

# Study Card

Module-No.	Semester	Teaching staff	Module-coordinator (designated each sem.)
Hyd_M108	1	Prof. Dr.-Ing. Delf Egge, Prof. Dr.-Ing Volker Böder	Prof. Dr.-Ing. Volker Böder

Module-name	Subject areas	Duration/sem.	Frequency of offering	Type (C/CE/E)	Emphasis in overall grade / %
Hydrography 1	Hydrography	1 Semester	each WiSe	C	8,33 %

CP (according to ECTS)	Workload / h.	Self-study / h.	Contact time / h.	Contact hours / week (SWS)	Type of examination
10CP	300	216	84	4 + 2	oral (graded)

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

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

Basic understanding on acoustic waves and measurement techniques, supported by practical training in hydrographic surveying.

Course contents

Basics Underwater Acoustics :

Fundamental theory of acoustic waves; sound velocity in water, resistance to acoustic waves; refraction of acoustic waves from one medium to another; reflection coefficient for the reflection at a border surface between different media, acoustic bending. Acoustic velocity and noise. Doppler effect, function sound transducers and receivers, criteria for selecting acoustic frequencies.

Function of echo sounders, analog and digital systems; function of analog echo sounders, transducers; difference between analog echo sounder and plotter; function of multi-channel area-covering sounding system; vertically operating echo sounders – swath sounding systems; advantages, disadvantages, possible errors of different systems, application of heave/roll/pitch sensors, parametric echo sounding, acoustic positioning, acoustic beacons; inverse echo sounding from the sea floor to the sea surface.

Determination of Positions and Water Depths :

Central problem related to hydrographic measurements.

Frequently used DGPS terms.

Differential corrections: SAPOS with and without area-based correction parameters, user-managed base stations.

Current and future positioning systems: DGPS and PDGPS applications in hydrography, optimization of hydrographic positioning. Course control: independent and system immanent control, aids to navigation.

Determination of water depths: overview of different procedures and accuracy budgets, purpose-oriented system selection, compensation of ship's motion in sonar devices, calibration of echo sounders, methods of tide correction for sounded depths, supplements from current results of research and development.

Introduction to the SURFER program, SURFER license; calibration of echo sounders using different methods; establishing, coordinating, and operating a GPS base station; static and dynamic calibration of positioning systems; surveying and practicing with a survey launch; determination of squat and settlement; simultaneous comparison of different positioning systems.

Teaching and learning methods

Taught seminars,  
Practical course

Condition for awarding the ECTS-credits

Practical training completion in Determination of Positions and Water Depths and Combined Oral examination

Additional Information

Latest update: 06/2011