ES99E-15 Urban Resilience, Disasters and Data

23/24

Department
School of Engineering
Level
Taught Postgraduate Level
Module leader
Evangelos Pitidis
Credit value
15
Module duration
1 week
Assessment
100% coursework
Study location
University of Warwick main campus, Coventry

Description

Introductory description

This is a five-day intensive module.

Module web page

Module aims

This intensive module is aimed at introducing the topics of disaster risks and urban resilience with emphasis on the use of innovative digital technologies to gather and analyse urban data for improving disaster resilience. It approaches, theoretically and practically, the the main concepts and practices surrounding disaster and communtity resilience and the way in which new technologies such as social media, Volunteered Geographic Information and the web 2.0 relate to our collective experience of disasters and crisis events. By means of a practical project and field work conducted within the city of Coventry and in collaboration with representatives of the local authorities, students will learn how to use physical maps to familiarise themselves with the built environment (FieldPapers), collect urban data using open-source mobile data collection software (i.e. OpenDataKit, KoboToolbox), process and analyse this data with Geographic Information Systems (QGIS) and produce interactive digital maps to visualise characteristics of the urban

environments and conceptualise their potential role in unfolding disasters.

Outline syllabus

This is an indicative module outline only to give an indication of the sort of topics that may be covered. Actual sessions held may differ.

*Preliminary Meeting (in the beginning of the term before the intensive week)
Introduction to the course and distribution of topics for the student-led seminar presentations (1 hour seminar). During this meeting students will also be divided into groups and such groups will be final for the duration of the module.

The module will be delivered as in three distinct but interrelated blocks, following the outline described below.

- Block 1 - Student-led presentations: Student-groups of two formulated during the preliminary meeting will be asked to prepare a very short five-minute presentation on a pre-selected topic related to the module. Questions and references will be provided to the students well in advance in order to prepare the presentations. Presentations will take place during the first part of the first three days of module delivery and will be followed by an expert presentation on a similar topic and wide collective discussions. Three to four presentations per day will take place. Students will be assessed as a group and NOT individually for this presentation and will receive collective feedback and ONE mark per group. This presentation accounts for 5% of the final mark.
- Block 2 - Practical Labs: This block will consist of practical labs provided by the teaching staff and aimed at teaching mapping and spatial data analysis skills using dedicated software (e.g. QGIS, JOSM, OpenStreetMap). Tutorials and PDFs will be available in Moodle, and for students but live presentations and collective work on the tools will also take place in the class. A workshop about mobile data collection and preparation for the fieldwork will also take place and will be followed by group work to design forms for mobile data collection and to print paper maps to be used in the field.
- Block 3 - Group Projects: Students will be divided into groups of 3-5 individuals during the preliminary meeting and develop a project idea related to the theoretical topics explored in Block 1, utilising tools and techniques introduced in Block 2. Each group will be asked to develop an initial project proposal prior to the field work (oral or written). Group proposals will be discussed and agreed with the teaching staff prior to the field work. Final presentations will take place during the last day of module delivery and will also provide the basis for the Individual project report.

- Supporting Live Sessions: Throughout the whole period of delivery of the three blocks above, regular live sessions on potential difficulties phased by the students on the newly introduced software will be delivered by the teaching staff.

Learning outcomes

By the end of the module, students should be able to:

- Demonstrate an understanding of basic concepts on interdisciplinary disaster risk and

resilience scholarship
- Appreciate the importance of disaster risk reduction, risk management , urban resilience and new urban agendas for sustainable development.
- Understand how urban data for disaster resilience is traditionally collected and identify the emerging urban data sources based on crowdsourced geographic information
- Critically appreciate the potential of participatory digital technologies and crowdsourced geographic information to support disaster risk management efforts.
- Reflect on how new technologies are related to changes in the collective experience of disasters and crisis events and comprehend their potential and limitations.
- Evaluate the role of urban data in strategies for disaster risk reduction and urban resilience.
- Use Geographic Information System software (QGIS, JOSM) to analyse the urban data collected and produce interactive digital maps that visualise urban resilience-related issues.
- Use open-source geotechnologies (OpenDataKit, KoboToolbox, FieldPapers) to perform mobile urban data collection on the field.
- Work in interdisciplinary teams to analyse an urban challenge related to disaster resilience and design strategies for using open source geo-technologies to collect, process and analyse urban data.

Indicative reading list

- Altan, O., Backhaus, R., Boccardo, P., Tonolo, F. G., Trinder, J., Manen, N. van, & Zlatanova, S. (Eds.). (2013). The Value of Geoinformation for Disaster and Risk Management (VALID) Benefit Analysis and Stakeholder Assessment (p. 130). Copenhagen, Denmark: Joint Board of Geospatial Information Socie- ties (JB GIS).
- Amin, S., & Goldstein, M. (Eds.). (2008). Data against Natural Disasters. The World Bank.
- Coaffee, J., & Lee, P. (2016). Urban resilience: planning for risk, crisis and uncertainty. London: Palgrave.
- Coaffee, J. (2019). Future Proof: How to Build Resilience in an Uncertain World, First. ed. Yale University Press, New Haven,CT.
- Cova, T. J. (2005). GIS in emergency management. In P. A. Longley, M. F. Goodchild, D. J. Maguire, & D. W. Rhind (Eds.), Geographical Information Systems: Principles, Techniques, Management and Applications (2nd Editio., pp. 845–858). Wiley.
- Crowley, J. (2014). Open Data for Resilience Initiative Field Guide (p. 134). Washington DC.
- Hacklay, M. (2013). Citizen Science and Volunteered Geographic Information: Overview and Typology of Participation. In D. Sui, S. Elwood, & M. Goodchild (Eds.), Crowdsourcing Geographic Knowledge (pp. 105–122). Dordrecht: Springer Netherlands.
- Kawasaki, A., Berman, M. L., & Guan, W. (2013). The growing role of web-based geospatial technology in disaster response and support. Disasters, 37(2), 201–21.
- Kelman, I .(2020). Disaster by Choice: How our action turn natural hazards into Catastrophes, Oxford: Oxford University Press
- Konečný, M., & Reinhardt, W. (2010). Early warning and disaster management: the importance of geographic information (Part A). International Journal of Digital Earth, 3(3), 217–220.
- Manfré, L. a., Hirata, E., Silva, J. B., Shinohara, E. J., Giannotti, M. a., Larocca, A. P. C., & Quintanilha, J. a. (2012). An Analysis of Geospatial Technologies for Risk and Natural Disaster Management. ISPRS International Journal of Geo-Information, 1(3), 166–185.

- Porto de Albuquerque, J., Anderson, L., Calvillo, N., Coaffee, J., Cunha, M.A., Degrossi, L.C., Dolif, G., Horita, F., Klonner, C., Lima-Silva, F., Marchezini, V., da Mata Martins, M.H., Pajarito-Grajales, D., Pitidis, V., Rudorff, C., Tkacz, N., Traijber, R., Zipf, A. (2021). The role of data in transformations to sustainability: a critical research agenda. Current Opinion in Environmental Sustainability 49, 153–163. https://doi.org/https://doi.org/10.1016/j.cosust.2021.06.009
- Roche, S., Propeck-Zimmermann, E., & Mericskay, B. (2013). GeoWeb and crisis management: issues and perspectives of volunteered geographic information. GeoJournal, 78(1), 21–40.
- Vacano, M. von, & Zaumseil, M. (2014). Understanding Disasters: An Analysis and Overview of the Field of Disaster Research and Management. In M. Zaumseil, S. Schwarz, M. von Vacano, G. B. Sullivan, & J. E. Prawitasari-Hadiyono (Eds.), Cultural Psychology of Coping with Disasters (pp. 3–44). New York, NY: Springer New York.
- Zook, M., Graham, M., Shelton, T., & Gorman, S. (2010). Volunteered Geographic Information and Crowdsourcing Disaster Relief: A Case Study of the Haitian Earthquake. World Medical & Health Policy, 2(2), 7.

Interdisciplinary

The module adopts an interdisciplinary teaching approach. Students from a wide variety of disciplinary and professional backgrounds will attend this module, enabling them to explore topics from a range of different perspectives and combine their various skills and expertise in rpoviding innovative solutions for existing urban problems. Interdisciplinarity will be a key requirement in the formulation of the groups for the final project.

Subject specific skills

Use open-source geotechnologies (OpenDataKit, KoboToolbox, FieldPapers) to do conduct urban data collection on the field.
Use Geographic Information System software (QGIS, JOSM) to analyse the urban data collected and produce interactive digital maps that visualise urban resilience -related issues.
Work in interdisciplinary groups to analyse an urban challenge related to disaster resilience, design strategies for using open source geo-technologies to collect, process and analyse urban data.

Transferable skills

Numeracy: apply mathematical and computational methods to communicate parameters, model and optimize solutions
Apply problem solving skills, information retrieval, and the effective use of general IT facilities
Communicate (written and oral; to technical and non-technical audiences) and work with others
Exercise initiative and personal responsibility, including time management, which may be as a team member or leader
Work in interdisciplinary groups and conceptualise, design and conduct a research project
Awareness of the nature of business and enterprise in the creation of economic and social value
Overcome difficulties by employing skills, knowledge and understanding in a flexible manner

Appreciation of the global dimensions of engineering, commerce and communication
Be professional in their outlook, be capable of team working, be effective communicators, and be able to exercise responsibility and sound management approaches.

Study

Study time

Type	Required
Lectures	3 sessions of 2 hours (4%)
Seminars	2 sessions of 4 hours (5%)
Project supervision	1 session of 6 hours (4%)
Fieldwork	1 session of 6 hours (4%)
Other activity	1 hour (1%)
Private study	11 hours (7%)
Assessment	113 hours (75%)
Total	151 hours

Private study description

Pre-module preparation and reading.

Other activity description

1 hour preliminary meeting

Costs

No further costs have been identified for this module.

Assessment

You do not need to pass all assessment components to pass the module.

Assessment group A1

	Weighting	Study time	Eligible for self-certification
Presentation	5%	10 hours	No
A student-led short presentation to introduce the students in the topics of the module.			
Individual Project Report	70%	75 hours	Yes (extension)

	Weighting	Study time	Eligible for self-certification
2,500-word individual project report			
Group presentation	25%	28 hours	No
A student-led oral goup presentation about the group project.			

Feedback on assessment

Class / seminar discussion / group presentation
Verbal feedback will be provided in situ in class in response to class discussion and groupwork presentation. Peer feedback will be given via student responses to presentations.

Summative Essay
Detailed written feedback will be given on all final written assessments and will be provided to each student online via Tabula. Feedback will be given in accordance to the University Policy on the Timing of the Provision of Feedback to Students on Assessed Work

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Availability

Courses

This module is Core for:

- TESA-H1C1 Postgraduate Taught in Humanitarian Engineering
  - Year 1 of H1C1 Humanitarian Engineering
  - Year 1 of H1C3 Humanitarian Engineering (with Management)
  - Year 1 of H1C2 Humanitarian Engineering (with Sustainability)
  - Year 2 of H1C1 Humanitarian Engineering
  - Year 2 of H1C3 Humanitarian Engineering (with Management)
  - Year 2 of H1C2 Humanitarian Engineering (with Sustainability)
- Year 1 of TESA-H1C4 Postgraduate Taught in Humanitarian Engineering

This module is Option list B for:

- Year 1 of TGDA-L801 Postgraduate Taught Global Sustainable Development