Study program: Integrated academic studies of Pharmacy

Type and level of the study program: integrated academic studies

Course title: CHEMISTRY OF SOLUTIONS (PhII-CSOL)

Teacher: Nataša P. Milošević, Nataša B. Milić

Course status: elective

ECTS Credits: 3

Condition: General chemistry; Inorganic chemistry; Organic chemistry 1

Course aim

Introduction to basic principles of solubility and rastvorimaod importance for the preparation of various dosage forms and processes of drug release from the dosage forms.

Expected outcome of the course:

Mastering the theoretical aspects of solubility factors that plug on the process of decomposition, prediction of solubility of substances in appropriate solvents, buffer systems and their applications in drug delivery. Preparation of solutions of various substances in appropriate solvents, troubleshooting insolubility of substances in certain solvents and preparation of buffers specified pH and specific capacity.

Course description

Theoretical education

1. Definition of the solution and the type of solution
2. Ideal solutions
3. Intermolecular interactions and real solutions
4. Basic principles of solubility. Energy changes
5. Dielectric constant
6. The concept of solubility and the type of solvents. Co-solvents
7. Factors affecting the solubility of substances (temperature, surface, pH)
8. Solubility of strong and weak electrolytes, solubility of non-electrolyte
9. Ionization of weak acid and weak base. Diagrams of distribution
10. Methods for increasing the solubility of poorly soluble substances
11. Non- aqueous solutions
12. Buffers. Buffering Capacity.
13. Universal buffers and Self-buffers
14. Application of the buffer solution in pharmacy
15. Safe storage of prepared reagents and solutions

Practical education: exercises, other forms of education, research related activities

1. Preparation of the solution
2. Prediction of solubility based on the physico-chemical properties of solution's components
3. Understanding and interpretation of the solubility curve
4. Monitoring of the temperature influence on the solubility of various substances
5. The prediction of the degree of ionization of weak acids and weak bases at different pH values
6. Increasing the solubility of poorly soluble compounds
7. Preparation of buffer solutions with defined pH
8. Preparation of solutions with defined buffer capacity

Literature

Compulsory

1. Jouyban A. Handbook of Solubility Data for Pharmaceuticals. Taylor and Francis, 2009.
2. Beynon RJ, Easterby JS. Buffer solutions. IRL Press at Oxford University Press, 1996.

Additional

Additional material

Number of active classes				Other:
Lectures: 30	Practice: 15	Other types of teaching:	Research related activities:	

Teaching methods

Lectures, interactive, experimental, demonstration exercises and stoichiometry

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures		Written	40
Practices	30	Oral	
Colloquium		.....	
Essay	30		