

NAME OF THE COURSE		HYDROGRAPHY SURVEY				
Code		Year of study	2., III. or IV. semester			
Course teacher	Tea Duplančić-Leder, PhD, Associate professor	Credits (ECTS)	4.0			
Associate teachers	Nenad Leder, PhD, Assistant professor	Type of instruction (number of hours)	L	S	E	F
			30		15	
Status of the course	elective	Percentage of application of e-learning	/			
COURSE DESCRIPTION						
Course objectives	The aim of the course is to provide students with basic principles of oceanography, positioning at sea and hydrography survey, selection of appropriate methods of measurements and positioning at sea.					
Course enrolment requirements and entry competences required for the course	Undergraduate qualification (6th level of EQF or CROQF).					
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	<p>The student will:</p> <ul style="list-style-type: none"> - recognize the different types of spatial coordinates used in hydrographic measurements, transform and use them to display the measured spatial data. - describe the measurements and processing of oceanographic parameters and the ways devised to use them to create a vertical profile. - use tide gauge data to correct the measured bathymetry data. - describe the hydrographic survey and processing of bathymetry and sediment data and explain their use in making the original survey. - work with the data of electronic navigational charts as the new standard for displaying data of hydrographic survey. - describe and interpret hydrographic activities and usage of marine data (especially bathymetry). 					
Course content broken down in detail by weekly class schedule (syllabus)	<p>History of hydrography Coordinate systems and cartographic projection in hydrography Standards and Requirements (Relevant standards and legislation; Definition of hydrography and bathymetry (depth measurement) Oceanography and Marine Geology (Properties of Seawater; Physical Oceanography; Marine Geology; Oceanographic data Collection Methods) Marine Positioning & Orientation (Introduction & Radio Frequency propagation; Coordinate systems and vessel orientation; Marine positioning systems and methods; Data logging, navigation and data links; Vertical positioning, dynamic draft, heave and tide; Errors sources, models and calibration) Introduction to Acoustics and Depth Measurement Systems (Acoustics Basics; Echo Sounder Principles; Sonar Equations; Acoustics and Depth Measurement Systems) Multibeam systems (Sidescan Sonar; Multibeam Echosounders; Multibeam Orientation and Raytracing; Multibeam Survey Operations) Tides, Currents and Water Levels (Tidal theory; Tidal datums; Tide and Current Tables; Tidal predictions; Non-tidal effects; Tide gauges – selection, calibration and</p>					

	use; Currents and tidal streams; Current meters – selection, calibration and use; Co-tidal charts; Harmonic analysis) Survey Management and Logistics (Survey management; Logistics; Returns of survey; Plan and carry out a simple hydrographic survey) Method of coastline definition, MSDI Marine cartography (ENC, ECDIS) LIDAR measurements; Satellite altimetry International and national hydrographic organization					
Format of instruction	<input checked="" type="checkbox"/> lectures <input type="checkbox"/> seminars and workshops <input checked="" type="checkbox"/> exercises <input type="checkbox"/> <i>on line</i> in entirety <input type="checkbox"/> partial e-learning <input checked="" type="checkbox"/> field work			<input checked="" type="checkbox"/> independent assignments <input type="checkbox"/> multimedia <input type="checkbox"/> laboratory <input type="checkbox"/> work with mentor		
Student responsibilities	Regular attendance of classes. Preparation of a written assignment. Oral exam.					
Screening student work (<i>name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course</i>)	Class attendance	1.5	Research		Practical training	1.0
	Experimental work		Report			
	Essay	0.5	Seminar essay			
	Tests	0.5	Oral exam			
	Written exam	0.5	Project			
Grading and evaluating student work in class and at the final exam	Attending classes and preparation of written assignment (40%). Oral exam (60%):					
Required literature (available in the library and via other media)	Title				Number of copies in the library	Availability via other media
	IHO 2005, C-13 - Manual of Hydrography, IHO, Monaco.;					
	IHO 2008, S-44 - IHO Standards for Hydrographic Surveys, 5. edn. IHO.					
	de Jong CD Lachapelle, G Skone, S Elema, IA 2010, Hydrography, DUP Blue Print.					
	LaRocque, PE West, GR 1997, Airborne Laser Hydrography: An Introduction, Proc. ROPME/PERSGA/IHB, Kuwait.					
	Tomczak, M 2012, Lecture Notes in Oceanography, Flinders University, Adelaide, Australia, http://www.msi.ttu.ee/~elken/IntroOcean_Tomczak.pdf					
Optional literature (at the time of submission of study programme)	(1) Hecht, H Berking, B Jonas, M Alexander, L 2011, The Electronic Chart: Functions, Potential and Limitations, 3rd. Edition, Geomares Publishing.					

proposal)	
Quality assurance methods that ensure the acquisition of exit competences	Quality assurance will be performed at three levels: (1) University level, through questionnaires; (2) Faculty level by Quality Control Committee; (3) Lecturer's level.
Other (as the proposer wishes to add)	