Table 5.2 Course specification B-403

Level: Bachelor
Course title: Biochemistry of Medicinal Plants
Status: elective
ECTS: 6
Requirements: none
Course aim To provide students with basic knowledge of structures of significant biologicaly and pharmacologically active classes of plant secondary biomolecules, biosynthetic pathways and pharmacological mechanisms of action. To introduce students to the latest scientific achievements in application of drugs and phytopreparations in modern medicine. Developing students' practical skills to apply laboratory techniques for isolation and chemical determination of pharmacologically active natural products.
Course outcome After successful completion of this course, the student is able to: (1) explain the importance of secondary biomolecules for plants and humans, (2) describe structural divergence, biosynthetic origin and pharmacological effects of major classes of secondary plant biomolecules, (3) apply appropriate experimental methods for the isolation and analysis of certain classes of secondary biomolecules
Course content *Theory:* Medicinal plants and their role in the development of modern medicine and pharmacology. Biologically active constituents of medicinal plants. Physiological and ecological role of secondary molecules in plants. Alkaloids in modern medicine. Biological and pharmacological functions of alkaloids, biosynthesis of certain classes of alkaloids, alkaloid drugs and their usage. Plant phenolics: classification, physiological and ecological significance in plants. General pathways of biosynthesis and degradation of phenolic compounds. Cannabinols, phenolic acids, phenilpropanoids, coumarins. Anthraquinone drug application in phytotherapy. Flavonoids: division, biosynthesis. Pharmacological significance and role of flavonoids. Essential oils: chemical structures, biosynthesis, and biological role and pharmacological effects. Aromatic herbal drugs and their usage in phytotherapy. Diterpenoids: biosynthesis, physiological and pharmacological significance. Triterpenoid compounds as potential non-steroidal anti-inflammatory drugs. Cardiotonic glycosides, classification, distribution in plants and pharamcoloigical activity. *Practice: Practical classes, OFT, SRW:* Extraction of plant secondary metabolites. Identification of particular groups of alkaloids. Volumetric quantification of alkaloids in plant extracts. Identification of particular classes of phenolic compounds. Qualitative and quantitative analysis of anthraquinone glycosides in plants. Identification of saponins and cardiotonic glycosides in plant drugs. Hydrodistillation and analysis of essential oils. Analysis of plant extracts by chromatographic techniques (TLC, HPLC, GC/MS).
Literature 1. Dewick P.M. Medicinal Natural Products. Wiley, 2009. 2. Heinrich, M., Barnes, J., Gibbons, S., Williamson, E.M. Fundamentals of Pharmacognosy and Phytotherapy. 2n. Edition. Churhill Livingstone, Elsevier, 2012.