

Module name	Biochemistry of Secondary Metabolites
Module code	B-BC.216E
ISCED code	0511: Biology
Study cycle	II ^o
Semester	summer
Responsible for this module	Anna Jarosz-Wilkolazka Department of Biochemistry and Biotechnology anna.wilkolazka@umcs.lublin.pl
Language of instruction	English
Website	
Prerequisites	Completed course of biochemistry
ECTS points hour equivalents	<p>Contact hours (work with an academic teacher) – 60</p> <ul style="list-style-type: none"> - lectures – 30 - labs - 30 <p>Non-contact hours (students' own work) – 60</p> <ul style="list-style-type: none"> - preparation for labs – 15 - preparation of reports from laboratory exercises – 15 - literature study – 10 - preparation for the exam - 20 <p>Total number of ECTS points for the module - 5</p>
Learning outcomes verification methods	tests, written assessment, continuous assessment during laboratories
Course full description	<p>The course covers the following issues:</p> <ul style="list-style-type: none"> - the position of secondary metabolism in biochemical processes in living organisms and its regulation at molecular and environmental level, - the variety of secondary metabolites in microorganisms and plants, from the perspective of biochemistry and biosynthesis with references to the relationship between biological function of secondary metabolites in defence against different stress, - the characteristic of basic secondary metabolites (bacterial, fungal and from plants), their biosynthetic pathways and practical applications for example such as pharmacological compounds. <p>Lectures</p> <ol style="list-style-type: none"> 1. Secondary metabolism in plants and microorganism-introduction 2. Regulation of secondary metabolism synthesis in plants and microorganisms. 3. Modular enzymes and their role in secondary metabolites synthesis. 4. Antibiotics – classification, structure, biological functions. 5. Characterisation of microbial siderophores – structure, synthesis and transport. 6. Terpenoids – structure, synthesis and biological

	<p>activity.</p> <ol style="list-style-type: none"> 7. Alkaloids – structure, synthesis and biological activity. 8. Polyketides as very diverse group of secondary metabolites. 9. Biological functions of diverse secondary metabolites produced by plants and microorganisms. 10. New strategies in secondary metabolites obtaining and characterisation. <p>Labs</p> <ol style="list-style-type: none"> 1. Determination of culture parameters in terms of growth phases determination. 2. Induction of enzymes in bacterial cultures: influence of antibiotics addition. 3. Characterisation of siderophores. 4. Extraction of etheric oils from plant materials. 5. Regulation of secondary metabolism in fungal cultures. 6. Alkaloids – preparation and characterisation 7. Natural dyes – sources, structures and characterisation
Bibliography	<p>Dewick PM “Medicinal natural products. A biosynthetic approach.” John Wiley & Sons, LTD, 2002</p> <p>Wink M (ed) “Functions and biotechnology of plant secondary metabolites” Wiley-Blackwell, 2010</p>
Learning outcomes	<p>KNOWLEDGE</p> <p>student knows the main groups of secondary metabolites produced by microorganisms and plants; can indicate a correlation between structure of secondary metabolites such as alkaloids, terpenoids and antibiotics and their biological activities; is aware of chemical and biological diversities of natural environment.</p> <p>SKILLS</p> <p>The student should be able to:</p> <ol style="list-style-type: none"> 1. recognise and characterise different groups of secondary metabolites 2. combine knowledge about the structure of the basic classes of secondary metabolites and their biological activities 3. indicate the practical implications resulting from the knowledge of the biodiversity of secondary metabolites. <p>ATTITUDES</p> <ol style="list-style-type: none"> 1. the openness to the world's diversity of living organisms and care for the environment 2. the willingness to broaden one’s knowledge 3. the willingness to update one’s practical and laboratory skills

	4. the awareness of the world community of living organisms and the environment
Practice	The laboratory classes provide the practical study of the following groups of secondary metabolites: antibiotics, terpenoids, siderophores, alkaloids, and polyketides, such as their biological and chemical diversity, biological activities, isolation and purification processes.