Information sheet for the course
Laboratory techniques III.

University: *Alexander Dubček University of Trenčín*

Faculty: *Faculty of Health Care*

Course unit code: *LabTech3/e* | **Course unit title:** *Laboratory techniques III.*

Type of course unit: *compulsory*

Planned types, learning activities and teaching methods:
Lecture: 1 hour weekly/13 hours per semester of study; full-time
Seminar: 6 hours weekly/78 hours per semester of study; full-time
Supervised practical output: *3 hour weekly/39 hours per semester of study; full-time*

Number of credits: *5*

Recommended semester: *3rd semester in the 2nd year (part-time)*

Degree of study: *I (bachelor)*

Course prerequisites: *Laboratory techniques II.*

Assessment methods:
- student obtains credits after the full time participation in the laboratory exercises and the written elaboration of protocols from laboratory exercises. The final evaluation shall take into account the complex individual approach of the student, the quality of the protocols (maximum score: 20)
- written or oral examination (30 score points)
- for obtaining the particular grades it is necessary to achieve:
at least 45 score points for the grade A
at least 40 score points for the grade B
at least 35 score points for the grade C
at least 30 score points for the grade D
at least 25 score points for the grade E

Learning outcomes of the course unit:
The student will deepen the self-mastery of basic operations in the laboratory, basic laboratory skills and will be eligible to use laboratory equipment. Student will acquire knowledge by studying of the physicochemical principles of laboratory procedures. Student will acquire knowledge of the basic design of instrumentation of analyzers, their functions and also mastering their basic maintenance. Student will be able to use the theoretical knowledge in the praxis and will have the ability to evaluate and interpret the obtained experimental results.

Course contents:
Lecture:

1. *Basic principles of the application of the statistical calculation methods in analytical chemistry*
2. *The calibration curve, detection limit, limit of determination and their application in methods of analytical chemistry*
3. *Validation, repeatability, reproducibility*
4. *Basic principles of refractometry*
5. *High performance liquid chromatography*
6. *Paper chromatography*
7. *Optimization of chromatographic separation - HPLC I*
8. *Optimization of chromatographic separation - HPLC II*
9. *Optimization of chromatographic separation - HPLC III*
10. *Gas Chromatography*
11. *Optimization of chromatographic separation - GC I*

1. *Optimization of chromatographic separation - GC II*

Seminar:

1. *Determination of the concentration of creatinine in the sample (CRM - freeze-dried urine) by spectrophotometry and the calculation of the standard deviation and arithmetic mean*
2. *Preparation of the calibration curve hippuric acid in the urine by spectrophotometry. Calculation of the calibration curve between LOD, LOQ, by the ULA 1 and ULA 2 method*
3. *Preparation of the calibration curve of hexavalent chromium spectrophotometry region. Validation of methods (LOD, LOQ, repeatability, reproducibility)*
4. *Determination of ethanol in the unknown samples (refractometry)*
5. *Determination of mandelic acid in biological material (urine) - HPLC*
6. *Separation of water-soluble dyes - paper chromatography*
7. *Determination of caffeine in the unknown samples (soft drinks) - HPLC*
8. *Determination of the concentration of sweeteners in the sample (Tera lemon soft drink, Coca-Cola)*
9. *Determination of the concentration of the conservatives in the sample (soft drink coca-cola light)*
10. *Determination of the concentration of organic solvents (toluene, xylene, styrene) - gas chromatography*
11. *Determination of the concentration of additives in the unknown samples - HPLC*
12. *Determination of ephemeral organic compounds in drinking water - gas chromatography (purge & trap)*

Supervised practical output:

Contents of supervised practical output is under natural conditions to deepen the theoretical knowledge and practical skills acquired by realization of procedures learned in lectures and seminars.

Recommended of required reading:

1. *ČAKRT, KRUPČÍK, MOCÁK, POLONSKÝ, SILEŠ: Praktikum z analytickej chémie (Alfa), 1989*
2. *KOHOUT J., MELNÍK M. : Anorganická chémia I. CHTF STU Bratislava 1997*
3. *GARAJ A KOL. : Analytická chémia CHTF STU Bratislava , Alfa 1987*

Language: *Slovak*

Remarks: -

Evaluation history: *Number of evaluated students -*

A	B	C	D	E	FX
-	-	-	-	-	-

Lectures: *RNDr. Zdenka Krajčovičová, PhD., RNDr. Mária Poláková, PhD.*

Last modification: *22.4.2014*

Supervisor: *doc. MUDr. Jana Slobodníková, CSc.*