

module code /  
module title

## Module D-DIS/ Development of Industrial Strains

 date / version of the module  
description

12.02.2021

<b>1</b>		<b>INFORMATION ON THE MODULE</b>
1a	module code	Module D-DIS
1b	module title (German title)	Klicken Sie hier, um Text einzugeben.
1c	module title (English title)	Development of Industrial Strains
1d	credit points	6
1e	responsible for the module	Prof. Dr. Barbara Reinhold-Hurek
1f	type of module	elective module
1g	programs using the module	M.Sc. Biochemistry and Molecular Biology, (elective component for students in MicroSys specialization, not available for students in Integrative BMB)
1h	organizational unit offering the module	City University of Applied Sciences Bremen, in the frame of ISTAB M.Sc.
1i	content-related prior knowledge or skills	Knowledge in General Microbiology, Microbial Physiology, Microbial Genetics, Molecular Genetics, Cell Biology, Biochemistry with an Emphasis on Enzymology is recommended.
1j	learning contents	Changes and adaption of metabolic capacities of microorganisms relevant to industry, based on genetic engineering, (and/or random mutagenesis and subsequent screening) exemplified by industrial projects. Synthesis of research findings on one hand in microbiology/ cell biology/ microbial physiology/ biochemistry, and, on the other hand, of the pharmaceutical, food and feed, and fine chemical industry, based essentially on original literature (publications, patents). The course will focus on selected examples of bio active compounds (pharmaceuticals) produced with the help of genetically modified microorganisms like steroids, secondary metabolites from plant origin, (glyco-) proteins.

		Particular topics: Products of the secondary metabolism (mostly of plants) as a source of new molecules, their biosynthetic pathways and enzymes involved such pathways. Introduction to drug development. Motivation and general constraints in industrial drug development. Introduction to ongoing industrial projects (e.g. hydrocortisone, artemisinin, paclitaxel, opioid alkaloids).																																																																								
1k	learning outcomes/ competencies/ targeted competencies	<p>Students have an in depth understanding of the abilities and peculiarities of microorganisms, and of the possibilities to use and modify them to the desired to the desired features. Students can adopt methods and results from fundamental research with respect to industrial application of those microorganisms (GLP/GMP, safety, economical and social issues). Students can critically analyse scientific literature for synthesis into novel applications and resort to a large catalogue of methods; they have social competence in group work.</p> <p>They can pinpoint interdisciplinary character of state-of-the-art drug development and production and are sensible to challenges, problems (genetics, technical, economical problems), and limitations in drug development.</p>																																																																								
1l	calculation of student workload <i>(part a: calculation of presence time and working hours)</i>	<p><b>The total amount of the presence time and working hours of the module has to be calculated additionally in the detailed calculation a) to c).</b></p> <p><b>a) detailed calculation:</b> <b>SWS / presence time/working hours in each course of the module</b></p> <table border="1"> <tr> <td><input type="checkbox"/></td> <td>lecture(s) with</td> <td></td> <td>SWS/ contact hours</td> <td></td> <td>hours of presence time</td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td>1 seminar(s) with</td> <td>4</td> <td>SWS/ contact hours</td> <td>56</td> <td>hours of presence time</td> </tr> <tr> <td><input type="checkbox"/></td> <td>exercise(s) with</td> <td></td> <td>SWS/ contact hours</td> <td></td> <td>hours of presence time</td> </tr> <tr> <td><input type="checkbox"/></td> <td>internship(s) with</td> <td></td> <td>sum of working hours</td> <td></td> <td></td> </tr> <tr> <td><input type="checkbox"/></td> <td>seminar(s) with</td> <td></td> <td>SWS/ contact hours</td> <td></td> <td>total hours of presence time</td> </tr> <tr> <td><input type="checkbox"/></td> <td>laboratory/laboratories with</td> <td></td> <td>SWS/ contact hours</td> <td></td> <td>total hours of presence time</td> </tr> <tr> <td><input type="checkbox"/></td> <td>tutorial(s) with</td> <td></td> <td>SWS/ contact hours</td> <td></td> <td></td> </tr> <tr> <td><input type="checkbox"/></td> <td>excursion(s) with</td> <td></td> <td>SWS contact hours in total</td> <td></td> <td>working hours</td> </tr> <tr> <td><input type="checkbox"/></td> <td colspan="5">other form of course (e.g. block seminar), namely this:</td> </tr> <tr> <td></td> <td colspan="5">Klicken Sie hier, um Text einzugeben.</td> </tr> <tr> <td></td> <td>with</td> <td>SWS / with totaly</td> <td>contact hours</td> <td><input type="checkbox"/></td> <td>presence time <input type="checkbox"/> working hours</td> </tr> <tr> <td></td> <td colspan="5"><b>= sum of presence time and working hours:</b></td> </tr> </table>	<input type="checkbox"/>	lecture(s) with		SWS/ contact hours		hours of presence time	<input checked="" type="checkbox"/>	1 seminar(s) with	4	SWS/ contact hours	56	hours of presence time	<input type="checkbox"/>	exercise(s) with		SWS/ contact hours		hours of presence time	<input type="checkbox"/>	internship(s) with		sum of working hours			<input type="checkbox"/>	seminar(s) with		SWS/ contact hours		total hours of presence time	<input type="checkbox"/>	laboratory/laboratories with		SWS/ contact hours		total hours of presence time	<input type="checkbox"/>	tutorial(s) with		SWS/ contact hours			<input type="checkbox"/>	excursion(s) with		SWS contact hours in total		working hours	<input type="checkbox"/>	other form of course (e.g. block seminar), namely this:						Klicken Sie hier, um Text einzugeben.						with	SWS / with totaly	contact hours	<input type="checkbox"/>	presence time <input type="checkbox"/> working hours		<b>= sum of presence time and working hours:</b>				
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		56
	<p>calculation of student workload</p> <p><i>(part b: preparation time and follow-up work/self-study)</i></p>	<p><b>b) working hours for preparation/follow-up work of the course(s) and/or self-study</b></p> <p>= sum of working hours:</p> <p>84</p>
	<p>calculation of student workload</p> <p><i>(part c: exam preparation etc.)</i></p>	<p><b>c) exam preparation (incl. examination)</b></p> <p>= sum of working hours:</p>
	<p>calculation of student workload</p> <p><i>(total amount of hours including a) - c))</i></p>	<p><b>Total amount of the presence time and working hours a) to c):</b></p> <p>40</p>
1m	<p>description of possible optional courses in the module</p>	<p><u>Can a student choose between different courses within the module?</u></p> <p>NO</p> <p><u>Short description of selection option</u></p> <p>Klicken Sie hier, um Text einzugeben.</p>
1n	<p>language(s) of instruction</p>	<p><input type="checkbox"/> German      <input checked="" type="checkbox"/> English      <input type="checkbox"/> Spanish      <input type="checkbox"/> French</p> <p><input type="checkbox"/> Other, namely this:</p> <p>Klicken Sie hier, um Text einzugeben.</p>
1o	<p>frequency</p>	<p><i>(regular cycle module is offered) e.g.: winter semester, yearly or summer semester, yearly or each semester</i></p> <p>summer semester yearly</p> <p>Klicken Sie hier, um Text einzugeben.</p>
1p	<p>duration</p>	<p>one semester module</p> <p>Klicken Sie hier, um Text einzugeben.</p>
1q	<p>Literature <i>(optional)</i></p>	<p>Klicken Sie hier, um Text einzugeben.</p>
1r	<p>more information on the module <i>(optional)</i></p>	<p>Instructor: Timann Achtstetter</p>

<b>2</b>	<b>INFORMATION ON THE MODULE EXAMINATION</b> (see also AT Art. 5 section 8)	
<b>2a</b>	type of examination	<input type="checkbox"/> module exam; i.e. exam with only one component (MP) <input checked="" type="checkbox"/> combination exam, i.e. exam with several components (administered by instructors) (KP) <input type="checkbox"/> partial exam; i.e. exam with several components (administered by registrar) (TP)
<b>2b</b>	exam components or prerequisites ( <i>type, number</i> )	<p><i>PL = graded component of the examination</i>  <i>SL = ungraded component of the examination, coursework</i>  <i>PVL = prerequisite of the examination (see AT Art. 5 Section 10)</i></p> <input checked="" type="checkbox"/> PL   2 <input type="checkbox"/> SL   <input type="checkbox"/> PVL   justification <p>If necessary, further explanations:</p> <p>PL2: Handout: max. 2 pages summary of the oral presentation</p>
<b>2c</b>	Give this information for combination examinations only: Weights (in percentage) of component grades	<p>PL 1: 80% (presentation, oral)  PL 2: 20% handout  PL 3: <a href="#">Klicken Sie hier, um Text einzugeben.</a>  PL 4: <a href="#">Klicken Sie hier, um Text einzugeben.</a></p> <p>If necessary, further comments:</p> <p><a href="#">Klicken Sie hier, um Text einzugeben.</a></p>
<b>2d</b>	form of examination (see AT BPO/AT MPO Art. 8, 9 and 10)	<input type="checkbox"/> Assignment <input type="checkbox"/> Oral examination (single) <input checked="" type="checkbox"/> Presentation, oral <input type="checkbox"/> Written examination <input type="checkbox"/> Group examination, oral <input type="checkbox"/> Presentation and written assignment <input type="checkbox"/> Portfolio <input type="checkbox"/> Project report <input type="checkbox"/> Bachelor Thesis <input type="checkbox"/> Internship report <input type="checkbox"/> Colloquium <input type="checkbox"/> Master Thesis <input checked="" type="checkbox"/> Other (concrete definition is given in the examination regulations): <p>handout</p>
<b>2e</b>	language(s) of instruction	<input type="checkbox"/> German <input checked="" type="checkbox"/> English <input type="checkbox"/> Spanish <input type="checkbox"/> French <input type="checkbox"/> Other, namely this: <a href="#">Klicken Sie hier, um Text einzugeben.</a>