

General Information

Course name	Global Navigation Satellite Systems	ECTS Credits	5
		Semester	summer
			4 hours/week

Aims

Acquiring basic theoretical knowledge and practical experience on Global Navigation Satellite Systems (GNSS) to a methodology for collecting 3D geodata for Geoinformatics.

The aims of the course:

- Basic principles of radio navigation and positioning.
- History of cosmic radio-navigation and positioning.
- GNSS - present and future (overview).
- GNSS - content, structure and division.
- Practical field measurements with GNSS and GPS apparatus, numerical and graphical processing observed 3D geodata.

Contents

1. GNSS in the context of the geography and geoinformatics.
2. GNSS, their nature and division.
3. GPS - principles, principles and characteristics; GPS structure and applications; GPS surveying technology; GPS instrumentation; GPS data collection and transmission and processing.
4. The European satellite navigation system Galileo; Galileo positioning and navigation and timing services; Galileo infrastructure; Galileo structure and applications.
5. Overview of other GNSS: GLONASS, Compass; principles and structures.
6. Overview of the Satellite Based Augmentation Systems (SBAS): BNS, EGNOS, WAAS, MSAS, QZSS, IRNSS etc.

Evaluation

Continuous and final evaluation is based on student's activities on practical field exercises and theoretical and practical knowledge in processing GNSS 3D geodata. The course ends with a final examination consisting of written and oral part.

Bibliography

- Dodel, H. & Häupler, H., 2009. *Satellitennavigation*. Heidelberg-Dordrecht-London-New York: Springer, 548p. ISBN 978-3-540-79446-1.
- Groves, P., 2008. *Principles of GNSS: Inertial, and Multisensor Integrated Navigation Systems*. London: Artech House, 536s. ISBN 978-1-580-53255-6.
- Hofmann-Wellenhof, B., H. Lichtenegger and E. Wasle, 2008. *GNSS – Global Navigation Satellite Systems: GPS, GLONASS, Galileo, and more*. Wien: Springer-Verlag, 518p. eBook ISBN 978-3-211-73017-1, Softcover ISBN 978-3-211-73012-6.
- Leick, A., 1995. *GPS Satellite Surveying. 2nd edition*. New York: John Wiley & Sons, Inc., 560p.

ISBN 0-471-30626-6.

Sedlák, V., 2017. *Globálne navigačné satelitné systémy*. (in Slovak) [Global navigation Satellite Systems]. Košice: Univerzita Pavla Jozefa Šafárika v Košiciach. 157p. ISBN 978-80-8152-554-4.

