1. **Title of the module**

DICE8490: Principles of Geographic Information Systems (GIS) and Remote Sensing

1. **Division or partner institution which will be responsible for management of the module**

Division of Human and Social Sciences

1. **The level of the module (Level 4, Level 5, Level 6 or Level 7)**

Level 7

1. **The number of credits and the ECTS value which the module represents**

15 (7.5 ECTS)

1. **Which term(s) the module is to be taught in (or other teaching pattern)**

Autumn or Spring

1. **Prerequisite and co-requisite modules**

None

1. **The course(s) of study to which the module contributes**

Optional on:

MSc in Conservation Science and Management;

MSc Ethnobotany,

MA Social Anthropology: Humanitarian and Environmental Crises

1. **The intended subject specific learning outcomes.  
   On successfully completing the module students will be able to:**

8.1 have a systematic understanding of knowledge of the principles of GIS and a clear understanding of the application of GIS for biodiversity conservation and environmental studies using real world examples

8.2 be able to acquire, combine and manipulate data from multiple sources in a GIS in order to deal and solve practical problems in biodiversity conservation and environmental science

8.3 have a comprehensive understanding of the principals underlying the analysis of spatial data and remote sensing data and be able to produce appropriate maps of environmental data

8.4 have acquired practical technical skills on GIS analytical techniques

8.5 be able to generate and critically evaluate GIS and remote sensing outcomes and write reports on GIS mapping and analysis

1. **The intended generic learning outcomes.  
   On successfully completing the module students will be able to:**
   1. to develop quantitative and IT skills in the context of the use of GIS software
   2. to combine different methods and techniques to produce effective research designs and analysis
   3. to communicate research findings effectively
2. **A synopsis of the curriculum**

The overall aim of this module is to provide an applied introduction to the use of GIS and remote sensing in biodiversity conservation and management and more broadly in environmental sciences. This module will provide an introduction to the theory and practice of GIS and remote sensing as well as an introduction to a range of methods for collection, management and interpretation of spatial data. Particular attention is paid to the development of students’ analysis skills of to deal with spatial data using GIS.

GIS are increasingly being used in biodiversity conservation and environmental sciences in general to help solve a wide range of “real world” environmental and associated social problems. As the current trend in ecological and environmental studies moves towards the acquisition manipulation and analysis of large datasets with explicit geographic reference, employers often report shortages of relevant GIS skills to handle spatial data. Thus, this module will introduce the use of GIS as a means of solving spatial problems and the potential of GIS and remote sensing techniques for biodiversity and environmental studies providing the student with marketable skills relevant to research and commercial needs.

Indicative topics:

* Principles of cartography, coordinate systems and projections
* Introduction to the fundamental principles of GIS;
* Introduction to remote sensing
* Data sources and methods of data acquisition
* Types of spatial data, working with raster and vector data
* Mapping (how to create and transform maps),
* Elementary database management
* ArcGIS -overview of ArcGIS, ArcMap, ArcCatalog; ArcToolbox, Spatial Analyst.
* GIS operations (Calculating area, Intersection of polygons etc)
* manipulation, spatial data query and analysis of a wide range of environmental and socio-economic information relevant to biodiversity conservation and environmental sciences
* Spatial analysis in GIS

These topics will be taught using a combination of lectures and practicals. The practical classes will provide hands-on experience using ArcGIS which is the most widely used GIS system. Students will be able to use knowledge and skills acquired in this module in practical project work

1. **Reading list (Indicative list, current at time of publication. Reading lists will be published annually)**

Bernhardsen, T. (2002) Geographic Information Systems: an Introduction, 3rd ed. John Wiley & Sons, New York.

Burrough, P. A. and McDonnell, R. A. (2015) Principles of Geographical Information Systems, 3rd edition. Oxford University Press, Oxford.

Campbell, J. B. (2011) Introduction to Remote Sensing, 5th edition. Guilford Press, New York

Chang, K.T. (2019) Introduction to Geographic Information Systems. 9th edition. McGraw-Hill, New York

Gorr, W.L. & Kurland, K.S. (2020). GIS Tutorial for ArcGIS Pro 2.6 (GIS Tutorials). 3rd edition. ESRI Press

Heywood, I., Cornelius, S., and Carver, S. (2011). An introduction to Geographical Information Systems. 4th edition. Pearson, Harlow.

Jensen, J.R. & Jensen, R.R. (2012). Introductory geographic information systems. Upper Saddle River, Pearson Education

Law, M. & Collins, A. (2019). Getting to Know ArcGIS Pro, 2nd edition. Publisher: ESRI Press

Lillesand, T. M. , Kiefer R. W. and Chipman J. W. (2015) Remote Sensing and Image Interpretation, 7th edition. John Wiley & Sons, New York.

Longley, P. (2015). Geographical Information science & systems. 4th edition. New York, Wiley.

Shekhar, S., Xiong, H., Zhou, X. (2015). Encyclopaedia of GIS. Imprint: Springer (e-book)

Tripp Corbin GISP (2020). Learning ArcGIS Pro, 2nd edition. Publisher Packt

Webster R. and Oliver M. (2007) Geostatistics for environmental scientists. 2nd edition Chichester, Wiley. E-book

1. **Learning and teaching methods**

Contact hours: 20

Private Study hours: 130

Total hours: 150

1. **Assessment methods**
   1. Main assessment methods

* Group presentation, 20%
* Individual report, 1,500 words (80%)

13.2 Reassessment methods

Reassessment Instrument 100% Coursework’

1. ***Map of module learning outcomes (sections 8 & 9) to learning and teaching methods (section12) and methods of assessment (section 13)***

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Module learning outcome** | *8.1* | *8.2* | *8.3* | *8.4* | *8.5* | *9.1* | *9.2* | *9.3* |
| **Learning/ teaching method** |  |  |  |  |  |  |  |  |
| Lectures | x | x | x |  | x |  | x |  |
| Computer Practical(s) |  | x |  | x | x | x | x | x |
| Seminar presentation |  |  |  |  |  |  |  |  |
| Private study | x | x | x | x | x | x | x |  |
| **Assessment method** |  |  |  |  |  |  |  |  |
| Group Project | x | x | x | x | x | x | x | x |
| Individual Report | x | x | x | x | x | x | x | x |

1. **Inclusive module design**

The Division recognises and has embedded the expectations of current equality legislation, by ensuring that the module is as accessible as possible by design. Additional alternative arrangements for students with Inclusive Learning Plans (ILPs)/declared disabilities will be made on an individual basis, in consultation with the relevant policies and support services.

The inclusive practices in the guidance (see Annex B Appendix A) have been considered in order to support all students in the following areas:

a) Accessible resources and curriculum

b) Learning, teaching and assessment methods

1. **Campus(es) or centre(s) where module will be delivered**

Canterbury

1. **Internationalisation**

The module will serve as a compulsory module to the Human Geography BSc programmes to enable students apply the skills of GIS mapping to physical landscapes and environments around the world. These skills are internationally transferable and so students will be equipped with the tools to conduct GIS mapping in whichever country they choose to work. **DIVISIONAL USE ONLY**

**Revision record – all revisions must be recorded in the grid and full details of the change retained in the appropriate committee records.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Date approved | Major/minor revision | Start date of delivery of revised version | Section revised | Impacts PLOs (Q6&7 cover sheet) |
|  |  |  |  |  |
|  |  |  |  |  |