Faculty of Maritime Studies / MARITIME SCIENCES / Integrated system electronic navigation

Course:	Integrated system electronic navigation			
Course ID	**Course status**	**Semester**	**ECTS credits**	**Lessons** (Lessons+Exercises+Laboratory)
13448	Mandatory	3	5	2+2+0
Programs	MARITIME SCIENCES			
Prerequisites	None			
Aims	Explain the working principles of echo sounders, speed logs and other electronic navigational devices. Describe and interpret working principle of magnetic compass, use of radar for navigation, use of electronic charts, ECDIS. Independent use of ECDIS and ARPA. Describe and interpret working principles of hyperbolic navigational systems, initial systems, satellite navigational systems of high precision. Describe and interpret use of VDR, AIS and INS. Recognize and analyze errors of electronic navigational systems and critically observe their usability.			
Learning outcomes	- To analyze working principle of electronic navigation devices; - To operate electronic navigation devices independently; - To spot the errors electronic navigation devices independently; - To handle the vessel using simulator electronic navigation devices ; - To apply gained knowledge in passage planning throughout dynamic conditions and handle the vessel independently.			
Lecturer / Teaching assistant	PhD Milorad Rašković, Capt.			
Methodology	Distance learning and self study of practical tasks. Use of Moodle server and download of posted materials. Excercising on Navi-Trainer 4000 simulator.			
Plan and program of work				
Preparing week	Preparation and registration of the semester			
I week lectures	Introduction. Review of INS theory.			
I week exercises	Introduction. Review of INS theory.			
II week lectures	ECDIS			
II week exercises	ECDIS			
III week lectures	Automatic radar plotting aid – ARPA. Transas RADAR/ARPA imitator. Navigational aids and plotting.			
III week exercises	Automatic radar plotting aid – ARPA. Transas RADAR/ARPA imitator. Navigational aids and plotting.			
IV week lectures	Analyze of ARPA system.			
IV week exercises	Analyze of ARPA system.			
V week lectures	Practical use of RADAR/ARPA.			
V week exercises	Practical use of RADAR/ARPA.			
VI week lectures	The First Compulsory Assignment			
VI week exercises	The First Compulsory Assignment			
VII week lectures	Satellite navigation.			
VII week exercises	Satellite navigation.			
VIII week lectures	GPS. GLONASS.			
VIII week exercises	GPS. GLONASS.			
IX week lectures	DGPS.			
IX week exercises	DGPS.			
X week lectures	Route planning in dynamic conditions.			
X week exercises	Route planning in dynamic conditions.			
XI week lectures	The Second Compulsory Assignment			
XI week exercises	The Second Compulsory Assignment			
XII week lectures	GPS, GLONASS. Error analyses.			
XII week exercises	GPS, GLONASS. Error analyses.			
XIII week lectures	Electronic charts. Error analyses and modeling.			

XIII week exercises	Electronic charts. Error analyses and modeling.
XIV week lectures	INS. Simulator excercises.
XIV week exercises	INS. Simulator excercises.
XV week lectures	AIS and VDR.
XV week exercises	AIS and VDR.
Student workload	Teaching and the Final Exam: 6h 40min x 16 = 106 h 40min Necessary preparation before Term starting (admin., enrolment, verification): 6h 40 min x 2 = 13h 20 min Total hours for the course: 5 x 30 = 150h Additional hours for preparing correction of final exam, including the taking of the exam:0 - 30h Structure of the students' duties: 106h 40 min (lectures) + 13h 20min + 30h (additional work)

Per week	**Per semester**
5 credits x 40/30=6 hours and 40 minuts 2 sat(a) theoretical classes 0 sat(a) practical classes 2 excercises **2 hour(s) i 40 minuts** of independent work, including consultations	Classes and final exam: **6 hour(s) i 40 minuts x 16 =106 hour(s) i 40 minuts** Necessary preparation before the beginning of the semester (administration, registration, certification): **6 hour(s) i 40 minuts x 2 =13 hour(s) i 20 minuts** Total workload for the subject: **5 x 30=150 hour(s)** Additional work for exam preparation in the preparing exam period, including taking the remedial exam from 0 to 30 hours (remaining time from the first two items to the total load for the item) **30 hour(s) i 0 minuts** Workload structure: **106 hour(s) i 40 minuts (cources), 13 hour(s) i 20 minuts (preparation), 30 hour(s) i 0 minuts (additional work)**
Student obligations	Students are required to do a seminar paper on one of the proposed topics for seminar papers (suggested topics will be available on the DL platform) and to take the final exam which will be organized in classical form at the Faculty of Maritime Studies in Kotor. They will also be informed about the dates of the final exam in a timely manner via the Internet.
Consultations	
Literature	1. M. Rašković, Terestička i elektronska navigacija, FZP, Kotor, 2001. 2. M. Rašković, Radar i ARPA, priručnik , FZP, Kotor, 2000. 3. Navigational simulator Navi-Trainer 4000, TransasLtd., 2004.
Examination methods	2 seminar papers on NT4 by 5 pts (totally 10 pts); 2 homeworks by 5 pts (totally 10 pts); 2 compulsory assignments by 15 pts (totally 30 pts); Final exam (theory + simulation NT4) 50 pts. Positive mark requires not less than 50 points cumulatively.
Special remarks	If required, the course can be delivered in English.
Comment	

Grade:	F	E	D	C	B	A
Number of points	less than 50 points	greater than or equal to 50 points and less than 60 points	greater than or equal to 60 points and less than 70 points	greater than or equal to 70 points and less than 80 points	greater than or equal to 80 points and less than 90 points	greater than or equal to 90 points