

Stand: 11.10.17 (Tobias Kleine)

Information about module					Courses			Exam			
Duration in semesters	Frequency of offer	Recommended semester	Module type: core (compulsory, (P)), core elective (WP) or elective (W) course	Module number/shorthand	Module name	Course title	Course type: lecture(V), tutorial (Ü), seminar (S), practical training (P)	Campus study hours per week (SWS)	Form of examination	Graded (yes/no)	Credits points (#)
3		P	OZ-M-OCEAN		<b>Theoretical Oceanography</b>				oral	yes	24
	annually in winter	1			<i>Theoretical Oceanography I</i>		V	4	oral	no	6
	annually in winter	1			<i>Theoretical Oceanography I</i>		Ü	2	Übungsabschluss	no	3
	annually in summer	2			<i>Theoretical Oceanography II</i>		V	4			6
	annually in summer	2			<i>Theoretical Oceanography II</i>		Ü	2	Übungsabschluss	no	3
	annually in winter	3			<i>Oceanic processes and Observations</i>		P	2	Übungsabschluss	no	3
	annually in winter	3			<i>Oceanic processes and Observations</i>		S	2	Poster/report/presentation	yes	3
<b>Learning outcomes:</b> Students have acquired the theoretical-physical fundamentals of the wind-driven and density-driven ocean circulation, on the entire spectrum of variability (ranging from periodic processes such as gravity waves, planetary waves via meso-scale eddies to turbulence). Students have gained a deeper understanding of the mechanisms, scales and dynamical balances, their mathematical description and numerical representations in ocean circulation models.											
<b>Exam:</b> The grade for this module consists of the grade for 'Theoretical Oceanography I & II' accounting for 3/4 of the grade, and the grade for 'Oceanic processes and observations' accounting for 1/4 of the grade. Exam in 'Theoretical Oceanography I & II': after the successful completion of 'Theoretical Oceanography I & II' by individual appointment, usually at the end of the 2nd semester. The oral exam for 'Theoretical Oceanography I' (usually at the end of the first term) is pass/fail. Exam in 'Oceanic processes and observations': students can individually select at the start of the term whether their graded course work will be a poster, a report or a presentation.											
<b>Requirements for exam registration:</b> Successful completion of the required course work in every individual course (= 'Übungsabschluss', pass/fail).											
2		P	OZ-M-CLIMATE		<b>Climate</b>				oral	yes	15
	annually in winter	1			<i>Climate processes and observations</i>		V	3			3
	annually in winter	1			<i>Climate processes and observations</i>		Ü	1	Übungsabschluss	no	3
	annually in summer	2			<i>Climate modelling</i>		V	2			3
	annually in summer	2			<i>Climate modelling</i>		Ü	2	Übungsabschluss	no	3
	annually in summer	2			<i>Climate dynamics</i>		V+Ü	2	Übungsabschluss	no	3
<b>Learning outcomes:</b> Students will have an in-depth knowledge of the processes and phenomena in the ocean that are relevant for short- and long-term climate variability, at both global and regional scales. Students will be able to describe these processes and phenomena in terms of the oceanic and atmospheric dynamics. Further, students know the opportunities and limitation inherent to the description of the processes and phenomena with observations and numerical climate models.											
<b>Exam:</b> Joint oral module exam for all courses by individual appointment.											
<b>Requirements for exam registration:</b> Successful completion of the required course work in every individual course (= 'Übungsabschluss', pass/fail).											
3		WP	OZ-M-ADVANCE		<b>Advanced methods and knowledge</b>					yes	24
	biannually in winter	1 oder 3			<i>Data assimilation</i>		V	3		yes	3
	biannually in winter	1 oder 3			<i>Data assimilation</i>		Ü	1		yes	3
	annually in winter	1 oder 3			<i>Sea-Ice</i>		V+Ü	1+1		yes	3
	annually in summer	2			<i>Shelf Sea Dynamics</i>		S	2		yes	3
	annually in winter	1 oder 3			<i>Non-linear processes I</i>		V+Ü	2+2	As announced	yes	6
	annually in summer	2			<i>Non-linear processes II</i>		V+Ü	2+2		yes	6
	biannually in winter	1 oder 3			<i>Predictions &amp; predictability of climate</i>		V	2		yes	3
	biannually in winter	1 oder 3			<i>Predictions &amp; predictability of climate</i>		S+Ü	2		yes	3
	annually in winter	1 oder 3			<i>Special topics in oceanography or climate sci</i>		S			yes	3
	annually in summer	2			<i>Special topics in oceanography or climate sci</i>		S			yes	3
	individually	1, 2, 3			<i>Seepaktikum (sea-going experience)</i>				by prior agreement and subsequent certificate	no	up to 6
	annually in winter/summer	1, 2, 3			<i>Nebenfachveranstaltungen des MSc ICSS (Physics track)</i>				as offered by the degree program	yes	depending on the course
	annually in winter	1			<i>Introduction to Physical Oceanography</i>		V	2	Übungsabschluss	no	3
<b>Learning outcomes:</b> Students have gained a deeper scientific or methodological expertise in the areas of physical oceanography and climate physics. Students can select from a list of courses announced at the beginning of the respective teaching term; the courses listed above are examples.											
<b>Exam:</b> Each course will be graded individually following the regulations of the respective course, as announced at the start. As a general rule, courses are graded, with two exceptions: (i) for students that take up this MSc without a background in physical oceanography from their previous degree, 'Introduction to Physical Oceanography' is offered at the beginning of the first term. (ii) individually arranged active participation in a scientific cruise can be credited - depending on the duration of the cruise and the kind of work conducted aboard - with up to 6CPs by prior approval of chairperson of the examination board.											
1		P	OZ-M-SPEC		<b>Specialization</b>					no	15
	annually in winter	3			<i>Specialization and project planning</i>				Report		12
	annually in winter	3			<i>Seminar</i>				Presentation		3
<b>Learning outcomes:</b> Students have acquired – through an extensive literature research and discussions within their working group – an in-depth understanding of a special topic in ocean or climate physics, which will also form the framework for the MSc thesis. Through active participation in a research group, students have also learned how to apply the necessary tools to conduct their MSc thesis research. Together with their MSc thesis advisor, they have shaped a concept and schedule for the upcoming MSc thesis, which students are able to present to a scientific audience and summarize in writing.											
<b>Formal requirements for registration:</b> none											
1		P	OZ-M-THESIS		<b>MSc Thesis</b>					yes	30
	annually in summer	4							thesis, presentation & discussion		
In the MSc thesis, students show that they can independently investigate a scientific question within the overall topic of ocean and climate physics using scientific methods, including a sub-sequential documentation following standard scientific practice. Starting from the current scientific understanding, students first demonstrate potential ways to tackle the scientific problem, which they then also apply. The scientific results are adequately described using both figures and text, and their limitations critically discussed. The module is completed by a presentation and open discussion at the Institute of Oceanography, whose grade counts for 1/5 of the module's grade.											
<b>Formal requirements for registration:</b> 60 CPs in core or core elective courses of the degree.											
2		W	OZ-M-ADD		<b>Additional/Ergänzungsfach</b>					no	12
	annually in winter	1			<i>Ergänzungsfach 1 / Additional 1</i>				as offered by the degree program		0 - 12
	annually in summer	2			<i>Ergänzungsfach 2 / Additional 2</i>				as offered by the degree program		0 - 12
<b>Learning Outcomes:</b> Students have widened their perspective by taking additional courses from one to two other subjects that complement their studies in ocean and climate physics, typically subjects from the natural sciences.											
The grades for these courses do not count towards the final grade. Students can select courses that are offered as 'pass/fail'.											
<b>Formal requirements for registration:</b> none											