University of Ljubljana FACULTY OF PHARMACY

No.	Subject in English	ECTS	Short description
Autumn semester			
	Pharmaceutical technology	10	Pulmonal drug delivery, Rectal and vaginal drug delivery, Coarse dispersion systems (suspensions, emulsions), Topical and transdermal drug delivery, Pharmaceutical microbiology and sterilization, Parenteral dosage forms, Ocular drug delivery, Particle size reduction, mixing and granulation, Tablets and tablet manufacturing (compression, coating, drying), Multiparticulate dosage forms
	Toxicological chemistry	5	Specific and unspecific poisons. Determination of substance toxicity. Toxicogenomics. Gene toxic, carcinogenous and co-carcinogenous substances. Immunotoxic substances. Toxicological chemistry of inhalation poisons, metals, heavy metals, organic solvents, pesticides, insecticides, herbicides, fungicides and rodenticides, chemical weapons, toxins of eukaryotes and prokaryotes, toxicomanogenous substances. Analytics of poisons. Antidotes and medicinal products.
	Pharmaceutical biotechnology	6	Modern and classical biotechnology. Basic principles of production of recombinant active substances and synthetic peptides. Function of the immune system. Cytokines. Growth factors. Monoclonal antibodies. Analytics of active substances of biotechnological origin. The use and mechanism of action of biopharmaceuticals. Plant and animal tissue and cell cultures. Gene therapy. Ethics and the regulatory process in the field of pharmaceutical biotechnology.
	Social Pharmacy	4	Public health: healthcare system, health insurance system, legislation, health promotion, ethics. Pharmacotherapy: supply and provision of medicinal products, pharmacy services, the use of medicinal products and associated problems. Pharmacoepidemiology and pharmacovigilance: risks, types of research, sampling, errors. Therapy outcomes: clinical, humanistic and economical. Evaluation of healthcare interventions.
	Biopharmaceutics with Pharmacokinetics	9	LADME system: mechanisms, kinetics, methods, physico-chemical, technologic and biologic parameters, biopharmaceutical classification system, in vitro-in vivo correlation. Pharmacokinetics, pharmacokinetic-pharmacodynamic relation. Compartmental pharmacokinetics: models, structure, parameters; single/multiple dose pharmacokinetics; one-/two-compartment models; different routes of application, pharmacokinetic analysis of plasma concentration profile and urine cumulative amount profile. Bioavailability and bioequivalence.

	Pharmacognosy I	9	Drugs of plant origin, their active substances and pharmacodynamic effects. Drugs with carbohydrates: mucilage, gums, pectins. Drugs with glycosides: cardiotonic, anthraquinone, flavonoid, coumarin, glucosinolate, cyanogen, saponin, iridoid. Bitter drugs. Drugs with etheric oils. Tannoid drugs. Alkaloid drugs. Gum drugs.

Autumn and Spring semester			
	Pharmaceutical technology I	20	Pulmonal drug delivery, Rectal and vaginal drug delivery, Coarse dispersion systems (suspensions, emulsions), Topical and transdermal drug delivery, Pharmaceutical microbiology and sterilization, Parenteral dosage forms, Ocular drug delivery, Particle size reduction, mixing and granulation, Tablets and tablet manufacturing (compression, coating, drying), Multiparticulate dosage forms. Thermodynamics, Chemical potential, Colligative properties, Isotonicity, Buffers, States of matter, Phase rule, Triphasic diagram, Condensed systems, Compound characterization, Preformulation, Polymorphism, Powders, Stokes' Law, Particle size, Powder density, Solubility, Dissociation constant, Distribution coefficient, Reaction kinetics, The rate of dissolution, Polymers, Biomucoadhesion, Advanced drug delivery systems and devices, Nanodelivery systems, Biopharmaceutics, Oral modified release dosage forms.

Spring semester			
	Biopharmaceutical evaluation of pharmaceutical forms	5	Pharmaceutical form: constituents, interactions. The effects of physicochemical properties on biopharmaceutical properties. Analytical methods for evaluation of biopharmaceutical properties. Physiological / pathological conditions at the site of administration. Oral administration. Digestive tract: pH, volumes, media, flows, movement. Release. Absorption. Presystemic metabolism. Stability. In vitro models. In vitro – in vivo correlation. Regulatory system. Industrial approaches.
	Cosmetology	5	Skin: cellular structures of skin and hair, skin matrix compounds, polysaccharides, proteoglycans, skin lipids. Cosmetic products: manufacturing technology, evaluation and application. Ingredients of cosmetic products: cosmetically active compounds, surface active compounds, emulsifiers, preservatives, antioxidants. Cosmetics Act. Evaluation of safety and efficacy. Care and natural cosmetic products. Sun protection products.
	Nutritional supplements	5	Legislation in the area of nutritional supplements. Definitions of basic terms: nutraceuticals, functional food, diet food. Recommended daily intake of nutrients. Vitamins. Vitaminoids. Minerals. Amino acids. Lipids. Carbohydrates. Prebiotics and probiotics. Antioxidants. Bee products. Enzymes. Phytoestrogens.

	Psychotropic substances and abuse of medicinal products	5	Groups of psychotropic substances and medicinal products that are commonly subject of abuse: illicit drugs – narcotics, anabolic steroid hormones, stimulants, diuretics, analgesics, local anesthetics, anxiolytics, antidepressants, hypnotics, glycoprotein hormones. Mechanisms of action. Symptoms of overdosing. The phenomenon of tolerance, addiction and withdrawal syndrome. Methods of poisoning and antidotes. Legislation.
	Research methods in social pharmacy	5	Pharmacoepidemiology, pharmacovigilance, evidence based medicine, evidence based pharmacy practice, research of structure, proceses and health outcomes, problems connected with drug use, qualitative methods of research: questionnaire, interview, opinion poll, focus groups.
	Biomedical genetics	5	Molecular, Mendelian, population and human genetics. Cause and effect relationship between Mendel's laws and Hardy-Weinberg principles and the action at molecular and cellular levels. Application of knowledge in practical examples from human genetics: Down's syndrome, phenylketonuria, cystic fibrosis, haemophilia, etc.
	Clinical pharmacy	5	Clinical outcomes. Pharmaceutical Care, Pharmacist cognitive services. Guidelines for the use of drugs in selected diseases. Pharmacotherapy of cardiovascular diseases, asthma and chronic obstructive pulmonary disease, psychosis, depression, infections, diabetes, pain. Risks in drug treatment during pregnancy and lactation. Treatment of special populations (children, elderly). Clinical pharmacokinetics and therapeutic drug monitoring. Drug interactions and adverse drug reactions.
	Pharmaceutical technology II	8	Thermodynamics, Chemical potential, Colligative properties, Isotonicity, Buffers, States of matter, Phase rule, Triphasic diagram, Condensed systems, Compound characterization, Preformulation, Polymorphism, Powders, Stokes' Law, Particle size, Powder density, Solubility, Dissociation constant, Distribution coefficient, Reaction kinetics, The rate of dissolution, Polymers, Biomucoadhesion, Advanced drug delivery systems and devices, Nanodelivery systems, Biopharmaceutics, Oral modified release dosage forms