

Full Title:	Data Handling and GIS
Module Code:	ENVR S8012
Credits:	5
Valid From:	Semester 1 - 2013/14 (September 2013)
Module Delivered in	1 programme(s)
Module Description:	<p>This course provides an in depth analysis of data handling techniques, providing information on appropriate methods for sorting, storing and using data, particularly in the manipulation of large complex datasets. Students will become proficient in applying scientific data to appropriate statistical tests and how to import data to data-handling programs, manipulate and graph them. The emphasis of the course is on the use of these methods in processing research data and the interpretation of analysis results using appropriate software (e.g. Microsoft Excel, R Statistical Program). The GIS component of this module will include a combination of lectures, tutorials and interactive practical classes that will allow the student to become highly proficient in a practical and spatially based skill-set highly relevant in today's working environment.</p>
Learning Outcomes:	
<i>On successful completion of this module the learner should be able to</i>	
<ol style="list-style-type: none"> 1. Evaluate and use state-of-the art GIS software. 2. Evaluate the role of GIS in the broader context of managing and working with environmental data. 3. Critically synthesise the importance of different types of data and assess the rationale for different methods of data sorting, storage, visualisation, presentation and analyses, including quantitative and qualitative approaches. 4. Select and utilise appropriate IT software (with particular emphasis on Microsoft Excel and R) to organise, store, manipulate and analyse scientific data, format scientific figures and tables and present data. 	

Module Content & Assessment

Indicative Content
Fundamental concepts of GIS n/a
Position on the earth and mapping the earth n/a
Creating digital data n/a
Mapping operations including displaying layers, querying and map design and presentation. n/a
Application areas and case studies in GIS. n/a
Data storage and organisation Defining data, data collection, ensuring reliability and validity of collected data, design of spreadsheets, spreadsheet structure, basic workbook operation, key functions of data entry and formatting in Microsoft Excel, data sorting, use of cell references, sorting and filtering data in Excel, VLOOKUP and macro functions in Excel, data integrity, recognising the importance of the use of master copies and working copies, entering and accessing information in a simple database, introduction to a range of database software, introduction to concepts in data ownership, retention, protection and sharing.
Data Visualisation Grouping data, using Pivot Tables in Excel, use of formulas and functions in Excel, selection and construction of appropriate graphical summaries of data in Excel, curve fitting and plotting, use of graphics to support data exploration, creating and formatting tables in Excel, introduction to the range of additional graphical software packages.
Data Interpretation Identifying appropriate statistical analyses, introduction to statistical software with a particular emphasis on using the R Statistical Program, selecting and extracting raw data in appropriate formats for interpretation of specific statistical analyses using a range of statistical software with a particular focus on 'R', dealing with outliers and incomplete or missing data.

Assessment Breakdown	%
Course Work	100.00%

Full Time

Course Work							
<i>Assessment Type</i>	<i>Assessment Description</i>	<i>Outcome addressed</i>	<i>% of total</i>	<i>Marks Out Of</i>	<i>Pass Marks</i>	<i>Assessment Date</i>	<i>Duration</i>
Class Test	During the GIS component there will be a classroom based test on the GIS skills of the student.	1,2	20.00	0	0	Sem 1 End	1
Continuous Assessment	The students will be required to complete a set of mapping exercises to a professional standard.	1,2	30.00	0	0	Every Week	0
Practical/Skills Evaluation	The students will carry out a variety of practical exercises using suitable software relating to the sorting, storage, visualisation and analyses of complex datasets.	3,4	30.00	0	0	Every Week	0
Presentation	Presentation on the methodology employed to collect, organise, manipulate and appropriately analyse and visually represent a dataset.	3,4	20.00	0	0	Week 10	0

No Project

No Practical

No End of Module Formal Examination

DKIT reserves the right to alter the nature and timings of assessment

Module Workload & Resources

Workload: Full Time

Workload Type	Workload Description	Hours	Frequency	Average Weekly Learner Workload
Lecturer-Supervised Learning (Contact)	Application and use of Data Handling techniques and software	2.00	Every Week	2.00
Lecturer-Supervised Learning (Contact)	Application and use of GIS software	2.00	Every Week	2.00
Independent Study	No Description	5.00	Every Week	5.00
Total Weekly Learner Workload				9.00
Total Weekly Contact Hours				4.00

This course has no Part Time workload.

Resources

Recommended Book Resources

Tim Ormsby 2010, *Getting to know ArcGIS Desktop (ArcGIS 10)*, ESRI Press

Albrecht, Jochen 2007, *Key concepts and techniques in GIS*, Sage Publications Los Angeles

QGIS project 2013, *QGIS User Guide Release 1.8.0*, QGIS project

Calvin Dytham, 2003, *Choosing and Using Statistics; A Biologist's Guide*, 2nd Ed., Blackwell Publishing UK [ISBN: 13 978-1-4051]

Andy Field, Jeremy Miles, Zoe Field 2012, *Discovering Statistics Using R*, 1st Ed., SAGE Publication Ltd. London [ISBN: 978-1-4462-00]

Ellen F. Monk 2013, *Problem-solving cases in Microsoft Access and Excel*, 10th Ed., Cengage Learning Melbourne [ISBN: 1133629806]

Zuur, Alain, Ieno, Elena N., Meesters, Erik, *A Beginner's Guide to R*, Springer [ISBN: 978-0-387-938]

This module does not have any article/paper resources

This module does not have any other resources

Module Delivered in

Programme Code	Programme	Semester	Delivery
DK_SENVI_8	Bachelor of Science (Honours) in Environmental Bioscience	7	Mandatory