

Table 5.2 Course specification

Type and level of studies: Bachelor of Science Degree			
Course name: Biochemistry of antioxidant systems			
Course status: Elective			
Number of ECTS credits: 6			
Requirement: none			
Course aim			
To introduce students to the latest scientific knowledge about the biochemical and physiological roles of reactive species in human organism, oxidative stress development and development of chronic diseases.			
Course outcome			
Students are expected to identify and describe reactive species in the cell, how they are produced and their roles in the development of chronic diseases. Student should be able to explain mechanisms of antioxidant defence and experimental methods for their characterisation.			
Course content			
<i>Theory</i>			
The phenomenon of oxygen toxicity in aerobic organisms. Activation of oxygen and formation of reactive species: superoxide anion radical, hydroxyl radical, singlet oxygen, organic peroxides, peroxy- and alkoxy-radicals, carboxyl radical, nitrogen oxides, thiyl radicals, etc. Cellular sources of reactive species. Physiological significance of reactive species. Oxidative stress. Mechanisms of free radical toxicity: lipid peroxidation, oxidative damage of proteins, nucleic acids and carbohydrates. Antioxidant mechanisms of cells: antioxidant enzymes and non-enzymatic cellular antioxidants. Exogenous antioxidants. Experimental methods for determination of reactive species level and characterisation of antioxidant systems. Pathological changes in the cell and the organism as a result of oxidative stress. Reactive species and chronic diseases.			
<i>Practice: Practical classes, OFT, SRW</i>			
Determination of chosen sample potential to neutralize DPPH [•] , superoxide anion radical and hydroxyl radical. FRAP and AEAC assays.			
Literature			
1. Halliwell, B., Gutteridge, J. (2007): <i>Free Radicals in Biology and Medicine</i> , fourth edition. Oxford University Press, NY, USA.			
2. Eberhardt, M. K. (2001): <i>Reactive Oxygen Metabolites: Chemistry and Medical Consequences</i> . CRC Press LLC, Florida, USA.			
3. Relevant scientific papers from the field			
Number of classes of active teaching			Other classes:
Lectures: 2 (30)	Practice: 3 (45)	OFT: /	SRW: /
Teaching methods			
Lectures, laboratory work, consultations, e-learning			
Assessment of knowledge (maximum of 100 points)			
Pre-exam obligations	Points	Final exam	points
activity during lecture classes	10	written exam	60
practical teaching	15		
seminars	15		