### Study Card

<table>
<thead>
<tr>
<th>Module-No.</th>
<th>Semester</th>
<th>Teaching staff</th>
<th>Module-coordinator (designated each sem.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geo_M208</td>
<td>2</td>
<td>Prof. Dr.-Ing. Dell Egge, Prof. Dr.-Ing. Volker Böder</td>
<td>Prof. Dr.-Ing. Volker Böder</td>
</tr>
</tbody>
</table>

#### Module name

- **Navigation**

#### Subject areas

- Hydrography

#### Duration/sem.

- 1 Semester

#### Frequency of offering

- each SuSe

#### Type (C/CE/E) C

#### Emphasis in overall grade / %

- 4.16 %

#### Workload / h.

- 141

#### Self-study / h.

- 85

#### Contact time / h.

- 56

#### Contact hours / week (SWS)

- 4 + 0

#### Type of examination

- oral (graded)

### Previous knowledge / Conditions for participation (in form and content)

- 

### Educational aims of the module (Learning objectives/results, skills)

- **Basic understanding for navigation and applications at sea and using of electronic charts.**

### Course contents

#### Nautical Science:


Law of marine traffic. Law of coastal traffic: general rules of behavior, principles of giving way, light setting, acoustic warning signals, and travel in fog. Regulations for navigation in waterways.

Radar: as navigational aid and for collision avoidance. Principle of radar positioning, display types, principle of display evaluation.

Seamanship. Maneuver techniques: steering elements and propulsion systems, import and properties in maneuvering, special maneuvers in narrow and flat waterways, in heavy weather, and in man-over-board situation.

Security technology.

#### Traffic Control Systems:


Bearing sensors: Radio direction finders. Sensors for distance and bearing: Radar: Display types, composition and function, resolution, limitations and display errors, radar as navigational aid, radar as collisions avoidance, ARPA devices.

Course sensors: Magnetic compass, gyro compass, electronic sensors, course information from position sensors, function and limitations.

Sensors for water depth: sounders, echo sounders, function and limitations.

Speed sensors: logs, general, hydro-mechanical logs, electromagnetic logs, Doppler sonar.

Position sensors: hyperbolic (e.g. Loran C and similar), pseudorange methods (GPS), improvement of procedures, differential methods (e.g. DGPS).

Integrating procedures, ECDIS, automatic guidance. Special procedures.

#### Electronic Chart Display:

An imaginary trip with ECDIS. On-board components of the electronic chart display. Differences between ECDIS, ECS, RCDS. Data: information and data, geo-reference, forms of display, raster and vector map, data structures, display of attribute information, realization of space relationship in vector charts. Hydrographic aspects: quality aspects of hydrographic data, necessity of continuous corrections, source-dependent quality aspects, quality assurance.

Transition from data to chart functions. Integration with other navigation systems.

Visit to the Federal Maritime and Hydrographic Agency of Germany (BSH) and to firms.

#### Integrated Navigation:


### Teaching and learning methods

- Taught seminars

### Condition for awarding the ECTS-credits

- Oral examination

### Oral examination

- 

### Additional Information

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Latest update: 06/2011