Study Card

Master Geomatik
HCU Hamburg

Module-No.	Semester	Teaching staff	Module-coordinator (designated each sem.)
Geo_M201	2	Prof. Dr.-Ing. D. Egge	Prof. Dr.-Ing. D. Egge

Module-name	Subject areas	Duration/sem.	Frequency of offering	Type (C/CE/E)	Emphasis in overall grade / %
Higher Geodesy	Hydrography	1 Semester	each SuSe	C	4,16 %

CP (according to ECTS)	Workload / h.	Self-study / h.	Contact time / h.	Contact hours / week (SWS)	Type of examination
5CP	155	99	56	4 + 0	written (graded)

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

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

The students learn the essential fundamentals of spherical trigonometry and are able to apply them in practical examples. Further they learn basic elements of ellipsoidal and three-dimensional geodesy, as well as geodetic projections currently used in practice. They are enabled to solve datum problems. Finally, the basics of physical geodesyand gravimetry are presented.

Course contents

Mathematical Geodesy:
Spherical Trigonometry:
Elements of spherical trigonometry: sphere, small circles, great circle, spherical twoangle, spherical triangle, fundamental rules in the spherical triangle, equations of Delambre and Napier, Napier's rule, differential formulas, applications. Forward and reverse computations for orthodromic and loxodromic curves on the sphere.
Mathematical Geodesy:
Reference ellipsoid: ellipsoid parameters, latitudes, curvature radii.
Three-dimensional geodesy: 3D ellipsoidal and Cartesian coordinates, coordinates in local geodetic and astronomical frame, coordinate conversion, observation equations in three-dimensional geodesy.
Differences between natural end ellipsoidal coordinates.
The geodesic curve on the rotational ellipsoid: normal section curve and geodesic, mathematical description of the geodesic. Angle and distance corrections from observed to ellipsoidal values: azimuth and angle corrections, distance corrections. Direct and reverse problems of geodesy: computation of distance and azimuths of a geodesic, coordinate transfer to a new point.
Geodetic mapping of the ellipsoid surface onto a mapping plane: general relationships, important mappings (Mercator, Gaussian, UTM. Lambert, polar stereographic). Mapping equations, magnification (point scale factor), meridian convergence, (T-t) correction, distance correction.
Overview of other mappings. Geodetic datums: comparison of different geodetic datums, transformation parameters, transformation equations, Molodensky transformation.

Physical Geodesy:
Gravity and gravity potential, parameters of the normal gravity field, computation of normal gravity, height systems (dynamic, orthometric normal), vertical datum. Disturbing quantities in the gravity field: gravity disturbance and anomaly, deflections of the vertical. Geoid determination: gravimetric method, astrogeodetic method, combined methods. Earth models, high resolution gravity field representations.

Teaching and learning methods

Taught seminars

Condition for awarding the ECTS-credits

Written examination

Additional Information

Latest update: 06/2011