**TECHNISCHE
HOCHSCHULE
LÜBECK**

Module: Digital Signal Processing

Level	Bachelor	**Short Name**	DSP
Responsible Lecturers	Hänsel, Ralph, Prof. Dr.		
Department, Facility	Electrical Engineering and Computer Science		
Course of Studies	Information Technology, Bachelor		
Compulsory/elective	Compulsory	**ECTS Credit Points**	5
Semester of Studies	7	**Semester Hours per Week**	4
Length (semesters)	1	**Workload (hours)**	120
Frequency	SuSe	**Presence Hours**	60
Teaching Language	English	**Self-Study Hours**	90

The following section is filled only if there is **exactly one** module-concluding exam.

Exam Type	Written Exam	**Exam Language**	English
Exam Length (minutes)	120	**Exam Grading System**	One-third Grades
Learning Outcomes	Upon successful completion of this course, the student will know the principle possibilities and restrictions of digital signal processing compared to analogue signal processing. They will know all the necessary intermediate steps to form a time-discrete signal from an analogue signal and vice versa. They will be able to describe the main effects and impairments of these processes. They will be proficient in expressing analogue and time-discrete systems mathematically and compare them using their system functions and their transfer functions. The students will be able to obtain the response of a linear time-invariant system and to verify the stability of the system. They will know how to make use of the z-Transform, to represent the different structures of time-discrete filters. The Discrete Fourier-Transform and the implementation of it, using the Fast Fourier Transform, and their relevance for digital signal processing will also be reviewed.		
Participation Prerequisites			

The previous section is filled only if there is **exactly one** module-concluding exam.

Consideration of Gender and Diversity Issues	✔ Use of gender-neutral language (THL standard) ✔ Target group specific adjustment of didactic methods ✔ Making subject diversity visible (female researchers, cultures etc.)
Applicability	Signals and Systems
Remarks	

03.02.2022

Module Course: Digital Signal Processing (Lecture)

(of Module: Digital Signal Processing)

Course Type	Lecture	**Form of Learning**	Presence
Mandatory Attendance	no	**ECTS Credit Points**	4
Participation Limit	60	**Semester Hours per Week**	3
Group Size	60	**Workload (hours)**	120
Teaching Language	English	**Presence Hours**	45
Study Achievements ("Studienleistung", SL)		**Self-Study Hours**	75
SL Length (minutes)		**SL Grading System**	

The following section is filled only if there is a course-specific exam.

Exam Type		**Exam Language**	
Exam Length (minutes)		**Exam Grading System**	
Learning Outcomes			
Participation Prerequisites			

The previous section is filled only if there is a course-specific exam.

Contents	Time-discrete signals
	Sampling theorem
	Quantisation
	LTI Systems
	System Function
	Frequency Response
	z- Transform
	BIBO stability
	DFT
	FFT
Literature	Oppenheim, Schafer: Time-Discrete Signal Processing, Prentice Hall
	Hsu: Signal and Systems, Schaums Outline, McGraw Hill
Remarks	

Module Course: Digital Signal Processing (Exercises)

(of Module: Digital Signal Processing)

Course Type	Exercise	**Form of Learning**	Presence
Mandatory Attendance	no	**ECTS Credit Points**	1
Participation Limit		**Semester Hours per Week**	1
Group Size	60	**Workload (hours)**	
Teaching Language	English	**Presence Hours**	15
Study Achievements ("Studienleistung", SL)		**Self-Study Hours**	15
SL Length (minutes)		**SL Grading System**	

The following section is filled only if there is a course-specific exam.

Exam Type		**Exam Language**	
Exam Length (minutes)		**Exam Grading System**	
Learning Outcomes			
Participation Prerequisites			

The previous section is filled only if there is a course-specific exam.

Contents	See above
Literature	See above
Remarks	