**Course description**

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| **Generic information** |
| Head of Course | Assoc. Prof. Irena Jurdana, PhD |
| Course | Electronic Navigation Devices |
| Study Programme | Marine Electronic Engineering and Information Technology |
| Type of Course | mandatory |
| Year of Study | 3. |  |
| Estimated Student Workload and Methods of Instruction | ECTS coefficient of Student Workload | 4 |
| Number of Hours (L+E+S) | 30+15+0 |

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| **1. GENERAL COURSE DESCRIPTION** |
| *1.1. Course Objectives*  |
| The basic objectives of the course are the acquisition of knowledge of electronic navigation devices and according to the STCW Convention. The course deals with the theoretical and practical basis of work and application of navigation devices on ships. |
| *1.2. Prerequisites for Course Registration*  |
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| *1.3. Expected Learning Outcomes*  |
| 1. Describe the types and application of electronic navigation devices2. Observe hyperbolic navigation systems3. Describe the principle of work and the type of gyrocompass4. Explain the types and application of the GPS and DGPS system, and the principle of work5. Describe the radar, basic features, and impulse radar6. Analyse ultrasonic navigation systems7. Explain the AIS communications navigation system and its application8. Analyse and describe VDR |
| *1.4. Course Outline*  |
| Basics of electronic navigation, overview of electronic navigation systems, Hyperbolic navigation systems, LORAN C system, GPS - Global Positioning System, DGPS, Doppler Effect, GLONASS, RADAR, ARPA, Ultrasonic systems, Sonars, Gyrocompass, Optical gyros - Sagnac effect, Automatic Identification System and VTS (Vessel Traffic System), VDR, Speed log. |
| *1.5. Modes of* *Instruction*  | [x] Lectures[ ]  Seminars and workshops [x]  Exercises [ ]  E-learning[ ]  Field work | [x]  Practical work [ ]  Multimedia and Network [ ]  Laboratory[ ]  Mentorship[ ]  Other \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| *1.6. Comments*  | - |
| *1.7. Student Obligations*  |
| Regular attendance to lectures, to 1st and 2nd mid-term exam, presentation of exercises in the practical work session, final exam. |
| *1.8. Assessment1 of Learning Outcomes*  |
| Course attendance | 1,5 | Class participation |  | Seminar paper |     | Experiment |     |
| Written exam | 0,5 | Oral exam | 1 | Essay |     | Research |     |
| Project |     | Continuous Assessment | 1 | Presentation |     | Practical work |  |
| Portfolio |     |  |     |  |     |  |     |

1 **NOTE:** 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. Use empty fields for additional activities.

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| *1.9. Assessment of Learning Outcomes and Examples of Evaluation during Classes and on the Final Exam*  |
| *The process of evaluating acquired learning outcomes is based on the regulation on University of Rijeka Studies and the regulation on Studying at the Faculty of Maritime Studies in Rijeka as follows:*• Through continuous assessment of knowledge during the course, 70% of the learning outcomes gained through the 1st mid-term exam - learning outcomes 1-4 (25%), 2nd mid-term exam - learning outcomes 5-8 (25%) are valued, including presentation of the practical task - learning outcomes 1-10 (10% in each mid-term exam); the student must achieve at least 50% points for each mid-term exam.• 30% of the learning outcomes (1-8) are evaluated in the final part of the exam (oral), with the student passing the final exam at least 50% of the points.Examples of learning outcomes in relation to the set learning outcomes are:1. Define and explain comparation of analogue and digital communication parameters2. Describe the types and application of electronic navigation devices3. Observe hyperbolic navigation systems4. Define basic types of gyrocompass and describe the working principle of work5. Explain the types and application of the GPS system, and the principle of signal propagation6. Compare the differential GPS with the classic GPS system7. Describe the radar, basic features, and basic principle of impulse radar8. Understand the use and basic functions of ultrasonic navigation systems9. Explain the AIS communications navigation system and its application10. Explain the use of the VDR system. |
| *1.10. Main Reading*  |  |  |
| 1. Jurdana I., Sušanj J.; Sustavi elektroničke navigacije, Pomorski fakultet Rijeka, 2013.
2. Sušanj J., Navigacijski radar, Pomorski fakultet Rijeka, 2006.
3. Reading material available on e – learning system - Merlin - (https://moodle.srce.hr)
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| *1.11. Recommended Reading*  |  |  |
| 1. Čavara J., Uvod u radarsku tehniku, 2008.
2. Zentner E: Radiokomunikacije, Školska knjiga, Zagreb, 19803.Sonnenberg G.J., Radar and Electronic Navigation, Cambridge, 1988.
3. Tetley L., Calcutt D., Electronic Navigation Systems, Oxford, 2003.
4. Reading material available on e – learning system - Merlin (https://moodle.srce.hr)
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| *1.12. Number of Main Reading Examples*  |  |  |
| *Title*  | *Number of examples*  | *Number of students*  |
| Sušanj J., Navigacijski radar, Pomorski fakultet Rijeka, 2006. | 6 | 55 |
| Jurdana I., Sušanj J.; Sustavi elektroničke navigacije, Pomorski fakultet Rijeka, 2013. | 6 | 55 |
| Reading material available on e – learning system - Merlin (https://moodle.srce.hr) | - | 55 |
| *1.13. Quality Assurance*  |
| The quality of the study is constantly monitored in accordance with the ISO 9001 system implemented at the Faculty of Maritime Studies in Rijeka. An analysis of exams is made annually, and once in semester is conducted by anonymous student evaluation of teaching. |