2nd Year – Module: Industrial Biotechnology – Elective Courses

INDBIOT-E01:	**SOLID-STATE FERMENTATION**
GENERAL INFORMATION	
Course Coordinator(s)	Marina Tišma, PhD, assoc. prof.
Associate(s)	Ana Bucić-Kojić, PhD, full prof.
Study Programme	Interdisciplinary Graduate Study Programme in English: Biotechnology
Course Status	Elective
Year of Study, Semester	2nd Year / 4th Semester
Credits (ECTS)	**4**
Teaching Method (number of classes)	Lectures 20; Seminars 10 Exercises 15
Expected Number of Students in the Course	25-30
COURSE DESCRIPTION	
Course Aims	
This course aims to provide knowledge on solid-state fermentation, reactor design with the aim to production of different products	
Prerequisites for Enrolment and the Entry Competencies Required for the Course	
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Learning Outcomes at the Programme Level Contributed by the Course	
INDBIOT-2	
Learning Outcomes at the Course Level	
After successful completion of this course students are expected to be able to: 1. Enumerate type and characteristics of substrate for microorganism cultivation in solid-state conditions 2. Know basics on physiology of filamentous fungi 3. Enumerate and explain the principle of bioreactors operating in solid-state conditions 4. Enumerate and know the advantages and disadvantages of microorganism cultivation in solid-state fermentation compared to submerge cultivation 5. Know the methods of substrate and biomass cultivation during solid-state fermentation.	
Course Content	
Lectures. Type and characteristics of solid-state fermentation. Basics on physiology of filamentous fungi. Type of bioreactors for solid-state fermentation. Mathematical model development for solid-state fermentation. Industrial application. **Seminar:** Application of solid-state fermentations for the production of biotechnologically important products or bioremediation - case study. **Exercises:** Cultivation of filamentous fungi under solid-state conditions in a bioreactor.	
Teaching Methods	
Lectures; seminars; laboratory exercises	
Students' Obligations	
Attendance at all forms of classes is mandatory and the students are obligated to attend all knowledge tests. The students may be absent from 30% (full-time students) and 50% (part-time students) of each of the forms of classes, provided that the absence is justified. An exercise which has not been completed must be made up through a midterm exam.	
Monitoring the Activity of the Students *(Connecting Learning Outcomes, Teaching Methods, and Grading)*	

Class-related activity	ECTS	Learning outcome	Student activity	Evaluation method	Grade points	
					Min.	Max.
Attending classes	0.25	1-5	Attendance at classes	Keeping records	2	5
Seminars	1	5	Seminar work	Presentation of seminar work	13	35
Laboratory exercise	0.75	4-5	Attendance at exercises	Laboratory exercises report	5	10
Final exam	2	1-5	Studying for the final exam	Oral exam	30	50
Total	**4**				**50**	**100**

Evaluation of the written part of the final exam

Percentage of correct answers (%)	Grade
>95.00	50
90.00-94.99	47
85.00-89.99	45
80.00-84.99	40
75.00-79.99	38
70.00-74.99	35
65.00-69.99	33
60.00-64.99	30

Forming the final grade:
The points granted for the final exam are added to the grade points awarded during class attendance. The grading process is conducted by absolute distribution, i.e. based on total achievements, and compared to the numerical system in the following manner:
A – Excellent (5): 90-100 grade points; B – Very Good (4): 80-89.99 grade points; C – Good (3): 65-79.99 grade points; D – sufficient (2): 50-64.99 grade points

Mandatory Literature (available in the library and via other media)

Title	Number of copies in the library	Availability via other media
Mitchell DA, Krieger N, Berovič M, Solid-State Fermentation Bioreactors, Springer, 2006.		

Additional Literature

1. Pandey A, Soccol CR, Larroche lC, Current Developments in Solid-state Fermentation, Springer 2008.
2. Scientific literature (available on-line).

Quality Assurance Procedures Designed to Ensure the Acquisition of Outcomes and Competencies

Anonymous, quantitative, standardised student survey on the course and the teacher's work implemented by the Quality improvement office of the Faculty of Food Technology Osijek and/or the Faculty of Medicine Osijek.

Note

E-learning is not included in the class quota, but it is used in teaching and it contains links to various sites and video and audio materials available on websites.