

**Course name:**  
**Introduction to Geographic Information Systems**

|                                                 |                                          |
|-------------------------------------------------|------------------------------------------|
| ECTS                                            | 5                                        |
| Course status                                   | <i>basic, obligatory</i>                 |
| Course final assessment /evaluation of outcomes | <i>graded credit</i>                     |
| Prerequisite                                    | An interest in working with spatial data |

**Main field of study:**  
**Land Management, Environmental Sciences, Environmental Engineering, Agriculture, Economics, Agricultural Engineering, Agronomy, Forestry and Natural Environment, Horticulture, Landscape Architecture**

|                                     |                           |
|-------------------------------------|---------------------------|
| Educational profile                 | General academic          |
| Code of studies and education level | <i>Bachelor or Master</i> |
| Semester of studies                 | summer                    |
| Language of instruction             | English                   |

**Course offered by:**

|                                        |                                                          |
|----------------------------------------|----------------------------------------------------------|
| Name of faculty offering the course    | Faculty of Environmental Engineering and Land Surveying  |
| Name of department offering the course | Department of Land Management and Landscape Architecture |
| Course coordinator                     | dr inż. Barbara Czesak, dr inż. Renata Różycka-Czas      |

**Learning outcomes:**

| Symbol of outcome                                 | Description of the learning outcome                                                                                                                                                                      | Reference to main field of study outcomes | Area symbol* |
|---------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|--------------|
| <b>KNOWLEDGE – student knows and understands</b>  |                                                                                                                                                                                                          |                                           |              |
| GIS_W1                                            | the history of GIS, understands the term of GIS. Knows and understands various data types, coordinate systems and basic spatial elements used in GIS. Is aware of the existence of various data sources. |                                           |              |
| GIS_W2                                            | various applications of geoinformation. Knows public participation methods that can be used with GIS. Understands that big data are spatial.                                                             |                                           |              |
| <b>SKILLS – student is able to</b>                |                                                                                                                                                                                                          |                                           |              |
| GIS_U1                                            | perform basic analyses in open source GIS tools. A student is able to perform analyses on vector and raster layers, and statistical data.                                                                |                                           |              |
| GIS_U2                                            | use GIS and geodata for their own professional needs.                                                                                                                                                    |                                           |              |
| <b>SOCIAL COMPETENCIES – student is ready to:</b> |                                                                                                                                                                                                          |                                           |              |
| GIS_K1                                            | critically assess the results of their work and the learning material.                                                                                                                                   |                                           |              |
| GIS_K2                                            | autonomically make decisions on their projects and exchange the knowledge with other users of GIS.                                                                                                       |                                           |              |

## Teaching contents

|                                                         |                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                              |
|---------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|
| Lectures                                                |                                                                                                                                                                                                                                                                                                                                                         | 15 hours                                                                                                                     |
| Topics                                                  | Introduction to Geographic Information Systems (GIS), history of GIS<br>Data types (vector, raster), coordinate systems, basic spatial elements – Points, Lines and Polygons<br>Various data sources<br>Applications of Geoinformation<br>Public participation and GIS<br>Big data in spatial context                                                   |                                                                                                                              |
| Accomplished learning outcomes                          |                                                                                                                                                                                                                                                                                                                                                         | <i>GIS_W1, GIS_W2, GIS_K1, GIS_K2</i>                                                                                        |
| Means of verification, rules and criteria of assessment |                                                                                                                                                                                                                                                                                                                                                         | <i>Written exam, the results of which is 50% of the overall mark.</i>                                                        |
| Classes:                                                |                                                                                                                                                                                                                                                                                                                                                         | 45 hours                                                                                                                     |
| Topics                                                  | Introduction to QGIS (user interface, components, plug-ins)<br>Vector processing<br>Raster processing<br>Analyses of statistical data on the map<br>Creating a project that will answer the needs of each student, creativity, how to use GIS in each student's field of study.<br>Participatory GIS, collecting field data, processing collected data. |                                                                                                                              |
| Accomplished learning outcomes                          |                                                                                                                                                                                                                                                                                                                                                         | <i>GIS_U1, GIS_U2, GIS_K1, GIS_K2</i>                                                                                        |
| Means of verification, rules and criteria of assessment |                                                                                                                                                                                                                                                                                                                                                         | <i>Evaluation of student's projects and student's activity during the classes, which constitute 50% of the overall mark.</i> |

## References:

|               |                                                                                                                                                                                                                                        |
|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Basic         | <i>P. A. Longley, M. F. Goodchild, D. J. Maguire. D. W. Rhind: Geographic Information Systems and Science, Wiley, 2005</i><br><i>M. J. de Smith, M. F. Goodchild, P. A. Longley: Geospatial Analysis - A comprehensive guide, 2020</i> |
| Supplementary | Martin van Maarseveen, Javier Martinez, and Johannes Flacke: GIS in Sustainable Urban Planning and Management A Global Perspective, CRC Press, 2019                                                                                    |

## Structure of learning outcomes

|                                                                            |         |
|----------------------------------------------------------------------------|---------|
| Area of academic study: R – Agricultural, forestry and veterinary sciences | ECTS ** |
| Area of academic study: T – technological sciences                         | ECTS**  |

## Structure of student activity

|                     |    |      |            |
|---------------------|----|------|------------|
| Contact hours       | 62 | hrs. | 2,5 ECTS** |
| Including: lectures | 15 | hrs. |            |

|                              |     |      |      |        |
|------------------------------|-----|------|------|--------|
| classes and seminars         | 45  | hrs. |      |        |
| consultations                | 2   | hrs. |      |        |
| participation in research    | ... | hrs. |      |        |
| obligatory traineeships      | ... | hrs. |      |        |
| participation in examination | ... | hrs. |      |        |
| e-learning                   | ... | hrs. | .... | ECTS** |
| student own work             | 63  | hrs. | 2,5  | ECTS** |

\*Areas of academic study in the fields of: H- humanities; S - social studies; P – biological sciences; T – technological sciences; M- medical, sport and health sciences; R – Agricultural, forestry and veterinary sciences; A – the arts

\*\* stated with an accuracy to 0.1 ECTS, where 1 ECTS = 25 - 30 hours of classes