Universität Bremen

module code / module title	**MN-BPR / Brain Pattern Recognition**
date / version of the module description	20.02.2023

1	**INFORMATION ON THE MODULE**	
1a	module code	MN-BPR
1b	module title *(German title)*	
1c	module title *(English title)*	Brain Pattern Recognition
1d	credit points	9
1e	responsible for the module	Dr. Felix Putze
1f	type of module	elective module
1g	programs using the module	M.Sc. Neurosciences
1h	organizational unit offering the module	Cognitive Systems Lab (FB03)
1i	content-related prior knowledge or skills	Prior completion of module S1 (Advanced Programming: Data Analysis and Modeling) is highly recommended to ensure that programming skills in Python and basic knowledge in data processing and neural modeling as well as machine learning are available.
1j	learning contents	Preparation: • Recap of programming fundamentals with focus on data processing • Introduction to important libraries (e.g. for EEG processing and visualization) • Paper reading on Brain-Computer Interfaces (BCI) Block Course: • BCI experiment design • EEG data recording for BCI

		• Signal preprocessing & artifact handling
		• Online Machine Learning (ML) for BCI
		• Machine Learning evaluation & ML experiment management
		• Integration of end-to-End BCI system
1k	learning outcomes/ competencies/ targeted competencies	• Students have an in-depth understanding of all components of state-of-the-art end-to-end BCIs • Students are able to design and conduct BCI experiments for specific applications and BCI paradigms • Students are able to implement a pipeline for preprocessing and classification of EEG data • Students are able to manage different classification setups systematically • Students know how to interpret the results of an BCI evaluation • Students are able to create end-to-end BCIs with simple adaptive user interfaces
1l	calculation of student workload *(part a: calculation of presence time and working hours)*	(content below)

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).

a) detailed calculation:
 SWS / presence time/working hours in each course of the module

☒	1	lecture(s) with	1	SWS/ contact hours	14	hours of presence time
☒	1	seminar(s) with	2	SWS/ contact hours	28	hours of presence time
☐		exercise(s) with		SWS/ contact hours		hours of presence time
☐		internship(s) with		sum of working hours		
☐		seminar(s) with		SWS/ contact hours		total hours of presence time
☒	1	laboratory/laboratories with	3	SWS/ contact hours	42	total hours of presence time
☐		tutorial(s) with		SWS/ contact hours		
☐		excursion(s) with		SWS contact hours in total		working hours

☐ other form of course (e.g. block seminar), namely this:

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with	SWS / with totaly	contact hours	☐ presence time	☐ working hours

		= sum of presence time and working hours: 84h
	calculation of student workload *(part b: preparation time and follow-up work/self-study)*	**b) working hours for preparation/follow-up work of the course(s) and/or self-study** = sum of working hours: 154h
	calculation of student workload *(part c: exam preparation etc.)*	**c) exam preparation (incl. examination)** = sum of working hours: 32h
	calculation of student workload *(total amount of hours including a) - c))*	**Total amount of the presence time and working hours a) to c):** 270h
1m	description of possible optional courses in the module	<u>*Can a student choose between different courses within the module?*</u> NO <u>*Short description of selection option*</u> Klicken Sie hier, um Text einzugeben.
1n	language(s) of instruction	☐ German ☒ English ☐ Spanish ☐ French ☐ Other, namely this: Klicken Sie hier, um Text einzugeben.
1o	frequency	*(regular cycle module is offered) e.g.: winter semester, yearly or summer semester, yearly or each semester* summer semester yearly
1p	duration	one semester module The main part of the module is a block course of three weeks, with preparatory/ follow-up-work throughout the whole semester
1q	Literature (*optional*)	Klicken Sie hier, um Text einzugeben.
1r	more information on the module (*optional*)	Limited to 8 students

2	**INFORMATION ON THE MODULE EXAMINATION** (see also AT Art. 5 section 8)	
2a	type of examination	☒ module exam; i.e. exam with only one component (MP) ☐ combination exam, i.e. exam with several components (administered by instructors) (KP) ☐ partial exam; i.e. exam with several components (administered by registrar) (TP)
2b	exam components or prerequisites *(type, number)*	*PL* = *graded component of the examination* *SL* = *ungraded component of the examination, coursework* *PVL* = *prerequisite of the examination (see AT Art. 5 Section 10)* ☒ PL | 1 ☐ SL | ☐ PVL | justification If necessary, further explanations: PL: Presentation and written assignment (of project)
2c	Give this information for combination examinations only: Weights (in percentage) of component grades	PL 1: 100% Presentation and written assignment (of project) PL 2: PL 3: Klicken Sie hier, um Text einzugeben. PL 4: Klicken Sie hier, um Text einzugeben. If necessary, further comments: Klicken Sie hier, um Text einzugeben.
2d	form of examination (see AT BPO/AT MPO Art. 8, 9 and 10)	☐ Assignment ☐ Oral examination (single) ☐ Presentation, oral ☐ Written examination ☐ Group examination, oral ☒ Presentation and written assignment ☐ Portfolio ☐ Project report ☐ Bachelor Thesis ☐ Internship report ☐ Colloquium ☐ Master Thesis ☐ Other (concrete definition is given in the examination regulations):
2e	language(s) of instruction	☐ German ☒ English ☐ Spanish ☐ French ☐ Other, namely this: Klicken Sie hier, um Text einzugeben.