

## PhD program: Cartography and GeoInformatics

<b>General Information</b>	
<b>University</b>	Osh Technological University named after M. Adyshev (OshTU)
<b>Course title</b>	<b>Spatial Data Infrastructure</b>
<b>Course/Module code</b>	SDI
<b>Course type</b>	Elective
<b>Year of Study</b>	1st year
<b>Term/Semester</b>	Spring semester
<b>Credits awarded</b>	5 ECTS (150 academic hours)
<b>Degree</b>	PhD
<b>Enrollment status</b>	Full-Time
<b>Entry requirements/ Competences</b>	

<b>Lecturer's details</b>	
<b>Name, surname</b>	
<b>Academic title</b>	
<b>Contact details</b>	
<b>Office hours and consultation schedule</b>	

<b>Course Structure</b>	
<b>Course Aim and Objectives</b>	The aim of the course is that students should acquire knowledge and skills related to Spatial Data Infrastructure. The course provides an overview of SDI organizational and technical components. Students will explore theoretical and practical concepts of Spatial Data Infrastructures (SDIs). It includes an introduction to Geographic Information Systems to harmonize the terminology and concepts related to spatial data, spatial data analysis, modeling and spatial databases.
<b>Short Description</b>	SDI
<b>Module/Topic</b>	Spatial Data Infrastructures
<b>Teaching Method</b>	<ol style="list-style-type: none"> <li>1. Regular lectures;</li> <li>2. Laboratory and practical work</li> <li>3. Project work</li> <li>4. Discussions in class</li> </ol>
<b>Form of Assessment</b>	<ol style="list-style-type: none"> <li>1. Labs and computing tasks (25%)</li> <li>2. Class discussion/participation (10%)</li> <li>3. Project report (25%)</li> <li>4. Final exam 40%</li> </ol>
<b>Course content</b>	<p>Lesson 1. Introduction to SDI</p> <ul style="list-style-type: none"> <li>▪ Introduction</li> <li>▪ Web and the Information Society.</li> <li>▪ What is SDI?</li> <li>▪ SDI Interoperability</li> <li>▪ Regulation: INSPIRE and National Cartographic System (LISIGE).</li> </ul> <p>Lesson 2: Internet, Communications, Protocols and Identification of resources. Client / Server Architecture. OGC.</p> <ul style="list-style-type: none"> <li>▪ Introduction</li> <li>▪ Internet (protocols and address).</li> <li>▪ ISO 19119 Services</li> </ul>

Lesson 3: Data Services.

- Map Service (ISO 19128).
- Feature Service (WFS).
- Coverage Service (WCS).
- Other Services (positioning ISO 19116, ISO 19117 representation).

Lesson 4: Description, Discovery and access to Data.

- Introduction
- Metadata and Metadata Services (ISO 19115-1, 19115-2, ISO 19139).
- Catalogues and Catalog Service (OGC-WFS).
- Gazetteer (ISO 19112) and Gazetteer Services (OGC-Gazetter).

Lesson 5: Technological Aspects.

- XML
- HTML and CSS.
- GML.
- JAVASCRIPT.

Lesson 6: SDI Projects.

- Intellectual property of Geographic Information.
- Legal Aspects.
- Licensing Models.
- Economic Aspects.

PRACTICES:

	<p>Lab #1. - Data Services.</p> <p>Lab #2. - Metadata.</p> <p>Lab #3. - Technologies Applied to SDI.</p> <p>Lab #4. - SDI evaluation.</p> <p>Lab #5. - Compare existing legislation, standards, etc used in different SDI.</p> <p>Lab #6. - Develop or improve some specific component for an existing SDI.</p> <p>Lab #7. - Improve an existing SDI to support risk management/Environmental modeling.</p>
<p><b>Literature:</b></p>	<p><b>Mandatory:</b></p> <ul style="list-style-type: none"> <li>- Developing Spatial Data Infrastructures: From Concept to Reality. Edition: -. Author: Ian P. Williamson (Editor), Abbas Rajabifard (Editor), Mary-Ellen F. Feeney (Editor) . Publisher: CRC Press</li> <li>- ISO standards for geographic information. Edition: -. Author: Kresse, Wolfgang. Publisher: Berlin: Springer, cop. 2004</li> <li>- Geographic information metadata for spatial data infrastructures. Edition: 1st ed. Author: Nogueras-Iso, Javier. Publisher: Berlin ; New York : Springer, 2005</li> </ul> <p><b>Elective:</b></p> <ul style="list-style-type: none"> <li>- Maps and the internet. Edition: 1st ed.. Author: -. Publisher: Amsterdam ; London : Elsevier, 2003.</li> <li>- Internet GIS: distributed geographic information services for the internet and wireless networks. Edition: -. Author: Peng, Zhong-Ren. Publisher: New Jersey: Wiley, cop. 2003</li> </ul>

<b>Learning Outcomes</b>	
<b>Knowledge and understanding</b>	<ul style="list-style-type: none"> <li>- describe the importance of spatial data for planning, decision making and sustainable development</li> <li>- describe the current status/problems for spatial data in terms as availability, accessibility, applicability and usability,</li> <li>- describe the general concepts and the aims for SDI and the importance of data exchange, in detail, explain and give an account of the main components of SDI,</li> <li>- describe the factors that influence the development of SDI and the nature of these factors,</li> <li>- at a general level describe the concepts clearinghouse networks and geoportals,</li> <li>- in detail explain the different generations of clearinghouse networks, the main components of these networks, interoperability of these systems, the available standards to achieve interoperability and the principles of service orchestration,</li> <li>- explain the cartographic aspects for geoportals</li> <li>- give an account of concepts and technologies for modelling and evaluation of SDIs</li> <li>- describe and discuss what is meant with a society that is spatially enabled.</li> </ul>
<b>Competence and skills</b>	<p>On completion of the course, the student shall be able to:</p> <ul style="list-style-type: none"> <li>- plan for the requirements that a society sets on SDI,</li> <li>- use and develop the standards and specifications that are required for SDI,</li> <li>- use and suggest policy that are needed for SDI,</li> <li>- design interoperable clearinghouse networks and geoportals for SDIs,</li> <li>- evaluate and process SDIer.</li> </ul>