Learning outcomes

Faculty offering the field of study:	Faculty of Pharmacy
Field of study:	Pharmacy
Level of qualification:	long-cycle studies
Level in the Polish Qualifications Framework:	level 7
Degree profile:	general academic
Degree awarded:	magister
Domains and disciplines of science or domains and disciplines of art to which the learning outcomes for the given field of study refer:	Discipline: pharmaceutical sciences (100%) Main discipline: pharmaceutical sciences

Symbol	Upon completion of studies, the graduate achieves the following learning outcomes:
	KNOWLEDGE **The graduate knows and understands:**
K_A.W1	organisation of living matter and the cytophysiology of cells;
K_A.W2	classical, population and molecular genetics, as well as genetic aspects of cell differentiation;
K_A.W3	monogenic and polygenic inheritance of human traits and the genetic polymorphism of the human population;
K_A.W4	anatomical structure of the human organism and fundamental relationships between the structure and function of the organism in health and illness;
K_A.W5	mechanisms of organism functioning on molecular, cellular, tissue and system level;
K_A.W6	pathophysiology of cells and systems of the human organism;
K_A.W7	disorders of adaptive and regulative functions of the human organism;
K_A.W8	structure, features and biological functions of amino acids, proteins, nucleotides, nucleic acids, carbohydrates, lipids and vitamins;
K_A.W9	disorders of adaptive and regulatory functions of the organism;
K_A.W10	molecular aspects of signal transduction;
K_A.W11	major metabolic pathways and their interconnections, the mechanisms of regulation of metabolism and the effect of drugs on the processes;
K_A.W12	functioning of the immune system and the mechanisms of immune response;
K_A.W13	principles of immunodiagnostics and the principles and methods of immunoprophylaxis and immunotherapy;
K_A.W14	molecular basis of the cell cycle – proliferation, apoptosis and neoplastic transformation;
K_A.W15	issues of DNA recombination and cloning;
K_A.W16	functions and genome and transcriptome testing methods;
K_A.W17	gene expression regulations mechanisms and the role of epigenetics in this process;
K_A.W18	characteristics of bacteria, viruses, fungi and parasites and the principles of microbiological diagnostics;
K_A.W19	basics of infectious diseases aetiopathology;
K_A.W20	principles of disinfection and antisepsis and the influence of antimicrobial agents on microorganisms and human health;
K_A.W21	issues of hospital-acquired infection and threats from the alert-pathogens;
K_A.W22	pharmacopoeial requirements and methods of testing microbiological purity and sterility of drugs;
K_A.W23	microbiological methods of testing mutagenic effects of drugs;
K_A.W24	morphological and anatomical characteristics of prokaryotic organisms, mushrooms and plants providing the source of medicinal raw materials and materials used in pharmacy;
K_A.W25	research methods used in the systematics and search for new species and varieties of medicinal plants and mushrooms;
K_A.W26	principles of managing a herbarium and its meaning and usefulness in pharmaceutical sciences;
K_A.W27	methods for assessing human primary vital signs in health emergencies and the principles of giving advanced first aid;
K_A.W28	basic philosophical issues (metaphysics, epistemology, axiology and ethics);

K_A.W29	psychological tools and principles of interpersonal communication with patients, their caregivers, doctors and other health care system workers;
K_A.W30	social determinants and limitations of disease and disability;
K_A.W31	psychological and social aspects of supportive attitudes and actions;
K_A.W32	molecular biology techniques in pharmaceutical biotechnology and gene therapy;
K_B.W1	physical basis of physiological processes (circulation, nerve impulse transmission, gas and substance exchange, movement);
K_B.W2	effect of physical and chemical factors of the environment on human organism;
K_B.W3	methodology of biophysical measurements;
K_B.W4	biophysical basics of diagnostic and therapeutic techniques;
K_B.W5	structure of the atom and the molecule, the periodic table of elements, and the properties of radioactive isotopes in terms of their application in diagnostics and therapy;
K_B.W6	formation mechanisms and types of chemical bonds and the mechanisms of intermolecular forces;
K_B.W7	types and properties of solutions;
K_B.W8	basic types of chemical reactions;
K_B.W9	characteristics of metals and non-metals, and the nomenclature and properties of inorganic compounds used in diagnostics and disease treatment;
K_B.W10	methods of identification of inorganic compounds including pharmacopoeial methods;
K_B.W11	classical methods of quantitative analysis;
K_B.W12	classification of instrumental analysis techniques, the theoretical and methodological basis of spectroscopic, electrochemical, chromatographic and mass spectrometry techniques, as well as the operation principles of devices used in the said techniques;
K_B.W13	criteria for selecting the analytical method;
K_B.W14	principles of the analytical method validation;
K_B.W15	thermodynamics basics and chemical kinetics and quantum basics of matter structure;
K_B.W16	physicochemistry of heterogeneous systems and surface phenomena and the mechanisms of catalysis;
K_B.W17	classification of carbon compounds and the nomenclature of organic compounds;
K_B.W18	structure of organic compounds in the context of the molecular orbital theory and describes the mesomeric and inductive effects;
K_B.W19	types and mechanisms of chemical reactions involving organic compounds (substitution, addition, elimination);
K_B.W20	classification of organic compounds into functional groups and their properties;
K_B.W21	structure and properties of heterocyclic compounds and selected compounds of natural origin: carbohydrates, steroids, terpenes, lipids, peptides and proteins;
K_B.W22	structure, properties and ways of receiving polymers used in pharmaceutical technologies;
K_B.W23	preparation and methods of spectroscopic and chromatographic analysis of natural compounds;
K_B.W24	elementary functions and basics of differential and integral calculus;
K_B.W25	elements of the probability theory and mathematical statistics (phenomena and probability, random variables, random variable distribution functions, mean value and variance), basic random variable distributions, point and interval estimation of parameters;
K_B.W26	methods for testing statistical hypotheses and the significance of correlation and regression;
K_B.W27	theoretical methods used in pharmacy and basics of bioinformatics and molecular modelling in the field of medication design;
K_C.W1	classification of medicinal substances in accordance with the Anatomic Therapeutic Chemical (ATC) Classification System;
K_C.W2	chemical structure of basic medicinal substances;
K_C.W3	correlation between chemical structure, physicochemical properties and mechanisms of medicinal substances effect;
K_C.W4	elements and compounds marked by isotopes used in diagnostics and disease treatment;
K_C.W5	pharmacopoeia's structure and its meaning to the substance quality and medicinal products;
K_C.W6	methods used in pharmaceutical quality assessment and in the analysis of medicinal substances and the ways of validating those methods;
K_C.W7	methods of controlling the quality of drugs marked by isotopes;
K_C.W8	durability of basic medicinal substances and their possible reactions to decomposition and factors influencing their durability;
K_C.W9	problematic aspects of falsified medicines;
K_C.W10	methods of preparing selected medicinal substances, the necessary physical operations, discrete chemical processes;
K_C.W11	requirements concerning the description of manufacturing and quality assessment of medicinal substances in registration documentation;

K_C.W12	methods of obtaining and separating optically active medicinal substances and methods of obtaining various polymorphic forms;
K_C.W13	methods of searching for novel medicinal products;
K_C.W14	basic categories of drugs and has knowledge of issues in patent protection;
K_C.W15	physicochemical and functional properties of basic auxiliary substances used in drug dosage form technology;
K_C.W16	production potential of living cells and organisms and possibilities of regulation using technological methods;
K_C.W17	conditions in living cells and organisms culture and the processes used in pharmaceutical biology together with purifying the received medicinal substances;
K_C.W18	methods and techniques of changing the scale an optimisation of the parameter processes in pharmaceutical biotechnology;
K_C.W19	basic groups, biological properties and the use of biological medicinal substances;
K_C.W20	forms of biopharmaceuticals and problems with their durability;
K_C.W21	basic vaccines, principles of their use and storage;
K_C.W22	basic blood-borne products and blood substitutes and the method of obtaining them;
K_C.W23	pharmacopoeial requirements of biological medicine and principles of introducing them to the market;
K_C.W24	new achievements in the research on biological and synthetic medicine;
K_C.W25	nomenclature, composition, structure and properties of particular medicine forms;
K_C.W26	rules for the selection of the form of the drug depending on the properties of the medicinal substance and the intended use of the medicinal product;
K_C.W27	principles of preparing prescription medications and their storage conditions;
K_C.W28	types of physicochemical variances between the components of pharmaceutical preparations;
K_C.W29	basic technological processes and equipment used in drug dosage form technology;
K_C.W30	obtaining liquid, semi-solid and solid dosage forms on a laboratory and industrial scale and the influence of technological process parameters on dosage form properties;
K_C.W31	aseptic techniques and methods of obtaining sterile medicinal products, substances and material;
K_C.W32	types of drug packaging and dosage systems;
K_C.W33	principles of Good Manufacturing Practice specified in the regulations issued on the basis the Article 39 (5) (1) of the Pharmaceutical Law of September 6, 2001 (Journal of Laws of 2019, item 499, as amended), including the principles of technological processes documentation;
K_C.W34	methods of dosage form quality assessment and production series analysis;
K_C.W35	factors determining drug stability and methods of testing;
K_C.W36	range of chemical pharmaceutical testing required for the registration documentation of the medicinal product;
K_C.W37	range of risk analysis, quality design and process analysis-based technology in pharmaceutical production;
K_C.W38	principles of preparing homeopathic medications;
K_C.W39	methods for preparing radiopharmaceuticals *ex tempore*;
K_C.W40	possibilities of using nanotechnology in pharmacy;
K_C.W41	types and methods of manufacturing and quality assessment of plant preparations;
K_C.W42	raw materials of plant origin used in medical treatment and in drug, dietary supplements and cosmetic production;
K_C.W43	groups of chemical compounds crucial to medicinal substances and plant preparation properties;
K_C.W44	chemical structures, mechanisms of action and applications of compounds present in medicinal plants;
K_C.W45	methods of substance and plant preparation testing and methods of isolating the components from plant material;
K_C.W46	nanoparticles and their use in diagnostics and therapy;
K_C.W47	biomedical polymers and macromolecular conjugates of medicinal substances and their use in medicine and pharmacy;
K_D.W1	processes affecting a medication in the organism, depending on the route and method of administration
K_D.W2	structure and function of biological barriers in the organism affecting drug absorption and distribution;
K_D.W3	influence of dosage forms and method of administration on absorption and duration of effect;
K_D.W4	pharmacokinetic processes (LADME) and their meaning in development research and in pharmacotherapy optimisation;
K_D.W5	parameters describing pharmacokinetic processes and means of indication;

K_D.W6	physiological, pathophysiological and environmental factors determining the course of pharmacokinetic processes;
K_D.W7	interactions of drugs in pharmacokinetic, pharmacodynamics and pharmaceutical phases;
K_D.W8	principles of therapy monitored by the concentration of active substance and principles of changes in drug dosage;
K_D.W9	methods of pharmaceutical and biological availability assessment and issues concerning the correlation of *in vitro – in vivo* (IVIVC) testing results;
K_D.W10	meaning of factors influencing the improvement of pharmaceutical and biological availability of a medicinal product;
K_D.W11	biopharmaceutical assessment of original and generic medications, including bioequivalence assessment methods;
K_D.W12	drug targets and drug action mechanisms and achievements of structural biology in this field;
K_D.W13	pharmacological properties of individual drug groups;
K_D.W14	determinants of drug action in pharmacodynamics phase including hereditary factors and objectives of personalised therapy;
K_D.W15	basics of molecularly-targeted therapy strategy and drug resistance mechanisms;
K_D.W16	routes of drug administration and drug dosage;
K_D.W17	indications, contraindications and side effects characteristic to the drug and dependant on the dosage;
K_D.W18	classification of adverse drug reactions;
K_D.W19	principles of drug combination, types of drug interactions, factors influencing their occurrence and possibilities of their avoidance;
K_D.W20	basic notions of pharmacogenetics and pharmacogenomics and new achievements in the field of pharmacology;
K_D.W21	basic notions of toxicokinetics, toxicometrics and toxicogenetics;
K_D.W22	processes affecting a xenobiotic in the organism, with a focus on the processes of biotransformation, depending on the route of administration and route of exposure;
K_D.W23	issues related to risk exposure to poisons (acute toxicity, chronic toxicity, long-term effects);
K_D.W24	endogenous and exogenous factors modifying the activity of enzymes metabolising the xenobiotics;
K_D.W25	toxic effects of selected drugs, addictive, psychoactive and other chemical substances and the procedures in case of poisoning;
K_D.W26	principles of air and biological monitoring in exposure to xenobiotics;
K_D.W27	*in vitro* and *in vivo* methods used in xenobiotics toxicity testing;
K_D.W28	principles of planning and methodology of toxicological testing required in the process of searching and registering new drugs;
K_D.W29	health hazards and consequences related to environment pollution;
K_D.W30	basic nutrients, system expenditure, its meaning, physiological availability and metabolism and nutrition sources;
K_D.W31	knows methods used in the assessment of nutritional value of food;
K_D.W32	issues related to substances added do food, food contamination and inappropriate quality of goods intended for contact with food;
K_D.W33	issues related to enriched foods, dietary supplements and special purpose foods;
K_D.W34	methods of assessing nutritional habits of a healthy and sick person;
K_D.W35	basics of drug – food interaction;
K_D.W36	requirements and methods of dietary supplement quality assessment, in particular the ones including vitamins and minerals;
K_D.W37	methods of enteral nutrition;
K_D.W38	principles of designing complex plant preparations;
K_D.W39	criteria for assessing the quality of medicinal plant products and dietary supplements;
K_D.W40	molecular mechanisms of substances of natural origin, their metabolisms and biological availability;
K_D.W41	medicinal products of natural origin and therapeutic indications for their use;
K_D.W42	issues related to clinical studies on plant-based medications and meaning and position of phytotherapy in the conventional medicine system;
K_D.W43	procedure of standardisation of a plant-based drug and its use in the registration process;
K_D.W44	new achievements pertaining to plant-based drugs;
K_E.W1	legal basis and principles of pharmaceutical market organisation in the scope of retail turnover in the Republic of Poland and functioning of retail and hospital pharmacies;
K_E.W2	principles of pharmaceutical market organisation in the scope of retail turnover in the Republic of Poland and functioning of pharmaceuticals wholesalers;

K_E.W3	principles of issuing, registering and filling prescriptions and principles of issuing drugs in a pharmacy;
K_E.W4	legal basis and principles of practice of the profession of a pharmacist, regulations pertaining to obtaining a licence to practice the profession of a pharmacist and functioning of a professional organisation for pharmacists;
K_E.W5	legal basis and organisation of medicinal products manufacturing process;
K_E.W6	principles of organising and financing health protection system in the Republic of Poland and the role of a pharmacist in this system;
K_E.W7	significance of the appropriate drug administration in the health protection system;
K_E.W8	idea of pharmaceutical care and notions related to pharmaceutical care, in particular pertaining to problems and needs related to using drugs;
K_E.W9	principles of monitoring efficiency and safety of patient's pharmacotherapy in pharmaceutical care process;
K_E.W10	principles of individualisation of pharmacotherapy allowing for the differences in drug action affected by physiological factors in disease states in clinical conditions;
K_E.W11	main scientific sources of medication information;
K_E.W12	principles of evidence-based therapeutic procedures;
K_E.W13	therapeutic standards and guidelines of therapeutic procedure;
K_E.W14	role of a pharmacist and representatives of other medical professions in a therapeutic team;
K_E.W15	hazards related to the independent use of drugs by patients;
K_E.W16	issues of addiction to medication and other substances and the role of a pharmacist in fighting addictions;
K_E.W17	principles of drug use depending on the form, type of packaging and dosing system;
K_E.W18	principles of introducing medicinal products, medical devices, dietary supplements, foods for particular nutritional uses and cosmetics;
K_E.W19	basics of health economics and pharmacoeconomics;
K_E.W20	methods and tools of cost and effect assessment for needs of economic analyses;
K_E.W21	knows and understands guidelines pertaining to the assessment of medical technologies, particularly with respect to cost performance, as well as the methodology of assessing drug efficiency and safety;
K_E.W22	legal basis and principles of conducting and organising drug testing, including experimental testing and testing involving people;
K_E.W23	legal, ethical and methodological aspects of conducting clinical studies and the role of a pharmacist in such studies;
K_E.W24	significance of population health indexes;
K_E.W25	principles of conducting various epidemiological studies;
K_E.W26	principles of monitoring the safety of medicinal products placed on the market;
K_E.W27	pharmacy and the pharmacy profession, directions in the development of education preparing for the practice of the profession of a pharmacist, as well as international pharmaceutical organisations and other organisations for pharmacists;
K_E.W28	basic notions in ethics, deontology and bioethics, as well as issues related to the deontology of the pharmacist profession;
K_E.W29	ethical principles of modern pharmaceutical marketing;
K_E.W30	principles of health promotion, its objectives and the role of a pharmacist in promoting healthy lifestyle;
K_E.W31	research methods and techniques used as part of a scientific project;
SKILLS The graduate is able to:	
K_A.U1	apply the knowledge of the genetic basis of cell differentiation and inheritance mechanisms to characterise genetic polymorphism;
K_A.U2	evaluate genetic determinants of the development of disease in the human population;
K_A.U3	use anatomical terminology in health status assessment;
K_A.U4	describe the mechanisms of functioning of the human organism at molecular, cellular, tissue and system levels;
K_A.U5	describe the mechanisms of development of functional disorders and correctly interpret the pathophysiological processes of disease development;
K_A.U6	apply knowledge of biochemistry in the analysis and assessment of physiological and pathological processes;
K_A.U7	detect and determine proteins, nucleic acids, carbohydrates, lipids, hormones and vitamins;
K_A.U8	perform the analysis of enzyme reaction kinetics;

K_A.U9	describe and explain immune mechanisms and processes in health and illness;
K_A.U10	perform the isolation, determination and amplification of nucleic acids and conduct the analysis;
K_A.U11	apply basic techniques of work involving microbes and the principles of aseptic work;
K_A.U12	identify microorganisms on the basis of morphological characteristics and physiological and culture properties;
K_A.U13	make use of immunological methods and molecular biology techniques in microbiological diagnostics;
K_A.U14	test and assess antimicrobial agents' activity;
K_A.U15	carry out microbiological control with the use of pharmacopoeial methods;
K_A.U16	identify and determine the structural components of plant cells, tissues and organs using microscopic histochemical methods;
K_A.U17	identify species of medicinal plants on the basis of their morphological and anatomical features;
K_A.U18	identify health- and life-threatening situations and give advanced first aid in the event of a health- or life-threatening situation;
K_A.U19	initiate and support group, help and remedial activities, influence attitude development and lead a team;
K_A.U20	make assessment of actions and moral dilemmas in accordance with ethical norms;
K_A.U21	use psychological tools in interpersonal communication with patients, caregivers, doctors and other health care system workers;
K_B.U1	describe and interpret physical, biophysical and physicochemical quantities with the use of appropriate laboratory apparatus and perform physical and chemical calculations;
K_B.U2	describe and interpret biophysical properties and phenomena, and evaluate the effects of physical environmental factors on living organisms;
K_B.U3	describe and analyse physical phenomena and processes related to diagnostics and disease therapy;
K_B.U4	identify inorganic substances with the use of pharmacopoeial methods;
K_B.U5	conduct water analysis for pharmaceutical purposes;
K_B.U6	perform validation of an analytical method;
K_B.U7	perform qualitative and quantitative analyses of elements and chemical compounds and assess the credibility of analysis result;
K_B.U8	perform tests of chemical reaction kinetics;
K_B.U9	analyse physicochemical properties and processes forming the basis of drugs biological functioning and pharmacokinetics;
K_B.U10	assess and predict properties of chemical compounds on the basis of their structure, plan and perform synthesis of organic compounds in a laboratory scale and identify them;
K_B.U11	use mathematical, statistical and computer tools to develop, interpret and present results of experiments, analyses and measurements;
K_B.U12	use computer tools to develop and present data and for creative problem solving;
K_C.U1	classify medicinal substances in accordance with the Anatomic Therapeutic Chemical (ATC) Classification System, including international terminology;
K_C.U2	discuss the application of radiopharmaceuticals in diagnostics and treatment;
K_C.U3	assess the properties of a substance for pharmacological use on the basis of its chemical structure;
K_C.U4	make use of pharmacopoeias, guidelines and literature related to assessment of pharmacological substance quality and medicinal product;
K_C.U5	perform control of a pharmacological substance and a medicinal product in accordance with pharmacopoeial requirements;
K_C.U6	perform pharmacological substance identity an quality testing and conduct the analysis of its content in a medicinal product with the use of pharmacopoeial methods, including spectroscopic and chromatographic methods;
K_C.U7	interpret the results of substance quality assessment for pharmaceutical and medicinal product purposes and verify the accordance of the obtained results with specification;
K_C.U8	detect by observation the faults of a medicinal product which qualify it to be reported to the competent authority for pharmacovigilance cases;
K_C.U9	select stages and critical parameters in the process of medicinal substance synthesis and prepare a block diagram of an exemplary synthesis process;
K_C.U10	perform the synthesis of a medicinal substance and propose a cleansing method;
K_C.U11	explain the presence of solvent residues and other pollution in a medicinal substance;
K_C.U12	analyse stages and parameters of a biotechnological process;
K_C.U13	assess the quality and durability of a medicinal substance obtained biotechnologically and propose its specification;

K_C.U14	use pharmacopoeias, formularies, and technological regulations, guidelines as well as literature regarding drug form technology, in particular with reference to prescription drugs;
K_C.U15	propose an appropriate drug form depending on a medicinal substance properties and its purpose;
K_C.U16	manufacture prescription drugs, select packaging and determine their shelf life and method of storage;
K_C.U17	identify and solve problems resulting from the composition of a prescription drug, control its dosage and verify its composition;
K_C.U18	make plant preparations in laboratory conditions and make an assessment of its quality with the use of pharmacopoeial methods;
K_C.U19	assess functional properties of auxiliary pharmacological substance;
K_C.U20	prepare preparations in aseptic conditions and selects adequate sterilisation methods;
K_C.U21	prepare parenteral feeding formulae;
K_C.U22	prepare cytostatic drugs in a form which is ready to serve;
K_C.U23	prepare operational procedures and make minutes of activities performed during manufacturing of the prescription and pharmaceutical drugs;
K_C.U24	plan stages of drug manufacturing in industrial conditions, select the equipment and methods of inter-process control;
K_C.U25	perform analyses related to dosage form quality assessment, operate control and measurement equipment and interpret the results of testing;
K_C.U26	assess the risk of poor-quality medicinal product and medical device as well as clinical consequences;
K_C.U27	propose a medicinal product specification and plan the testing of medicinal substance and medicinal product durability;
K_C.U28	determine factors affecting medicinal product durability and select storage conditions;
K_C.U29	identify a medicinal plant raw material and classify it into the appropriate botanical family on the basis of its morphological and anatomical characteristics;
K_C.U30	use micro- and macroscopic methods to determine the identity of a plant medicinal substance;
K_C.U31	evaluate the quality and therapeutic value of plant raw material using pharmacopoeial monographs and perform its analysis using pharmacognostic testing methods;
K_C.U32	perform analyses of a simple and compound plant medicine and identify its active substances with the use of chromatographic or spectroscopic methods;
K_C.U33	provide information about chemical composition and properties of medicinal substances and plant preparations;
K_C.U33	search for the scientific information regarding medicinal substances and products;
K_D.U1	examine differences in medicinal substance absorption depending on the composition and form of the medication and physiological and pathological conditions;
K_D.U2	explain the significance of membranous transport in pharmacokinetic processes (LADME);
K_D.U3	calculate and interpret the pharmacological parameters of a medication determined using pharmacokinetic models or other methods;
K_D.U4	present meaning, propose methodology and interpret the results of pharmaceutical and biological availability testing and bioequivalence testing;
K_D.U5	use law regulations, guidelines and scientific publications regarding the biological availability and pharmaceutical bioequivalence;
K_D.U6	present and explain the profiles of active substance concentration depending on the drug and dosage form;
K_D.U7	perform the analysis of release from an oral dosage form in order to determine similarities between different medicinal products with the use of pharmacopoeial methods and equipment;
K_D.U8	justify the possibility of exempting a medicinal product from *in vivo* bioequivalence studies on the basis of the Biopharmaceutics Classification System;
K_D.U9	predict the results of changes in the pharmaceutical and biological availability of a medicinal substance resulting from dosage form modification;
K_D.U10	explain the causes and results of interactions during the pharmacokinetic phase and determine methods of prevention;
K_D.U11	describe the pharmacological properties of a medication with respect to drug target and mechanism of action;
K_D.U12	justify the need to change drug dosage depending on physiological and pathological conditions and genetic factors;
K_D.U13	predict adverse reactions of certain drug groups depending on drug dose and mechanism of action;
K_D.U14	explain the causes and results of interactions during the pharmacokinetic phase and determine the ways of preventing such interactions;

K_D.U15	provide information about indications and contraindications of using drugs as well as appropriate dosage and intake;
K_D.U16	provide patients with knowledge of pharmacology in an understandable manner;
K_D.U17	co-operate with representatives of other medical professions for the purposes of ensuring the safety and efficacy of pharmacotherapy;
K_D.U18	assess risks related to environmental pollution with environmental poisons and medicinal substance and their metabolites;
K_D.U19	characterise the biotransformation of xenobiotics and assess its meaning in metabolic activation and detoxification;
K_D.U20	predict the direction and power of toxic effects of a xenobiotic depending on its chemical structure and type of exposure;
K_D.U21	perform the isolation of toxins from biological material and select an adequate method for their detection;
K_D.U22	perform exposure assessment (biological monitoring) on the basis of toxicological analysis of biological material;
K_D.U23	characterise food products in terms of their ingredients and nutritional value
K_D.U24	perform the assessment of nutritional value of food products using analytical and computational methods (including gas and liquid chromatography and atomic absorption spectrometry);
K_D.U25	perform the assessment of nutritional value of food products in terms of demand for energy and basic nutrients in the state of health and disease;
K_D.U26	explain the principles and role of proper nutrition in prophylaxis and prevention of disease;
K_D.U27	assess of the exposure of the human organism to food pollutants;
K_D.U28	predict the results of changes in active substance concentration in blood as a result of consuming certain food products;
K_D.U29	explain the causes and effects of interactions between drugs and between drugs and food;
K_D.U30	advise patients on interactions between drugs and food;
K_D.U31	provide information on the use of nutritional preparations and dietary supplements;
K_D.U32	assess the quality of products containing medicinal plant raw materials;
K_D.U33	design a plant-based drug of a specific effect;
K_D.U34	assess the profile of a plant-based medicinal product based on its composition;
K_D.U35	provide advice on the use, contraindications, interactions and adverse reactions of drugs of natural origin;
K_E.U1	discuss the principles of hospital and pharmacy drug management;
K_E.U2	fill a prescription using available IT tools and provide information regarding the issued drug;
K_E.U3	determine the scope of duties, supervise and organise the work of staff members of a pharmacy;
K_E.U4	determine the storage conditions of medicinal products, medical devices and dietary supplements, indicate products requiring special storage conditions and perform control of storage conditions;
K_E.U5	plan, organise and deliver pharmaceutical care;
K_E.U6	offer pharmaceutical consultation in the process of pharmaceutical care and pharmaceutical counselling;
K_E.U7	co-operate with a doctor in the scope of optimisation and rationalisation of therapy in outpatient and inpatient healthcare;
K_E.U8	select over-the-counter drugs in medical conditions not requiring doctor's consultation;
K_E.U9	develop a plan for monitoring pharmacotherapy, determining the methods and principles of efficacy assessment and therapy security;
K_E.U10	perform and explain dosage individualisation in clinical conditions;
K_E.U11	select drug form for a patient, taking into account clinical recommendations, patient's needs and products availability;
K_E.U12	indicate appropriate procedures for handling a medication during its use and provide drug information;
K_E.U13	indicate appropriate procedures for handling a medication by the healthcare staff members;
K_E.U14	educate patients on their medications and other problems related to their health and illness and prepare individualised educational materials for patients;
K_E.U15	use IT tools in professional work;
K_E.U16	predict the effects of various factors on the pharmacokinetic and pharmacodynamic properties of drugs and solve problems related to individualisation and optimisation of pharmacotherapy;
K_E.U17	monitor and report adverse drug reactions, implement preventive measures, provide information about possible pharmacotherapy complications to health care professionals, patients and their families;
K_E.U18	determine the risks of an administered pharmacotherapy in various patient groups and plan preventive actions;

K_E.U19	describe the role and tasks of individual units of professional organisation for pharmacists, and indicate the rights and responsibilities of their members;
K_E.U20	evaluate and interpret the results of epidemiological tests, analyse them and indicate the basic errors occurring in those tests;
K_E.U21	indicate appropriate pharmaceutical organisation or institution handling a given occupational problem;
K_E.U22	identify major ethical problems related to contemporary medicine and health and life protection and conducting scientific research;
K_E.U23	actively participate in the tasks of a therapeutic team, co-operates with healthcare staff members;
K_E.U24	actively participate in clinical studies, in particular in supervising the quality of a tested medicinal product and monitoring a clinical study as well as manage the medicinal products and medical devices intended for clinical studies;
K_E.U25	use various sources of information about the drug and critically interpret the information;
K_E.U26	take part in activities promoting health and prophylaxis;
K_E.U27	estimate the costs and effects of pharmacotherapy, calculate and interpret cost-effectiveness ratios, indicate the more cost-effective procedure and determine the influence of new medical technology on financing the health protection system;
K_E.U28	perform a critical analysis of publications regarding to efficacy, security and economic aspects of pharmacotherapy as well as publications regarding to work practice and pharmaceutical market;
K_E.U29	compare the frequency of occurrence of health-related phenomena as well as estimate and interpret population health indices;
K_E.U30	abide by the principles of occupational deontology, including the Code of Ethics for Pharmacists of the Republic of Poland;
K_E.U31	respect the patient's rights;
K_E.U32	communicate with patients and healthcare personnel in a foreign language on B2+ level of Common European Framework;
K_F.U1	plan scientific research, discuss its purpose and expected results;
K_F.U2	interpret scientific research and relate it to the current state of knowledge;
K_F.U3	use national and international specialist research literature;
K_F.U4	perform scientific research, interpret and document its results;
K_F.U5	present the results of scientific research.
SOCIAL COMPETENCE **In the scope of social competencies the graduate is ready to:**	
1.	establish relationships with a patient and colleagues based on mutual trust and respect;
2.	notice and recognize their own limitations, make a self-assessment of deficits and educational needs;
3.	implement the principles of colleagueship and co-operation in a team of professionals, including representatives of other medical professions, also in a multicultural and multinational environment;
4.	observe secrecy concerning health, patient's rights and rules of professional ethics;
5.	present an ethical and moral behaviour compliant with ethical principles and take actions on the basis of code of ethics in work practice;
6.	propagate health-promoting behaviours;
7.	use objective sources of information;
8.	draw conclusions based on their measurements or observation;
9.	formulate opinions concerning various aspects of professional activity;
10.	take responsibility related to decisions made within the framework of professional activity, including the safety aspects.