**II.2.2 ANALYTICAL CHEMISTRY**

1. **Course description:**
2. **Credit points**: 3 ECTS
3. **Time commitment:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Items | Lecture | Tutorial/  Exercise | Practice/  Assignment | Lab-work | **Total** |
| No. of hours | 22 | 4 |  | 4 | **30** |

1. **Prerequisites**: Basic biochemistry and organic chemistry
2. **Recommended background knowledge**:
3. **Subject description:**

Bioanalytical Methods used in Pharmaceutical Development, Clinical laboratory testing, Biological Research.

1. **Objectives & Outcome**

To reinforce chemical principles central to analytical chemistry

To introduce instrumental techniques for pharmaceutical and bioanalytical measurements

To develop critical thinking for interpreting analytical data

1. **Assessment/ Evaluation**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Component | Attendance | Exercises | Practice | Hours exam | Midterm | Final |
| Percentage % | 10 | 20 |  |  | 20 | 50 |

1. **Prescribed Textbook(s)**

[1] Understanding Bioanalytical Chemistry. Principles and Applications V A Gault and NH Mc Clenaghan, Wiley-Blackwell.

**II.** **Course content & schedule:**

1. Introduction: *(specificity of bioanalytical chemistry, biological samples)*
2. Physicochemical parameters of the analyte: *(chemical bond and structure, mass, chirality, polarity*)
3. Basic concepts and tools: *(SI units, measuring weights and volumes, chemicals and buffers*)
4. Separation methods: (*sample preparation, chromatography, electrophoresis*)
5. Detection methods (*spectroscopy: visible, UV,IR, NMR, mass spectrometry, radioisotopes, signal vs noise*)
6. The modern analytical instrument: *(GC and HPLC; hyphenated methods: GC and HPLC-MS*)
7. Derivatization to improve separation and detection: (*for gas and liquid chromatography*
8. Qualitative analysis: (identification of metabolites and impurities)
9. Quantitative analysis (internal standard, calibration curve, integration, basic statistics, guidances for Regulated bioanalysis)
10. The complete bioanalytical study (pre and post issues)
11. Applications (Therapeutic Drug Monitoring, Drug development: ADME/Toxicokinetics,; pharmaceutical analysis
12. Additional topics (Ligand-based bioassays, ion detection in solution, bioanalysis of macromolecules)
13. Current developments and conclusions ( criteria to select a method, conclusions)

**III. Reference Literature:**

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| [1] Understanding Bioanalytical Chemistry. Principles and Applications V A Gault and NH Mc Clenaghan, Wiley-Blackwell. |
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