



GTTC Continuing Education Course¹

Introduction into Application of Geoinformation Technologies to Cultural Heritage and Tourism Economics (delivered by Erasmus+ HERiTAG project established Geoinformation Technologies & Tourism Centre – GTTC)

General Information	
Universities/Departments	Course delivered within the framework of HERiTAG Geoinformation Technologies & Tourism Centre (GTTC) by: Ilia State University (ISU) Institute of Economics and Business and School of Natural Sciences and Engineering Georgian Technical University (GTU), Department of Engineering Geodesy and Geoinformatics (DEGG) in cooperation with National Agency for Cultural Heritage Preservation (NACHPG) and GeoGraphic (GeoG)
Course title and modules	" Introduction into Application of Geoinformation Technologies to Cultural Heritage and Tourism Economics " ISU Module 1: Introduction into Tourism Economics (delivered by ISU Institute of Economics and Business) ISU Module 2: Applying GIT in Archaeology (ISU Cultural Heritage and Environment Research Center) GTU Module 1: 3D Laser Scanning Hardware & Software Application to Cultural Heritage (GTU, support NACHPG) GTU Module 2: Mobile and Web Mapping for Cultural Heritage and Tourism Applications (GTU) GTU Module 3: Application of GIS in Cultural & Natural Heritage Management (GTU, support NACHPG/ISU/GeoG)
Course/Module code	GTTC-01
Course type	Continuing Education Course (5 modules introducing tourism economics & GiT tools applied in cultural heritage).
Number of students	Minimum 8 maximum 12 students (online applicants to be selected on first registration first treatment basis).
Registration	GTTC course announced on 22 February 2019 through https://heritag.ge HERiTAG webpage in Georgia. Announcement distributed through GTU and ISU intranet channels of communication as well distributed via cultural heritage & tourism sector professional community by ISU, GTU, NACHPG. Applications to be received via https://heritag.ge/moodle Learning Management System used to deploy course. All course materials will be shared with participants during and upon course completion. Participants to be selected by HERiTAG Project Management Board in Georgia. Registration period – February 22-01 March, 2019, selection completion deadline – March 05, 2019. Course to culminate on 14:00, March 12, 2019 by GTTC Labour Market Day hosted jointly by ISU, GTU & partners.

¹ This project has been funded with support from the European Commission. This document reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.



What, When and Where	<p>Course shedule – March 08-12, 2019:</p> <p>2019.03.08 Fri 10:00-13:30 GTTC GIS lab at ISU Building F 2nd Floor (ISU Module 2) GiT in Archaeology 2019.03.08 Fri 14:30-18:00 GTTC GIS lab at ISU Building F 2nd Floor (ISU Module 1) Tourism Economics 2019.03.09 Sat 10:00-18:00 GTTC GIS lab at ISU Building F 2nd Floor (GTU Module 2) Mobile and Web Mapping 2019.03.10 Sun 10:00-18:00 Selected CH site in Tbilisi (field work) (GTU Module 1) 3D Laser Scanning Hardware 2019.03.11 Mon 10:00-13:30 GTTC Laser Scanning Class GTU DEGG (GTU Module 1) 3D Laser Scanning Software 2019.03.11 Mon 14:30-18:00 GTTC GIS Laboratory Class GTU DEGG (GTU Module 3) Introduction into GIS tools 2019.03.12 Tue 10:00-14:00 GTTC GIS lab at ISU Building F 2nd Floor (ISU Module 2) Heritage & tourism GIS cases 2019.03.12 Tue 14:00-18:00 ISU Building E Room E-207 (Course Certificates + GTTC Labour Market Day Event)</p>
Duration (days, hours)	<p>ISU Module 1: 0.5 days, 4 hours ISU Module 2: 0.5 days, 4 hours GTU Module 1: 1.5 days, 12 hours (including 8 hours of field work practice) GTU Module 2: 1.0 days, 8 hours GTU Module 3: 1.0 days, 8 hours) Total: 4.5 days, 36 hours</p>
Entry requirements/ Competences	<p>ISU Module 1: motivation statement (applies to all), professional experience in cultural heritage and/or tourism ISU Module 2: strong ICT proficiency, professional experience in cultural heritage GTU Module 1: strong ICT proficiency, professional experience in cultural heritage and/or geodesy/geoinformatics GTU Module 2: strong ICT proficiency, professional experience/interest in cultural heritage and/or tourism GTU Module 3: strong ICT proficiency, professional experience/interest in cultural heritage and/or tourism</p>
Responsible person/coordinator	<p>Course delivered in joint coordination by Dimitri Japaridze, ISU, Director of Institute of Economics and Business and Malkhaz Khurtsidze, Head of DEGG, GTU, supported by Mamuka Gvilava (GeoGraphic). Responsibles for course module delivery are: ISU Module 1: Dimitri Japaridze, (g.chiaureli@gmail.com), Professor, Director, Inst. Economics and Business, ISU ISU Module 2: Mikheil Elashvili (mikheil_elashvili@iliauni.edu.ge), Professor, Director, Cultural Heritage and Environment Research Center, ISU GTU Module 1: Giorgi Chiaureli (g.chiaureli@gmail.com), Associated Professor, DEGG, GTU GTU Module 2: Irina Kazariani (irina.kazariani@gmail.com), Invited Lead Teacher, DEGG, GTU GTU Module 3: Catherine Khokhiashvili (ekhokhiashvili@hotmail.com), Visiting Associated Professor, DEGG, GTU</p>

Lecturer's details	
<p>Name, surname Academic title e-mail</p>	<p>ISU 1: Dimitri Japaridze (japaridze@iliauni.edu.ge), Professor, Director, Inst. Economics and Business, ISU (expertise in tourism economics, education and governance)</p> <p>ISU 2: Mikheil Elashvili (mikheil_elashvili@iliauni.edu.ge), Professor, Director, Cultural Heritage and Environment Research Center, ISU (expertise in cultural heritage and environment)</p> <p>GTU 1: Giorgi Chiaureli (g.chiaureli@gmail.com), Associated Professor, DEGG, GTU (expertise in 3D Laser Scanning hardware, Point Cloud processing, Engineering Geodesy) Diana Botkoveli (diana@geographic.ge), Visiting Associated Professor, DEGG, GTU (expertise in Remote Sensing and Photogrammetry, 3D Laser Scanning Software) <i>With contribution by (field work)</i> Giorgi Khaburzania (giokhabu@gmail.com), Information Systems Unit, NACHPG (cultural heritage GiT) Ivane Kenia, Information Systems Unit, NACHPG (expertise in cultural heritage GiT applications) Giorgi Datunashvili (datunashvili72@gmail.com), ISU, School of Natural Sciences and Engineering (expertise in geomatics for cultural heritage and earth sciences)</p> <p>GTU 2: Irina Kazariani (irina.kazariani@gmail.com), Invited Lead Teacher, DEGG, GTU (expertise in mobile and web mapping applications)</p> <p>GTU 3: Catherine Khokhiashvili (ekhokhiashvili@hotmail.com), Visiting Associated Professor, DEGG, GTU (expert in Geographical Information Systems (GIS) their applications in numerous fields including cultural and natural heritage) <i>With contribution by (lecturers)</i> Giorgi Khaburzania (giokhabu@gmail.com), Information Systems Unit, NACHPG (cultural heritage GiT) Irakli Ugulava (i.ugulava@gmail.com), Associated Professor, ISU (GIS applications in CH and tourism) Tamar Bakuradze (tbakuradze@GeoGraphic.ge), GIS Analyst, GeoGraphic Ltd. (expertise in GIS applications in cultural and natural heritage) Mamuka Gvilava (mgvilava@GeoGraphic.ge), Environmental Sustainability Expert, GeoGraphic Ltd. (expertise in GIS applications in environmental planning and management)</p>



Course Structure

Course Aim and Objectives

Course aims to introduce professional community into modern geospatial technologies in support of cultural heritage through exposure to following three knowledge modules, as well as acquaintance of tourism economics.

ISU Module 1: The main aim of this module is focused on providing an understanding of the basic concepts about tourism economics; fundamental role played by tourism in developed and developing countries; 'big data' needs.

ISU Module 2: Rapidly growing Geographic Information Systems and Remote Sensing technologies provide new tools and perspectives for archaeological and even broader cultural heritage studies. The course module aims at providing basic knowledge about methodologies and practical tools of GIS and RS technologies at different aspects of archaeological studies, such as: archaeological survey, spatial analysis and mapping of field data, application in historical geography, far and close range aerial imagery, documentation of archaeological sites. Course will not focus on particular GIS and RS tool, but provide more conceptual/general view on above-mentioned topics, based on widely used software (ArcMAP, QGIS, Google Earth). After accomplishing the course, student will be capable of independent applications and will hold solid bases for further development.



GTU Module 1: There is ever increasing need to apply modern precise measurement technologies to aboveground and archaeological cultural heritage objects to document their state, important for the preservation and management of cultural heritage and to provide tools for dissemination of this knowledge serving the needs of the society at large and sectors such as cultural tourism. 3D Laser Scanning instruments and related software provide cost effective opportunities for such applications.

GTU Module 2: There is increasing need for geospatial instruments and the application of appropriate knowledge processes, skills and tools such as mobile and web mapping are critical to successful response to growing worldwide user demands. The module aims to introduce students an opportunity to get acquainted with the effective modern technologies, tools and techniques for creating mobile and web mapping applications for CH.



GTU Module 3: Introducing geoinformation systems (GIS) and examples of GIS development, defining its functionality and purpose, based on several real-world examples from cultural/natural heritage & tourism sectors.



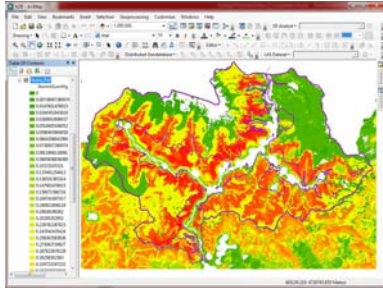
<p>Short Description</p>	<p>Course will introduce professional users into the new geospatial instruments and software with applications in cultural heritage field. It is to be delivered through the following three different but complementary modules:</p> <p>ISU Module 1: The most important aspects of tourism are analysed in the course such as sustainability, economic impacts, demand, supply, costs and benefits, social and environmental consequences and tourism as a potential factor to develop destination areas. Role of ICT, geospatial and big data in tourism economics.</p> <p>ISU Module 2: The proposed module will teach students the basic tools and applications of GIS and RS technologies in the field of archaeology. Course is structured in a form of considering cases studies, targeting each of the topics (archaeological survey, spatial analysis and mapping of field data, application in historical geography, far and close range aerial imagery, documentation of archaeological sites). Practical tasks will be given and solved using the common GIS and RS software.</p> <p>GTU Module 1: This module will expose students to professional 3D Laser Scanner equipment and its use for the measurement and documentation of cultural heritage structures. Course includes lectures in hardware and software of laser scanning, short field work experience to collect precise point cloud measurements data for a cultural heritage facility and processing of field data back in the class to generate precise photogrammetric model of the heritage site.</p> <p>GTU Module 2: This module builds on developing mobile and web mapping applications. Offers students an opportunity to make maps in mobile and web applications and distribute those using free mapping tools (such as MIT App Inventor & Leaflet). Topics include mobile development, web development & mapping on both of them.</p> <p>GTU Module 3: This module introduces students into basic functions of GIS, designed to quickly build understanding of this tool and after hearing lectures from best sectoral experts, to train in opening and analysing datasets from professional GIS systems and expert applications developed in the fields of cultural and natural heritage and tourism.</p>
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Module/Topic	Learning Outcomes	Teaching Method	Assignments and Literature	Form of Assessment
<p>ISU Module 1:</p>  <p>Basics of Tourism Economics</p>	<p>Know definition of terms. Make characteristics of tourism. Explain advantages and disadvantages of tourism. Understand the nature of the tourism product. Analyse widespread impact of travel & tourism.</p>	<p>Lecture/seminar.</p>	<p>Travel & Tourism economic impact WTTC. 2015 https://www.wttc.org/-/media/files/reports/economic_impact_research/regional_2015/world2015.pdf The Comparative Economic Impact of Travel and Tourism WTTC, 2012 https://www.wttc.org/-/media/files/reports/benchmark-reports/the_comparative_economic_impact_of_travel_tourism.pdf International Recommendations for Tourism Statistics, UNWTO: 2008 http://unstats.un.org/unsd/publication/SeriesM/seriesm_83rev1e.pdf Glossary of Tourism Terms, UNWTO, 2014 http://cf.cdn.unwto.org/sites/all/files/Glossary-of-terms.pdf</p>	<p>Course certificate will be provided to course participants based on: - Student attendance - Teacher assessment based on results obtained by the student and demonstrated ability to apply acquired knowledge in the field of Tourism Economics.</p>
<p>ISU Module 2:</p>  <p>Applying GiT in Archaeology</p>	<p>Basic understanding of GIS and RS concepts and functions, main topics of their application in case of archaeological studies.</p>	<p>Lecture/seminar.</p>	<p>Course notes: Application of RS and GIS in Archaeology. Thinking About GIS: Geographic Information System Planning for Managers. Esri Press. Modeling Our World: The ESRI Guide to Geodatabase Concepts, Second Edition by Michael Zeiler.</p>	<p>Course certificate will be provided to course participants based on: - Student attendance - Teacher assessment based on results obtained by the student and demonstrated ability to apply acquired knowledge.</p>

Higher Education interdisciplinary Reform in Tourism management and Applied Geoinformation curricula

<p>GTU Module 1:</p>  <p>3D Laser Scanning Heritage</p>	<p>Basic understanding of 3D lasers scanning technology, hardware specifications, related software functionalities (Point Cloud Processing, 3D Geovisualisation and Photogrammetry) and their application for a cultural heritage site.</p>	<p>Lectures¹ and practical² sessions in the use of 3D laser scanning hardware and software. Joint field work to generate 3D Laser Scanning data and its processing in the class to derive cultural heritage projects³ based on Point Cloud Processing, 3D Geovisualisation and Photogrammetry.</p>	<p>3D laser scanning hardware specifications & documentation (FARO FocusS 150). 3D laser scanning data processing and visualisation software documentation (PointSense Heritage, SCENE). Teaching PowerPoint files Sample data. Processed data.</p>	<p>Course certificate issued based on: Attendance of all sessions and filed work. Review and rating of individual 3D laser scanning project completion and results obtained by student.</p>
<p>GTU Module 2:</p>  <p>Mobile and Web Mapping</p>	<p>Introduction into basic skills for creating mobile and web mapping applications with emphasis on relevance for cultural heritage and tourism sectors. Understand (i) how to create mobile mapping applications & (ii) how to create a dynamic styled web page with interactive map.</p>	<p>Lectures followed by practical hands on GIS Class sessions for students independently creating their first (i) mobile and (ii) web mapping application following detailed instructions.</p>	<p>Lecture notes with detailed instructions for application development by student. Teaching PowerPoint files. Sample data for project development. Final project data for self-assessment. Further materials for independent continuation of skills development.</p>	<p>Course certificate issued based on: Attendance of all sessions. Review and rating of individual mobile and web mapping exercise completion by student.</p>

Higher Education interdisciplinary Reform in Tourism management and Applied Geoinformation curricula

<p>GTU Module 3:</p>  <p>GIS in Cultural Heritage</p>	<p>This module introduces students into the basic functions of GIS and application of this powerful instrument in cultural heritage management and cultural tourism fields.</p>	<p>Module is designed to build understanding of this tool and after hearing lectures from best sectoral experts, will train in opening and analysing datasets from professional GIS systems and expert applications developed in the fields of cultural and natural heritage and cultural tourism.</p>	<p>Lecture notes with instructions for basic GIS acquaintance. Teaching PowerPoint files. Sample professional data for GIS project opening and review in cultural and natural heritage and cultural tourism fields. Further materials for independent continuation of self-training, skills development through online access to more detailed training materials.</p>	<p>Course certificate issued based on: Attendance of all sessions. Demonstrated ability to utilise cultural heritage thematic GIS maps and derive spatially relevant conclusions by student.</p>
<p>Teaching and Assessment Requirements</p>	<p>Course certificate issued based on:</p> <ul style="list-style-type: none"> - Attendance of all modules and all sessions. - Teacher review and rating of individual project completion and results obtained by the student and demonstrated ability to apply acquired knowledge in GiT to cultural and natural heritage and tourism sectors. - Course delivery will be evaluated by students as well based on simple one-page on-line questionnaire. 			
<p>Resources</p>	<p>ISU Module 1: GTTC ISU GIS Class with 12 computers, projector, manuals, PowerPoint presentations. ISU Module 2: GTTC ISU GIS Class with 12 computers, projector, manuals, PowerPoint presentations. GTU Module 1: GTU/DEGG Computer Remote Sensing and 3D Laser Scanning Class capable of hosting up to 8-12 students and with projecting screen for lecturer. 3D Laser Scanner (full set, 1 unit, FARO Focus S 150). Point Cloud (SCENE, 6 licenses) and 3D Visualisation and Photogrammetry Software (PointSense Heritage, 1 license). Example datasets. Arrangements for field work. GTU Module 2: GTU/DEGG GIS Class capable of hosting up to 16 desktops for students. Projection screen. GTU Module 3: GTU/DEGG GIS Class capable of hosting up to 16 desktops for students. Projection screen. Resources in all modules include full sharing of extensive teaching manuals, presentations, sample datasets, full sharing of open source codes (mobile & web mapping) and class access to proprietary software (FARO laser scanner SCENE, PointSense for Heritage, ArcGIS). Sharing teaching materials to students on memory cards and through open source-based distance learning platform deployed at https://heritag.ge/moodle.</p>			



Learning Outcomes	
Knowledge	Students from professional community and novice users will have the opportunity to be introduced into state-of-the-art geospatial equipment (such as 3D laser scanner) and software tools (such as point cloud processing, geovisualisation; mobile, web and desktop mapping applications, GIS) in support of cultural heritage and tourism. Students would also acquire knowledge and understanding of tourism business environment.
Skills	Based on the obtained knowledge, the student will be able to basically understand a range of novel geospatial technologies, such as 3D laser scanning, mobile & web mapping and GIS and be exposed to basic knowledge how to use these instruments in sectoral applications such as cultural heritage and tourism. The modules would also be useful for students to comprise economic reality with respect to tourism sector.
Attitudes	Students will acquire basis understanding of tourism sector from micro- and macroeconomic perspectives. Students will also gain competencies in the modern fields of geospatial technologies (such as 3D laser scanning, mobile & web mapping, as well as GIS) and specifically their applications in the cultural and natural heritage and cultural tourism disciplines. Course will allow novice as well as professional students/users to independently pursue further self-development of acquired skills, as well as be capable of the application of these modern geospatial instruments in their professional carries.

¹ The **Lecture** is a creative process in which the lector and the student are participating simultaneously. The main goal of the lecture is to understand the idea of the provisions of the subject to be studied, which implies the creative and active perception of the presented material. In addition, attention should be paid to the basic provisions of the material, definitions, marks and assumptions. Critical analysis of key issues, facts and ideas are needed. The lecture should provide scientific and logically consistent understanding of the basic provisions of the subject without overloading the details. Therefore, it must be logically completed. In addition, facts, examples, charts, drawings, experiments, and other visuals should serve to explain the idea of the lecture.

² **Practice** (learning and work) helps the student to enhance and strengthen the obtained knowledge. It develops the ability to use knowledge in practice, using the methods that are used to study the subject to solve problems. It combines all the methods of learning that help the student to develop practical skills. In this case, on the basis of the acquired knowledge the student independently performs a certain action, such as pedagogical practice, field work, etc.

³ **Coursework/project** is a creative process. Every new building, machine, instrument, automatic device, etc. is created according to the project. The design process is a combination of theory and practice. In the course of the study, the student performs graphic assignments and course projects, which are actually the student's first independent work, which is carried out under the leadership of the pedagogue.