

Name of discipline	<b>Pharmaceutical disperse systems</b>		
Type	Compulsory	Credits	4
Academic year	II		Semester IV
Number of hours	Course	15	Practice/laboratory work 45
	Seminar		Self-training 60
Component	Fundamental		
Course holder	Mirzac Viorica, lecturer		
Location	Chisinau, 66 Malina Mica street, building 2		
Conditionings and prerequisites of:	Program: basic knowledge in related disciplines such as chemistry, physics, mathematics, biology		
	Competences: digital abilities (use of the Internet, document processing, electronic tables and presentations, use of graphic programs); ability to communicate and team work;		
Mission of the discipline	<p>The discipline of Pharmaceutical disperse systems is a fundamental discipline for the formation of future pharmacists, the acquired knowledge being necessary for understanding the physicochemical mechanisms present in the process of preparation and analysis of pharmaceutical forms. The course has the purpose of forming the theoretical knowledge in the field of disperse systems, the accumulation of practical skills and their application to the study of pharmaceutical chemistry and drugs technology. The acquired knowledge allows the future ability to measure and control the physicochemical properties of drugs.</p>		
Overview of the topics	<p>Disperse systems.  Methods of obtaining, the kinetic-molecular and optical properties of dispersed systems and their application to the research of pharmaceutical systems.  Surface tension and superficial free energy.  Surface-active substances.  Surface phenomena. Sorption processes at the interface.  Chromatography. Application of chromatography to the production and analysis of drugs. Direct and indirect electrokinetic phenomena.  Coagulation of disperse systems.  Coarse dispersed systems. Association colloids. Macromolecular compounds (MMC). Methods of preparation, classification and properties of MMC and their solutions.  Donnan membrane equilibrium.</p>		
Outcomes	<ul style="list-style-type: none"> <li>• to define the terms: dispersed system, dispersed phase, medium of dispersion, dispersion degree, specific surface, osmosis, concentration gradient, rate of diffusion, surface tension;</li> <li>• to know the classifications, names of dispersed systems;</li> <li>• to know the methods of obtaining and purification of the dispersed systems;</li> <li>• to apply the knowledge of sedimentation analysis in determining of the particles' size of the dispersed phase;</li> <li>• to define the notions: sorption, adsorption, chemisorption, desorption, capillary condensation, adsorption isotherm, cohesion and adhesion, hydrophilic coefficient, partition <i>coefficients</i>, ionization, electrophoresis, electroosmosis, flow and sedimentation potentials, coagulation threshold, additivity, mutual</li> </ul>		

	<p>coagulation;</p> <ul style="list-style-type: none"> <li>• to be familiar with the classification and properties of solid sorbents and their use in the pharmacy, the function principle of ion exchange resins and their role in various fields;</li> <li>• to explain the coagulation process and the action of electrolytes on sols, the mutual coagulation of lyophobic sols and to know the methods of stabilizing the sols;</li> </ul> <p>to define the notions: aerosol, powder, suspension, emulsion, foams, pastes, flotation, coalescence, association colloids, critical micelle concentration, solubilization, direct and indirect micelles, MMC, velocity, swelling of polymers, viscosity, nonionic and polyelectrolyte polymers, membrane equilibrium, isoelectric point and isoelectric state of polyampholytes, coacervation, thixotropy, syneresis;</p> <ul style="list-style-type: none"> <li>• to know the types of coarse dispersed systems, methods of obtaining and stabilizing them, application of dispersed coarse systems in pharmacy and medicine, superficial active substances and their classification, association colloids, classification of MMC according to different criteria;</li> <li>• to explain the structure of the micelles of the association colloids, depending on the concentration of the solution, to understand the mechanism of swelling and dissolving of macromolecular compounds and the influence of various factors on the degree of swelling, the principle of the membrane equilibrium and what conclusions can be drawn from Donnan's equation;</li> <li>• to demonstrate the relationship between the viscosity of MMC solution, the osmotic pressure and their molecular weight;</li> <li>• to apply theoretical knowledge in obtaining and stabilizing the emulsions, the methods for determining of the superficial tension to determine the critical micelle concentration, to draw diagrams of swelling degree and velocity dependence on time.</li> </ul>
Clinical skills	<ul style="list-style-type: none"> <li>• to know and identify the methods of obtaining and purification for various dispersed pharmaceutical systems;</li> <li>• to build up the sedimentation curves and to determine the particles' size of the dispersed phase and its relative content in the powders</li> <li>• be able to determine the surface tension by the Rebinder method and apply the calculations of the STA molecule surface;</li> <li>• to separate by chromatography the mixture of substances (thin layer, chromatographic paper and column);</li> <li>• to use the electrical properties to studying and analyzing different pathological systems compared to normal systems</li> <li>• to obtain stable emulsions, determine their type, and to reverse phase of emulsions;</li> <li>• be able to determine the critical micelle concentration for colloidal solutions of STA (surfactants).</li> <li>• be able to determine the molecular weight of polymers by the viscozometric methods, to determine the isoelectric point of the proteins.</li> </ul>
Evaluation form	Exam