



## COURSE DATASHEET

<b>Semester:</b>	2012/13/2
<b>Course:</b>	Special bioreactors
<b>Code:</b>	VEMKBMM412B
<b>Responsible department:</b>	Research Institute on Bioengineering, Membrane Technology and Energetics
<b>Department code:</b>	MKBME
<b>Responsible instructor:</b>	Dr. László Gubicza

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### Course objectives:

Aim of this study is introduction more complex systems like micro reactors. By studying this systems students will be able to use micro reactors and membrane reactors as a bioreactor.

### Course content:

Introduction bioreactor types, classification.

Conventional bioreactors. Limitations and drawbacks, examples.

Developments of the microreactors, early examples.

Microreactors: state of the arts. Industrial examples.

Micro-bioreactors: theory and modeling.

Micro-bioreactors: types and examples.

Special micro-bioreactors, Lab on a chip.

PCR as micro-bioreactor.

Non conventional agitation methods and examples.

Membrane bioreactors: classifications.

Membrane bioreactors at water treatment.

Special membrane bioreactors, enzyme technology, pharmaceutical industry.

Test.

Model work: conclusions, remarks.

### Requirements, evaluation and grading:

After a half an hour's preparation the examinee gives an oral presentation on the topic for about 20-



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### Requirements, evaluation and grading:

25 minutes.

Fail (1) when the examinee is unable to prove either the definition of the basic notions or the short scheme of things connected with the topic.

Pass (2) when the examinee is able to interpret the basic notions of the topic.

Satisfactory (3) when the examinee is well - versed in the basic notions of the topic and is able to present their logic connections - with the help of the examiner.

Good (4) when the examinee provides a logic, well - structured presentation with all the important facts and connections but he does not know or partly knows the required reading material connected with the topic.

Very good (5) when the examinee gives a logic, excellent, well-structured, perfect in details oral presentation that completely reveals the connection of the concepts within the topic.

### Required and recommended readings:

Wolfgang Ehrfeld Volker Hessel, Holger Löwe: Microreactors: New Technology for Modern Chemistry Wiley-VCH, (2000) Michael J. Heller, Andras Guttman: Integrated Microfabricated Biodevices CRC Press (2001)