Study course title	Introduction to remote sensing
Study course code (DUIS)	Ģeog2008
Credits	2
European credit transfer and accumulation system credits	3
Total number of contact hours	32
Number of lecture hours	16
Number of hours for seminars	Click or tap here to enter text.
Number of hours for practical assignments	Click or tap here to enter text.
Number of hours for laboratory assignments	16
Independent study hours	48
Course developer (-s)	
M.Sci.Env., lecturer Dainis Lazdāns	
Prerequisite knowledge	
There is no prerequisite knowledge required for this course	
Study course abstract	
Course aim: to provide a basic understanding of Earth Remote Sensing as a technical Geography (Geomatics) sector, this applied science conception, data collection and interpretation methods and the importance of Earth Remote Sensing in earth sciences and environmental science. Course objectives: 1) to acquaint students with the Earth Remote Sensing methods physical principles, 2) to provide an idea of the Earth Remote Sensing data acquisition capabilities, methods and technical support, 3) to acquire the knowledge of the Earth Remote Sensing data decryption, visualization, image properties and their application to Geomatics and environmental science, 4) to acquire practical skills for use Remote Sensing data and image in scientific and applied researches, 5) to acquire practical skills for use GPS.	
Course plan	
Lecture topics: 1. The concept of „Earth's remote sensing". The physical essence, methods and techniques of remote sensing. 2. The electromagnetic radiation, it types, sources and usage in remote sensing. Electromagnetic radiation and the Earth's surface interaction. Electromagnetic radiation locking methods. 3. "Ideal remote sensing system", its components and the operating principles. The real remote sensing systems, their opportunities, deficiencies in the application and the scope of the data obtained. The notion of technical and graphical resolution. 4. Aerial photography. Essence of the photographic process. The geometric and informative characteristics, transformation and conversion types and methods. Aerial photography equipment and materials. 5. Satellite photos and scanning. Multispectral, thermal and hyperspectral imaging, other out-of-atmosphere methods of Earth's observation. Satellite photography equipment and materials. 6. Remote sensing data visual interpretation and decoding methods. Manual and instrumental decoding. Digital processing options of remote sensing images. Automated decode software capabilities and techniques. Decode quality determinants. 7. Remote sensing data usage options: cartography, GIS, environmental science, environmental impact assessment, hydrology, meteorology, geology and geomorphology, forestry, etc. 8. Remote sensing data usage to improve scientific and business skills. GPS data obtaining and applications.	

Laboratory work topics:
1. Introduction to the remote sensing (remote sensing definitions, data collection methods).
2. The use of satellites in remote sensing – TERRA and LANDSAT satellites.
3. The use of satellites in remote sensing – SPOT satellites.
4. Data of remote sensing on the territory of Latvia.
5. Orthophoto map decoding.
6. Geospatial data obtaining using GPS.
7. Post-treatment of GPS data.
8. Examples of the use of remote sensing in scientific practice.

Learning outcomes

After successful completion of the study course students will get:
1. Knowledge:
- Understanding of the Earth's remote sensing as a technical geography (geomatics) field, the concepts of applied science, data acquisition and interpretation methods and its role in earth science and environmental science;
- Understanding the physical principles of Earth's remote sensing methods;
- Understanding the possibilities of remote sensing data acquisition, methods and technical support;
- Detailed knowledge about the digitizing and visualization of remote sensing images, their properties and the possibilities of their use in geoinformatics, geosciences and environmental science.
2. Skills:
- Improved competence in work with remote-sensing data and images and their use in scientific and applied research;
- practical kills in working with GPS devices

Requirements for awarding credits

During the semester, all laboratory works has been completed. Examination at the end of the course: a differentiated test.

Course content

Earth remote sensing. Remote sensing methods and techniques. Aerial photography. Satellite photography and scanning. Remote sensing data use in geographic information systems, data decrypting. The use of GPS data.

Compulsory reading list

1.Easterbrook D.J., Kovanen D.J., 1999. Interpretation of Landforms from Topographic Maps and Air Photographs Laboratory Manual. -New Jersy, Prentice Hall. – 194 pp. 2.Lillesand T.M, Kiefer R.W., 2000. Remote Sensing and Image Interpretation (4th Edition). –New York, John Wiley & Sons, - 724 pp.

Further reading list

1.Берлянт А.М., 1990. Геоизображения и геоиконика. –Москва: Знание, -48 с.
2.Визуальные методы дешифриования. 1990. Москва, Недра.
3.Сладкопевцев С.А. 1982. Изучение и картографирование рельефа с помощью аэрокосмической информации. Москва, Недра..

Periodicals and other sources

1. INTERNET resursi: http://ceos.cnes.fr:8100/cdrom-98/ceos1/science/science.htm; http://www.isprs.org; http://www.ersc.wisc.edu/home/home.htm; http://geog.hkbu.edu.hk/online.html; http://www.hq.nasa.gov/office/mtpe; http://www.noaa.gov; http://www.spaceimage.com; http://terraserver.microsoft.com; http://www.calmit.unl.edu/calmit/gisrs.html; http://www.tbs-satellite.com/tse/online; http://visibleearth.nasa.gov; http://eol.jsc.nasa.gov/sseop/clickmap/map061.htm

Notes

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