    | Immunology                              | 2  |  |  |  |  |  |  |  |
|                                                                    | Microbiology                            | 4  |  |  |  |  |  |  |  |
| <b>Course Group B<br/>Physicochemical Basics of Pharmacy</b>       | Biophysics                              | 2  |  |  |  |  |  |  |  |
|                                                                    | Inorganic and General Chemistry         | 7  |  |  |  |  |  |  |  |
|                                                                    | Analytical Chemistry                    | 6  |  |  |  |  |  |  |  |
|                                                                    | Physical Chemistry                      | 5  |  |  |  |  |  |  |  |
|                                                                    | Organic Chemistry                       | 10 |  |  |  |  |  |  |  |
|                                                                    | Statistics with Elements of Mathematics | 4  |  |  |  |  |  |  |  |
|                                                                    | Information Technology                  | 1  |  |  |  |  |  |  |  |
| <b>Course Group C<br/>Humanistic and Social Basics of Pharmacy</b> | Psychology                              | 1  |  |  |  |  |  |  |  |
|                                                                    | History of Philosophy                   | 1  |  |  |  |  |  |  |  |
|                                                                    | History of Pharmacy                     | 1  |  |  |  |  |  |  |  |
|                                                                    | Professional Ethics                     | 1  |  |  |  |  |  |  |  |
|                                                                    | Sociology                               | 1  |  |  |  |  |  |  |  |
|                                                                    | Protection of Intellectual Property     | 1  |  |  |  |  |  |  |  |

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|                                                                   | Foreign Language                                                     | 9 |  |  |  |  |  |  |  |
|                                                                   | Latin                                                                | 3 |  |  |  |  |  |  |  |
| <b>Course Group D<br/>Drug Analysis, Synthesis and Technology</b> | Pharmaceutical Biotechnology                                         |   |  |  |  |  |  |  |  |
|                                                                   | Drug Chemistry                                                       |   |  |  |  |  |  |  |  |
|                                                                   | Drug Analysis                                                        |   |  |  |  |  |  |  |  |
|                                                                   | Pharmacognosis                                                       |   |  |  |  |  |  |  |  |
|                                                                   | Synthesis and Technology of Therapeutic Agents                       |   |  |  |  |  |  |  |  |
|                                                                   | Drug Form Technology I                                               |   |  |  |  |  |  |  |  |
|                                                                   | Drug Form Technology II                                              |   |  |  |  |  |  |  |  |
| <b>Course Group E<br/>Biopharmacy and Drug Effects</b>            | Biopharmacy                                                          |   |  |  |  |  |  |  |  |
|                                                                   | Bromatology                                                          |   |  |  |  |  |  |  |  |
|                                                                   | Pharmacokinetics                                                     |   |  |  |  |  |  |  |  |
|                                                                   | Pharmacology and Pharmacodynamics I                                  |   |  |  |  |  |  |  |  |
|                                                                   | Pharmacology and Pharmacodynamics II                                 |   |  |  |  |  |  |  |  |
|                                                                   | Plant Medicine                                                       |   |  |  |  |  |  |  |  |
|                                                                   | Analytical Metrology and Chemometrics in the Pharmaceutical Sciences |   |  |  |  |  |  |  |  |

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|                                                           | Toxicology                                                 |  |  |  |  |  |  |  |  |
| <b>Course Group F<br/>Pharmacy Practice</b>               | Clinical Pharmacy                                          |  |  |  |  |  |  |  |  |
|                                                           | Pharmacy Practice                                          |  |  |  |  |  |  |  |  |
|                                                           | Pharmacoeconomics                                          |  |  |  |  |  |  |  |  |
|                                                           | Pharmacoepidemiology                                       |  |  |  |  |  |  |  |  |
|                                                           | Pharmacotherapy                                            |  |  |  |  |  |  |  |  |
|                                                           | Drug Information                                           |  |  |  |  |  |  |  |  |
|                                                           | Pharmaceutical Law                                         |  |  |  |  |  |  |  |  |
|                                                           | Public Health                                              |  |  |  |  |  |  |  |  |
|                                                           | Introduction to Pharmacy                                   |  |  |  |  |  |  |  |  |
|                                                           | Advanced First Aid                                         |  |  |  |  |  |  |  |  |
|                                                           | Basics of Pharmacy Practice                                |  |  |  |  |  |  |  |  |
| <b>Course Group G<br/>Scientific Research Methodology</b> | Master's Thesis                                            |  |  |  |  |  |  |  |  |
|                                                           | Specialised Tutorials and Research Methodology             |  |  |  |  |  |  |  |  |
| <b>Course Group H<br/>Work Placement</b>                  | Work Placement in a Community Pharmacy (3rd year of study) |  |  |  |  |  |  |  |  |
|                                                           | Work Placement in a Hospital Pharmacy (4th year of study)  |  |  |  |  |  |  |  |  |

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|                                                                                                                                   | Work Placement in a Community Pharmacy, Hospital Pharmacy or Institutional Pharmacy (5th year of study) |          |  |  |  |  |  |  |  |
| <b>Course Selection Group supplementing knowledge and skills in course groups D–F</b>                                             | Pharmaceutical Entrepreneurship and Pharmacy Management                                                 | <b>3</b> |  |  |  |  |  |  |  |
|                                                                                                                                   | Basics of Computer-Aided Drug Design and Molecular Modelling                                            | <b>3</b> |  |  |  |  |  |  |  |
|                                                                                                                                   | Quality by Design (QbD) – Tools and Applications in Pharmacy                                            | <b>3</b> |  |  |  |  |  |  |  |
|                                                                                                                                   | Clinical Trials – Basics and Organisation                                                               | <b>3</b> |  |  |  |  |  |  |  |
|                                                                                                                                   | Systematic Reviews and Meta-analyses in the Evaluation of Drug Efficacy                                 | <b>1</b> |  |  |  |  |  |  |  |
|                                                                                                                                   | Biostatistics in Clinical Trials                                                                        | <b>1</b> |  |  |  |  |  |  |  |
| <b>Course Selection Group, e.g. university-wide courses not related to the programme, or courses offered in another programme</b> | Elective Course 1                                                                                       | <b>1</b> |  |  |  |  |  |  |  |
|                                                                                                                                   | Elective Course 2                                                                                       | <b>1</b> |  |  |  |  |  |  |  |
|                                                                                                                                   | Elective Course 3                                                                                       | <b>1</b> |  |  |  |  |  |  |  |
|                                                                                                                                   | Elective Course 4                                                                                       | <b>1</b> |  |  |  |  |  |  |  |
|                                                                                                                                   | Elective Course 5                                                                                       | <b>1</b> |  |  |  |  |  |  |  |
|                                                                                                                                   | Elective Course 6                                                                                       | <b>1</b> |  |  |  |  |  |  |  |

|                                                    |                                                           |          |        |        |        |        |        |        |        |
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|                                                    | Elective Course 7                                         | <b>1</b> |        |        |        |        |        |        |        |
|                                                    | Elective Course 8                                         | <b>1</b> |        |        |        |        |        |        |        |
|                                                    | Elective Course 9                                         | <b>1</b> |        |        |        |        |        |        |        |
| <b>Physical Education</b>                          | Physical Education                                        | <b>0</b> |        |        |        |        |        |        |        |
| <b>Other</b>                                       | Elements of Occupational Health and Safety and Ergonomics | <b>0</b> |        |        |        |        |        |        |        |
|                                                    | Library Orientation                                       | <b>0</b> |        |        |        |        |        |        |        |
| <b>Diploma Thesis and/or Diploma Examination**</b> |                                                           |          |        |        |        |        |        |        |        |
| <b>TOTAL:</b>                                      |                                                           |          | ../..% | ../..% | ../..% | ../..% | ../..% | ../..% | ../..% |

\* The study programme with a practical profile provides for work placements totalling at least:

- 6 months – for first-cycle studies and uniform long-cycle studies,
- 3 months – for second-cycle.

\*\* Diploma thesis is:

- obligatory in case of second-cycle studies and uniform long-cycle studies,
- optional in case of first-cycle studies.

\*\*\* The names of scientific and artistic disciplines must comply with the Regulation of the Minister of Science and Higher Education of 11 October 2022 on fields of study and academic and artistic disciplines, (Journal of Laws of 2022, item 2202, as amended)

\*\*\*\* applies to general academic profile

\*\*\*\*\* applies to practical profile

| <b>Course Group</b>                                     | <b>Course</b> | <b>Programme content</b>                                                                                                                                                                                                                                                                                                                                  |
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| <b>Course Group A<br/>Biomedical Basics of Pharmacy</b> | Anatomy       | The Anatomy course is designed to help students master the basic knowledge of anatomy and provides a basis for further study of other general courses and major courses. The course is divided into six sections (systems): musculoskeletal system, circulatory system, respiratory system, digestive system, urinary and sexual systems, nervous system. |

|  |                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
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|  | General Biochemistry     | The content of the course is to provide basic information on the properties and biosynthesis of biomolecules (proteins, nucleic acids, sugars, fats), energy derivation and storage, and the basics of cell metabolism regulation and molecular genetics.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|  | Clinical Biochemistry    | <p>The aim of the Clinical Biochemistry course is to understand the mechanisms underlying the normal functioning of the body and the pathophysiological changes that underlie human diseases. The course focuses on metabolic processes occurring under physiological and pathological conditions, as well as on understanding the mechanisms of action of medicinal products and their impact on biochemical and metabolic processes.</p> <p>Furthermore, the course enables students to analyse the relationship between biochemical changes and laboratory test results, allowing for their accurate assessment and interpretation in the context of diagnosis, treatment monitoring and the safety of pharmacotherapy. The knowledge and skills acquired prepare graduates to apply the fundamentals of clinical biochemistry in pharmaceutical practice and to collaborate within diagnostic, therapeutic and research teams.</p> |
|  | Plant and Animal Biology | <p>The course covers topics in cytology, histology, plant organography and systematics, as well as the systematics, anatomy and morphology of fungi. It also includes topics relating to medicinal animal-derived raw materials.</p> <p>The aim of the course is to enable students to identify plant tissues and organs under a microscope and to recognise selected medicinal plants on the basis of their morphological characteristics.</p> <p>Topics relating to the anatomical and morphological structure of plants are utilised in later stages of the degree programme, during the teaching of Pharmacognosy and Drug Form Technology.</p>                                                                                                                                                                                                                                                                                    |
|  | Parasitology             | The Parasitology course in the Pharmacy programme is taught in the first semester and comprises 5 hours of lectures and 10 hours of laboratory sessions. The Parasitology course covers topics that enable students to understand the biology of human parasites, the symptoms and epidemiology of parasitic diseases, and the diagnostic methods used in parasitology. The aim of the course is to prepare students to apply their knowledge of parasitology in pharmaceutical practice, with particular emphasis on the prevention, diagnosis and principles of pharmacotherapy of parasitic diseases.                                                                                                                                                                                                                                                                                                                               |
|  | Genetics                 | The Genetics course in the Pharmacy programme is taught in the first semester and comprises 10 hours of lectures and 10 hours of laboratory sessions. The Genetics course covers topics that enable students to understand the key issues in 21st-century medicine and to master the theoretical foundations required for further medical studies. The primary aim of teaching Genetics in the Pharmacy programme is to prepare students for their future profession. Knowledge of the fundamentals of the body's molecular functioning, genetics and molecular biology is essential in day-to-day professional practice. The course,                                                                                                                                                                                                                                                                                                  |

|                                                                  |                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
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|                                                                  |                                 | alongside other basic sciences, forms the foundation upon which students can build their further knowledge and improve their practical skills.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|                                                                  | Molecular Biology               | The aim of the Molecular Biology course is to familiarise students with the basic knowledge of the structure of the human genome and methods of nucleic acid analysis. The programme includes lectures and laboratories to familiarise students with the basics of classical, population and molecular genetics.                                                                                                                                                                                                                                                                                                                                                          |
|                                                                  | Physiology                      | Physiology course enables the student to learn the basic concepts and understand the processes that regulate the functioning of individual organs as well as systems. In addition, it allows the student to understand the interrelationships between the various elements of the human body.                                                                                                                                                                                                                                                                                                                                                                             |
|                                                                  | Pathophysiology                 | Pathophysiology is a pre-clinical science that explains the mechanisms of organismal dysfunction in various pathological states. It encompasses the detailed pathophysiology of cells, systems and organs, as well as issues relating to changes in the adaptive functions of the body, disorders of the body's regulatory mechanisms, metabolic disorders and the pathophysiology of cancer.                                                                                                                                                                                                                                                                             |
|                                                                  | Immunology                      | The aim of the course is to familiarise students with the structure and functions of the human immune system, with particular emphasis on the basic mechanisms of the immune response. Students will learn about the proper functioning of defence mechanisms, as well as selected issues in immunopathology.                                                                                                                                                                                                                                                                                                                                                             |
|                                                                  | Microbiology                    | Microbiology takes into account the characteristics of the natural microbiota of humans and their most common pathogens together with their morphology, biochemical properties, pathogenicity and drug sensitivity. It includes lectures and laboratories to familiarise students with methods of identifying microorganisms and assessing their drug sensitivity and mechanisms of antibiotic resistance, principles of asepsis, antisepsis and principles of working in a microbiological laboratory. In this course, students are introduced to the aetiology, epidemiology and diagnosis of selected systemic infections and methods of microbiological drug control. |
| <b>Course Group B<br/>Physicochemical Basics of<br/>Pharmacy</b> | Biophysics                      | Introduction of the physical fundamentals describing the functioning of the body, identify the effects of the environment on the human body and learn the principles of medical diagnosis and therapy and physical methods used in drug testing.                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                                                                  | General and Inorganic Chemistry | General and Inorganic Chemistry covers fundamental topics relating to the structure of matter, the properties of elements and chemical compounds, and the course of chemical reactions. Students learn methods for identifying inorganic substances, with particular emphasis on pharmacopoeial methods, and acquire basic laboratory skills whilst observing safety procedures. The course provides the essential                                                                                                                                                                                                                                                        |

|  |                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
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|  |                                         | foundation for understanding the structure and action of medicinal substances and for further study in the Pharmacy programme.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|  | Analytical Chemistry                    | The course covers the basics of chemical analysis applied in pharmacy, with particular emphasis on the properties of solutions, chemical equilibria, sample preparation and pharmacopoeial methods of quantitative analysis. Students learn the principles underlying classical and instrumental techniques, as well as the criteria for selecting an analytical method. During the course, students learn how to carry out analyses in practice, optimise and perform basic validation of methods, resolve measurement issues and document results accurately. The course develops the ability to assess the quality of analytical data and fosters a sense of responsibility, ethical reporting and teamwork within a laboratory setting.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|  | Physical Chemistry                      | The Physical Chemistry course in Pharmacy programme is taught in the second semester. The course comprises 20 hours of lectures, 45 hours of laboratories and 10 hours of tutorials. Physical Chemistry covers macroscopic, atomic, subatomic and intermolecular phenomena in chemical and biochemical systems taking into account the laws and concepts of physics. The progressively familiarised rules formulated by physical chemistry, with their interrelation and quantitative presentation, form the basis for introducing the student to chemical apparatus analysis and all laboratory methods used in the synthesis and identity studies of active substances in drugs and plant raw materials. In addition, the mastery of the issues implemented in the Physical Chemistry course at the Pharmacy programme constitutes the basis for the courses implemented in the following semesters, such as: Medicinal Chemistry, Drug Form Technology, Pharmacology, Biopharmacy, and prepares students for independent work in an analytical laboratory. This course, together with other basic sciences, forms the foundation on which the student should build his/her further knowledge and improve cognitive-practical skills. |
|  | Organic Chemistry                       | The aim of Organic Chemistry course is to familiarise the student with organic chemistry issues related to the nomenclature, structure and reactions of organic compounds with a focus on drug structure. Acquire practical skills related to the synthesis and purity assessment of organic compounds. Assimilation of organic chemistry issues forms the basis for courses taken in subsequent years, such as Drug Chemistry, Drug Form Technology and Pharmacology.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|  | Statistics with Elements of Mathematics | The course aims to familiarise students with the basic mathematical and statistical methods used in the pharmaceutical sciences, covering elements of differential and integral calculus, probability theory, descriptive statistics and statistical inference.<br>As part of the course, students will learn the principles of analysing and interpreting experimental data, including biological and medical data, using modern computational methods and data analysis tools.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

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|                                                                    |                        | The aim of the course is to develop students' ability to apply basic quantitative methods in the use of mathematical methods in pharmacy, as well as in the analysis of biomedical data and the interpretation of the results obtained from statistical analyses.                                                                                                                                                                                                                                                                                                                                                                                                                           |
|                                                                    | Information Technology | The aim of the course is to familiarise students with the basic, widely available IT tools used for data analysis, presentation and visualisation; and with text formatting techniques used in the editing of lengthy documents.                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Group Course C<br/>Humanistic and Social Basics of Pharmacy</b> | Psychology             | Psychology – a course designed to familiarise students with the basic concepts of psychology. The course content focuses on understanding psychology as a science, its distinctive features and its role. Individual fields of psychology will be discussed, with particular emphasis on various aspects of health and illness. It is recommended that students commencing this course possess a general, intuitive understanding of psychological processes.                                                                                                                                                                                                                               |
|                                                                    | History of Philosophy  | The content of the course focuses on the fundamental philosophical issues and concepts that have shaped Western culture. It also discusses the philosophical concepts and stances that have had a significant impact on the development of scientific medicine.                                                                                                                                                                                                                                                                                                                                                                                                                             |
|                                                                    | History of Pharmacy    | The History of Pharmacy course covers ten topics relating to the formation and development of pharmacy (proto-pharmacy) from the earliest civilisations (around 3000–2500 BC) to the early 20th century AD.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|                                                                    | Professional Ethics    | In the Professional Ethics course the student is introduced to the basic concepts of general and professional ethics. He/she learns to recognise ethical problems that arise from the process of medicalisation and pharmaceuticalisation of social life. He/she learns to recognise ethical dilemmas arising from the marketing activities of pharmaceutical companies, becomes acquainted with current problems of bioethics, acquires the ability to think critically and the readiness to analyse moral dilemmas arising from the professional role of a pharmacist and acquires awareness of the obligations arising from the Code of Ethics of Pharmacists of the Republic of Poland. |
|                                                                    | Sociology              | The aim of the course is to familiarise students with the basic issues in the sociology of medicine and their significance for the practice of pharmacy. Students will explore the social and cultural factors influencing health, illness and health behaviours; analyse the social determinants of the use of medicines and pharmaceutical care; and learn how to plan educational activities aimed at patients and the local community.                                                                                                                                                                                                                                                  |

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|                                                                           | Protection of Intellectual Property | The course aims to familiarise students with the fundamental issues related to the protection of intellectual property, with particular emphasis on the specific characteristics of the pharmaceutical sector. The course covers the principles of protection for inventions, patents, trade marks, copyright and trade secrets, as well as the commercialisation of research findings and the protection of innovation in the pharmaceutical industry.                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                                                           | Foreign Language                    | The aim of Foreign Language (English) course is to teach students specialist English terminology in the field of pharmacy. The course aims to teach students how to use the vocabulary and idioms of English for pharmacy when interacting with patients, doctors and students both at home and abroad. The course emphasises the ability to use specialist English for pharmacy in both spoken and written communication at B2 level.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|                                                                           |                                     | Medical German aims to introduce pharmaceutical terminology at B1+, B2 and B2+ levels; to teach students how to use specialist literature to the extent that they can read and translate specialist texts independently; and to teach them how to communicate in German within an international professional environment. It is expected that, upon completion of the course, students on this programme will have reached European Level B2+ in German (Medical German).                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|                                                                           | Latin                               | The aim of the course is to: to develop the linguistic proficiency to understand Latin texts, especially prescriptions, and to use professional terms and to master the basics of grammar and vocabulary needed in pharmaceutical and medical sciences.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Course Group D<br/>Analysis, Synthesis and<br/>Technology of Drugs</b> | Medicinal Chemistry                 | The aim of the course is to discuss and teach students about the basic medicines used in pharmacotherapy, presented according to the Anatomical Therapeutic Chemical (ATC) classification system, taking into account international terminology and synonyms. The drugs covered are used in the treatment of disorders of the central and peripheral nervous systems, the cardiovascular and respiratory systems, as well as in the treatment of cancer and metabolic disorders. Medicinal Chemistry also examines the relationship between the chemical structure and the action of drugs; therefore, topics relating to the therapeutic utility of drugs will be discussed, primarily in terms of their biochemical mechanism of action, routes of administration, distribution within the body, biotransformation, and the resulting adverse and toxic effects. Basic topics in radiopharmacy will also be covered. |
|                                                                           | Drug Analysis                       | The aim of the course is to prepare students to carry out qualitative and quantitative analyses of substances for pharmaceutical purposes and of medicinal products, using classical and instrumental methods. As part of the course, students will learn the principles of identifying medicinal substances,                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

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|  |                                         | assessing their purity, determining their content, and interpreting results in accordance with pharmacopoeial requirements. The course also covers the selection of appropriate analytical methods, the basics of validation, the processing of measurement results, and the assessment of the compliance of tested samples with established quality requirements.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|  | Pharmacognosy                           | The aim of the Pharmacognosy course is to familiarise students with the basic definitions (raw material/plant substance, active compounds) synergism, antagonism, variation factors, origin, principles of raw material collection, methods of identity testing, standardisation, types of plant medicines, preparation methods, groups of compounds belonging to primary metabolites (carbohydrates, fats: oils, proteins: enzymes) and secondary (phenolic compounds, phenylpropanoids, coumarins, tannins, flavonoids, anthocyanins, quinones, terpenes, bitters, alkaloids, essential oils), determining the biological and pharmacological activity of plant raw materials, also at the molecular level, action and use of raw materials. Knowledge of side effects, toxicity, possible side effects, interactions of plant raw materials with plant and synthetic drugs, potential for addiction when used as a stimulant. Use of plant raw materials for purposes other than medicinal and prophylactic (cosmetic, food). |
|  | Drug Analysis, Synthesis and Technology | The course subject includes learning and understanding of methods of searching for biologically active compounds, methods of obtaining selected therapeutic agents, synthesis of radiopharmaceuticals and their applications in therapeutics and diagnostics, as well as operation and application of biosensors. It also includes an introduction to the principles of patenting and the pharmaceutical industry in Poland and worldwide, problems of drug polyformism and physical operations and unit chemical processes used in the production of active pharmaceutical substances (APIs).                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|  | Drug Form Technology I                  | Drug Form Technology is the science of methods of manufacturing and quality control of different drug forms.<br>Drug Form Technology includes laboratories, and practical laboratory classes to familiarise students with the methods of manufacturing prescription drug forms and their requirements, particularly pharmacopoeial ones. Mastery of issues in Drug Formulation Technology forms the basis for the professional work of a pharmacist.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|  | Drug Form Technology II                 | The course aims to familiarise students with the industrial manufacture of medicines – forms of industrially manufactured medicines, individual technological processes, requirements, methods, technology, technological challenges and quality control. In addition, the course aims to prepare students to prepare medicines specific to hospital pharmacies (e.g. cytostatic drugs, enteral and parenteral nutrition).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

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|                                                              |                                      | Furthermore, the course aims to familiarise students with modern dosage forms and the excipients used in their production.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Course Group E</b><br><b>Biopharmacy and Drug Effects</b> | Biopharmacy                          | Biopharmacy is a course designed to familiarise Pharmacy programme students with the factors affecting the bioavailability of a medicinal substance administered as a pharmaceutical preparation.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|                                                              | Bromatology                          | <p>The course covers topics in the field of food science, with particular emphasis on the importance of food and nutrition for human health, the prevention and progression of diseases, and the efficacy and safety of pharmacotherapy. The course covers essential nutrients, their sources, bioavailability and the body's requirements, as well as the principles of assessing nutritional value, food quality and dietary patterns for both healthy and sick individuals.</p> <p>As part of the course, students also learn about food additives, food contaminants, fortified foods, dietary supplements, foods for special medical purposes, and methods of enteral nutrition. A key element of the course is the analysis of the significance of drug–food interactions and the development of skills in applying food science knowledge in pharmaceutical counselling and health promotion activities.</p>                                     |
|                                                              | Pharmacokinetics                     | Pharmacokinetics is the science dealing with the numerical description of changes in the amount (concentrations) of a medicinal agent in the blood, tissues, organs, as well as the amount metabolised and excreted over time.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                                                              | Pharmacology and Pharmacodynamics I  | In this course, students will learn about the processes of drug administration, distribution, absorption, metabolism and elimination. Students will gain knowledge of the basic mechanisms of therapeutic action as well as side effects of the drug, various types of interactions and learn what methods are used in drug testing; the majority of the tutorials will be devoted to various groups of antimicrobial drugs: including antibiotics, sulfonamides, quinolones.                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|                                                              | Pharmacology and Pharmacodynamics II | In this course, students will learn about the basic groups of drugs, their mechanisms of action, dosage, drug-drug interactions, drug-food interactions, and adverse effects accompanying therapy. Lectures will mainly focus on the pharmacological treatment of diseases related to the functioning of the nervous system, as this topic requires an in-depth explanation of the mechanisms by the lecturer. Tutorials will additionally cover drug groups used in infectious diseases, drugs acting through the receptors of the sympathetic and parasympathetic systems, drugs affecting smooth and skeletal muscles, non-steroidal anti-inflammatory drugs. Teaching emphasis will be on widely available over-the-counter (OTC) drugs, interactions between multiple prescription drugs and between prescription and OTC drugs. Laboratories will provide an understanding of the mechanisms of drug-protein and drug-drug interactions, drug and |

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|                                                   |                                                                      | pro-drug metabolism, first-pass effects, the impact of a drug on overall changes in the body (metabolomics), and learning about new directions in pharmacology, i.e. reducing the side effects of chemotherapy and using drugs routinely used to treat a given disease entity as indicators of organ function.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                   | Plant Medicine                                                       | The course covers the principles of designing, formulating and using plant-based medicines in the prevention and treatment of various conditions, based on their effects. The skills acquired during the course are essential for professional practice in the distribution of authorised products in a pharmacy. The over-the-counter dispensing of widely available herbal preparations requires advice from a pharmacist regarding the efficacy and safety of the medicine's use.                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|                                                   | Analytical Metrology and Chemometrics in the Pharmaceutical Sciences | This course extends the analytical skills of Pharmacy students beyond the scope of standard method validation. It combines three complementary areas: (1) advanced validation of analytical methods in accordance with current guidelines of the International Council for Harmonisation of Technical Requirements for Registration of Pharmaceuticals for Human Use (ICH), incorporating the concept of Analytical Quality by Design (AQbD), (2) the estimation of measurement uncertainty in accordance with the GUM (Guide to the Expression of Uncertainty in Measurement) approach and Eurachem/CITAC guidelines; and (3) chemometric methods used in modern pharmaceutical quality control: multivariate analysis, multivariate calibration and classification.                                                                                                                                                                                        |
|                                                   | Toxicology                                                           | The aim of Toxicology course is to equip the student with knowledge of basic toxicological concepts, mechanisms of toxic action of xenobiotics and health hazards (acute and chronic poisoning, remote effects) posed by chemical substances. Particular attention is paid to the toxicity of therapeutic agents, and in particular to drugs, which are the most common cause of poisoning and addiction. In addition, issues concerning the interaction of toxic substances with drugs and the role of systemic metabolic systems, mainly microsomal enzymes, in the biotransformation of chemicals and the influence of these processes on the toxic effects of xenobiotics are presented. Students will learn about health and safety rules for working with toxic substances and biological material and how to provide first aid to poisoned persons, including the correct choice of antidotes and methods for assessing exposure to toxic substances. |
| <b>Course Group F<br/>Pharmaceutical Practice</b> | Clinical Pharmacy                                                    | Students are introduced to the role of the clinical pharmacist, the person providing pharmaceutical care in a hospital ward. During the course, students analyse pharmacotherapy for individuals with cardiovascular, neurological, and internal medicine conditions, as well as comorbid chronic diseases.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

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|  | Pharmacy Practice   | This course develops the practical skills required of a pharmacist in a pharmacy and other healthcare settings: dispensing prescriptions, managing medicinal products, storing products, selecting the appropriate dosage form, providing information on medicinal products, monitoring the safety of pharmacotherapy, and reporting adverse reactions and incidents.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|  | Pharmacoeconomics   | The course covers the basics of health economics, methods of pharmacoeconomic analysis, and the practical interpretation of the results of cost-effectiveness assessments of pharmacotherapy in the context of the funding of healthcare services and medical technologies.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|  | Pharmacopidemiology | The aim of the Pharmacoeepidemiology course is to familiarise students with issues relating to population health and civilisation diseases, as well as methods for estimating health indicators; to develop the ability to recognise health risks; to present the methodology of epidemiological research, as well as methods for evaluating results and assessing risk; to outline the role and tasks of epidemiological surveillance in preventing the spread of infectious diseases; to highlight the epidemiological risks arising from existing lifestyle-related diseases; safety in the use of medicines; to present the role of pharmacists within an interdisciplinary team addressing the most significant epidemiological threats to the population; principles of good clinical practice in the field of drug trials.                                                                                |
|  | Pharmacotherapy     | Pharmacotherapy is one of the leading courses in the Pharmacy programme. The course extends the knowledge acquired in previous years on the mechanisms of action and side effects of drugs and allows students to understand treatment regimens with individual drugs. Due to the complexity of the issues, students make use of the knowledge gained in other courses, i.e. Physiology, Biochemistry, Biology and others. Active participation in tutorials allows for discussion of a given topic, especially issues related to the mechanisms of drug action and the occurrence of drug resistance, which are the subject of continuous research and require updating of knowledge on the basis of scientific publications. The topics covered are mainly clinical issues, which are the most important problems from the point of view of civilisation diseases (cancer, cardiovascular diseases, diabetes). |
|  | Drug Information    | The course prepares students to professionally search for, critically evaluate, interpret and communicate reliable information concerning medicinal products, medical devices and pharmacological therapies. The course covers the use of contemporary sources of scientific information, databases and tools to support clinical decision-making in accordance with the principles of Evidence-Based Medicine (EBM) and Evidence-Based Pharmacy (EBP).<br>Students acquire the skills to provide reliable information to patients and healthcare professionals, assess the safety of pharmacotherapy, and analyse drug interactions, adverse reactions and medication-related problems. Particular emphasis is placed on developing practical skills related to pharmaceutical care,                                                                                                                            |

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|                                                           |                                                | clinical communication, the analysis of scientific literature and the use of digital drug information systems.                                                                                                                                                                                                                                                                                                                                                                   |
|                                                           | Pharmaceutical Law                             | This course covers the legal regulations governing the practice of the pharmacy profession, the operation of pharmacies, the marketing of medicinal products, medical devices and other categories of products, as well as the professional and legal responsibilities of pharmacists.                                                                                                                                                                                           |
|                                                           | Introduction to Pharmacy                       | This course introduces students to the structure of pharmaceutical studies, the specific nature of the pharmacist's profession, the settings in which the profession is practised, the role of the professional body, and the key sources of information used in pharmacy practice.                                                                                                                                                                                              |
|                                                           | Advanced First Aid                             | The course aims to prepare students to carry out life-saving procedures in situations where there is an immediate threat to health or life, using basic techniques and first-aid equipment. The aim of the course is to enable students to acquire the knowledge and skills required to provide advanced first aid and to minimise the consequences of a medical emergency until the arrival of, and handover to, an emergency medical services team or other relevant services. |
|                                                           | Basics of Pharmacy Practice                    | This course prepares students for the basic tasks carried out in community and hospital pharmacies: dispensing prescriptions, handling documentation, using IT tools, and applying health and safety at work procedures.                                                                                                                                                                                                                                                         |
| <b>Course Group G<br/>Scientific Research Methodology</b> | Master's Thesis Seminar                        | The aim of the course is to enable students to acquire the skills to plan research independently, analyse the results and draw appropriate conclusions. Students also learn how to present research findings correctly.                                                                                                                                                                                                                                                          |
|                                                           | Specialised Tutorials and Research Methodology | The aim of the tutorials is to plan and carry out a research study, analyse the results of the research, and develop the ability to take a critical approach to the measurement results obtained during the experimental part of the Master's thesis.                                                                                                                                                                                                                            |
| <b>Course Group H<br/>Work Placements</b>                 | Work Placement in a Community Pharmacy         | Practical preparation for working in a community pharmacy. Organisation of pharmacy work, dispensing, formulation.                                                                                                                                                                                                                                                                                                                                                               |
|                                                           | Work Placement in a Hospital Pharmacy          | Practical preparation for work in hospital pharmacy. Principles and requirements for work organisation, professional activities.                                                                                                                                                                                                                                                                                                                                                 |

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|                                                                                       | Work Placement in a Community Pharmacy, Hospital Pharmacy or Institutional Pharmacy (4-month) | Practical preparation for work in community and hospital pharmacy. Organisation of pharmacy work, dispensing, formulation.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Course Selection Group supplementing knowledge and skills in course groups D–F</b> | Pharmaceutical Entrepreneurship and Pharmacy Management                                       | The aim of the course is to familiarise students with the principles governing the operation of a pharmacy as a regulated healthcare enterprise. The course covers the basics of management, the organisation of pharmacy operations, the management of medicinal products, pharmacy economics, competitive conditions, and the legal and ethical aspects of running a pharmacy. The skills acquired prepare students to understand the practical realities of practising as a pharmacist, organising the work of a pharmacy team, and making responsible decisions whilst taking into account patient safety and the quality of pharmaceutical services.                                                                                                                                                  |
|                                                                                       | Basics of Computer-Aided Drug Design and Molecular Modelling                                  | The aim of the Basics of Computer-Aided Drug Design and Molecular Modelling course is to familiarise students with the basics of computer-aided screening and design of new medicinal substances. The course covers the fundamental stages of the drug discovery process, the analysis of the relationship between chemical structure and biological activity, the modelling of ligand–molecular target interactions, working with chemical and biological databases, the prediction of physicochemical and ADMET properties, and the fundamentals of molecular docking. The skills acquired prepare students to use in silico tools effectively, to critically interpret the results of computer analyses, and to understand the significance of modern computational methods in pharmaceutical sciences. |
|                                                                                       | Quality by Design (QbD) – Tools and Application in Pharmacy                                   | The course aims to introduce students to issues related to the planning, organisation, conduct and analysis of clinical trials. The lectures cover the basics of clinical trial methodology, legal and ethical aspects, the principles of Good Clinical Practice (GCP), the process of registering medicinal products, and the roles of the various trial participants, with particular emphasis on the role of the pharmacist. The tutorials are hands-on and involve the analysis of trial protocols, informed consent forms, statistical data and trial documentation. Particular emphasis is placed on the safety of trial participants, the monitoring of adverse events, data quality assessment and the practical aspects of conducting clinical trials.                                            |
|                                                                                       | Systematic Reviews and Meta-analyses in                                                       | The aim of the Systematic Reviews and Meta-analyses in the Evaluation of Drug Efficacy course is to prepare students to independently identify, critically evaluate and synthesise scientific evidence in medicine (EBM). During the course, students learn to design literature search strategies, assess the risk                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

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|                                                                                                                                   | the Evaluation of Drug Efficacy                           | of systematic error in studies, and interpret the results of quantitative analyses, including decision trees. The analytical skills acquired are essential for making therapeutic decisions in pharmaceutical care, health technology assessment (HTA) and work in the research sector.                                                                                                                                                                                                                                                                       |
|                                                                                                                                   | Biostatistics in Clinical Trials                          | The aim of the Biostatistics in Clinical Trials course is to prepare students to independently and critically evaluate scientific reports on the efficacy and safety of pharmacotherapy. During the course, students learn to verify the methodological accuracy of clinical trials, evaluate population-based strategies and independently calculate absolute and relative measures of risk. The analytical skills acquired are essential for carrying out professional tasks in the fields of clinical research, clinical pharmacy and pharmaceutical care. |
| <b>Course Selection Group, e.g. university-wide courses not related to the programme, or courses offered in another programme</b> |                                                           | Curriculum content depending on the student's choice of course.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Other</b>                                                                                                                      | Elements of Occupational Health and Safety and Ergonomics | Within the framework of the education provided, topics in the field of popularisation of labour protection issues are addressed in accordance with human psycho-physical capabilities and the objectives of the University's activities in this field.                                                                                                                                                                                                                                                                                                        |
|                                                                                                                                   | Library Orientation                                       | This class aims to familiarise the student with the Medical Library, its collections, databases and to present practical ways of using the sources.                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Physical Education</b>                                                                                                         |                                                           | Curriculum content depending on the student's choice of discipline.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

Study programme outline – Part B) – Description of the process leading to the achievement of learning outcomes (including information below the table stating when it was reviewed by the Dean's Council and the discipline council to which the degree programme is assigned, or by the discipline councils (if the degree programme is assigned to two disciplines) or a commission composed of representatives appointed by the discipline councils (if the degree programme is assigned to more than two disciplines) and the student council, and the academic year from which it is to come into effect) must be signed by the Dean of the Faculty.

The study programme is valid from ..... semester of the ...../..... academic year.

The outline of the study programme has been reviewed by ..... on.....

.....  
(Dean's signature)

