



INTERNATIONAL SCHOOL FOR GEOSCIENCE RESOURCES (IS-Geo)
KOREA INSTITUTE OF GEOSCIENCE AND MINERAL RESOURCES (KIGAM)

PUBLIC CUSTOMIZED TRAINING COURSE ON Urban Geology

The **International School for Geoscience Resources** of KIGAM presents an intensive training course on **Urban Geology**. The course will take place at the Mirinae room of International School for Geoscience Resources of KIGAM in Daejeon (Korea) in **August 17 (Mon) to August 21 (Fri) 2015** and will include training on the following topics:

Topics	Date	Instructor
Day 1. INTRODUCTION TO URBAN GEOLOGY		
Topic 1. Course Overview		
Topic 2. The concept of Urban Geology	8. 17	
Topic 3. Quaternary / Anthropogenic processes		
Topic 4. Designing the Urban Geological investigation for planning & land-use		
Day 2. CHARACTERISING THE ZONE OF HUMAN INTERACTION & URBAN GEOLOGY		
Topic 1. Integrated mapping & modelling		
Topic 2. Brownfield developments	8. 18	
Topic 3. Urban Engineering Geology		
Topic 4. Coastal engineering and climate change		
Topic 5. The conceptual ground model		Dr. Vanessa Banks & Mr. David Boon (BGS, UK)
Day 3. URBAN GROUNDWATER & ENVIRONMENTAL GEOLOGY		
Topic 1. Urban Groundwater		
Topic 2. Resource & protection		
Topic 3. Groundwater & flooding	8. 19	
Topic 4. Environmental Geology		
Topic 5. Land contamination, investigation and remediation: principals		
Topic 6. Case studies & practical		
Day 4. DELIVERY OF URBAN GEOSCIENCE FOR DECISION-MAKING & RESEARCH		
Topic 1. Enabling urban geological data & knowledge	8. 20	
Topic 2. Data management		
Topic 3. Cross-cutting initiatives		
Topic 4. Urban Geoscience research		
Day 5. URBAN GEOLOGY FIELD EXCURSION		
Topic 1. Mapping the urban environment	8.21	
Topic 2. Field observation and data acquisition		
Topic 3. Conceptual model validation		



COURSE INFORMATION

• Summary

- This course will provide a basic and intermediate introduction to global and local-scale urban and environmental geology. It will focus on human landscape processes and interactions and application of this knowledge to strategic and local land-use planning. The course will explore and provide basic training on principal office, laboratory and field-based techniques for urban geology research and application.

• Agenda

- Day 1, will provide an introduction to urban geology aimed at those who are involved in land-use planning and development, and geotechnical and environmental engineering and will involve classroom-based training.
- Days 2, 3 and 4 will cover advanced urban geology topics and students will then be challenged with practical problems to expand their capabilities and understanding. Practicals will provide an opportunity to exchange knowledge and experiences with the UK experts.
- Day 5 includes a field visit around the Daejeon area to examine field mapping techniques and discuss practical aspects of Urban Geology.

• Course Will Cover

- The strategic demand for understanding urban and anthropogenic geology;
- The history behind Urban Geology in Northern Europe and the US;
- Approaches to urban geological investigations;
- Conceptual ground models and their application;
- Groundwater and Land Contamination;
- Engineering Geology and Hazards, and
- The application of 3D urban geology models for subsurface planning

• Course Requirements: Prerequisite

- The participants should have a background and basic knowledge of Geosciences, and a desire to develop their knowledge in applied geology.
- The course language will be English;

• Who should Attend?

- The course is designed for geoscientists and applied geoscientists involved in urban-based projects.

- **Summary of topic contents and learning objectives**

The opening day of the course will be used to introduce key concepts of urban geology and familiarise students with the drivers for urban geology in Korea. Day 2 will cover research methods and data systems and principles of engineering geology (including geotechnical properties, hazards, coastal engineering and 3D mapping). The day will finish with a practical exercise, using a tunnelling project from London to develop a conceptual ground model. Day 3 will cover: groundwater and environmental geology; with an emphasis on water as a resource and a hazard; land contamination, investigation and remediation. The afternoon practical will link groundwater and land contamination issues. Day 4 will cover urban geology into urban planning practice and policy (including resilience) and will equip students with techniques of how this can be achieved. Day 5 will be a field excursion to demonstrate some of the issues discussed using real examples and will develop students observational and mapping skills and experience.

- **Day 1. Introduction and drivers for urban geological investigation**

Day 1 will start with an introduction from the instructors, then an overview of the course times and topics. The session will provide an introduction to the concept of urban geology (including the zone of human interaction, data considerations and the context of vulnerability, resilience and ecosystem services) and brief history of its development. Following this will be a session on the processes and geological products of natural and anthropogenic activity in the urban environment, then a lecture on design approaches of an urban investigation and stakeholder engagement. The practical session aims to encourage the students to explore the drivers for urban geology in South Korea, and this will set the scene for Day 2.

- 10:00-11:00 – Introduction to course aims and outcomes
- 11:10-12:10 – Overview of urban geology, the significance of humans and the historic drivers
- 12:10-13:30 – Lunch
- 13:30-14:30 – Quaternary/Anthropogenic processes and products
- 14:40-15:40 – Planning for future land use and climate change
- 15:50-16:50 – Practical 1: Drivers for urban geology in South Korea
- 17:00-18:00 – Practical 2: Design an urban geology investigation

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- **Day 2. Characterising urban geology and the shallow zone of human interaction**

Day 2 will start with an introduction to the day and further definition of the shallow zone of human interaction. The session will provide an overview of integrated mapping and modelling techniques used for urban geological investigation, brownfield development, heterogeneity and the implications for engineering geology and geotechnical characterisation in the urban environment. The session will go on to consider how this data is used in the development of conceptual ground models and city planning.

- 10:00-11:00 – Characterising the shallow zone of human interaction
- 11:10-12:10 – Land use change and brownfield development
- 12:10-13:30 – Lunch
- 13:30-14:30 – Engineering and geotechnical considerations
- 14:40-15:40 – Coastal engineering
- 15:50-16:50 – Conceptual ground models and their applications
- 17:00- 18:00 – Practical: Using site investigation data to build a ground model

- **Day 3. Water in the urban environment**

Day 3 will start with an introduction to the day. The session will provide an overview of the importance of groundwater as both a resource and hazard in the urban environment. The lectures will cover: the urban groundwater cycle, aquifer properties, water quality and protection; Flood hazard process, mitigation (including sustainable drainage systems) and control for urban engineering schemes; groundwater investigation techniques and remediation options; Groundwater modelling (including types, uses and limitations); The day will include case studies and will end with a practical on the application of groundwater domains.

- 10:00-11:00 – Introduction to urban groundwater
- 11:10-12:10 – Groundwater quality
- 12:10-13:30 – Lunch
- 13:30-14:30 – Investigation approaches
- 14:40-15:40 – Modelling
- 15:50-16:50 – Contamination and approaches to remediation
- 17:00- 18:00 – Practical: Application of hydrogeological domains

- **Day 4. Environmental geology and delivery of urban geoscience for decision making**

Day 4 will start with an introduction to the day. The session will provide an overview of the importance of delivery mechanisms for land use development and planning. The lectures will cover: enabling geological data and knowledge within planning and scientific communities using examples from the UK; urban resources, including thermal energy, underground space, ecosystem services, urban vulnerabilities and resilience. The day will include a series of illustrative case studies and will end with preparation for the urban geology field excursion.

- 10:00-11:00 – Applied geological mapping
- 11:10-12:10 – Introduction to urban geoscience delivery
- 12:10-13:30 – Lunch
- 13:30-14:30 – Practical: Stakeholder engagement focused on Daejeon
- 14:40-15:40 – Management of data for urban geology
- 15:50-16:50 – Urban resources, geo-conservation, ecosystem services, vulnerability and resilience
- 17:00- 18:00 – Preparation for field excursion

- **Day 5. Urban Geology field excursion**

Day 5 will assemble at a designated meeting point. Start time will be announced during the course. The field trip will provide training in field based techniques for geological mapping in urban environments and will include practical demonstrations.

- 10:00-11:00 – Meet and travel to field site 1
- 11:10-12:10 – Fieldwork at field site 1
- 12:10-13:30 – Lunch
- 13:30-14:30 – Travel to field site 2
- 14:40-15:40 – Fieldwork at field site 2
- 15:50-16:50 – Fieldwork at field site 3
- 17:00- 18:00 – Return to KIGAM offices

About the instructor – *Dr. Vanessa Banks*



Vanessa Banks joined the BGS as a contaminant hydrogeologist in 2005 and now holds the position of Team Leader for Shallow Geohazards and Risks. She has developed considerable expertise in the development of ground models and their application to a range of aspects of applied geology, primarily in urban areas. This knowledge has been gained through an extensive period of employment as an Engineering Geologist/ Geoenvironmental Engineer in the private sector working on projects that ranged from ground investigation for and supervision of tunnelling schemes (including the extension of the (underground) Jubilee Line and Isle of Dogs Northern Drainage Scheme in London) to landfill monitoring and design, flood risk assessments and contaminated land remediation schemes. A Geology graduate from the University of Manchester, Vanessa was awarded an MSc and DIC in Engineering Geology from Imperial College in 1988 and undertook a PhD in Karst Hydrogeology (Karst Hydrogeology of the Southern Catchment of the River Wye, Derbyshire) prior to joining BGS. Since 2005, Vanessa has been researching: the contaminant hydrogeology of abandoned mines and mine waste; soil erosion; the application of hydrogeological domains to groundwater resource and vulnerability studies; geohazard susceptibility, karst processes and the impacts of contaminated land on controlled waters. She is a Chartered Geologist and Visiting Research Associate at the University of Derby, with a publication record that includes peer reviewed publications, conference proceedings, reports, articles and book chapters.

About the instructor – *Mr. David Boon*



David Boon joined the BGS as an applied engineering geologist in 2005 and now holds position of Deputy Head of Station for Wales. He leads the City Region Geoscience programme in Wales and has developed considerable knowledge and experience in Urban Geology through his involvement in 3D urban geology modelling projects in Cardiff and Belfast. Since joining the BGS he developed experience in the geotechnical behaviour of soil and rock materials within a civil engineering context, with a strong focus on landslides. In 2009 he was contracted by the New Zealand Geological Survey where he developed new 3D geological models and seismic hazard maps for the capital city, Wellington, and gained first-hand experience of natural disaster management and resilience. Since returning to the BGS in 2010 he has been heavily involved with providing geological data and information solutions to support decision making in the urban environment. He has experience in engineering geological and geotechnical mapping, landslide hazard mapping and risk assessment, remote sensing and GIS, geo-conservation, geothermal potential assessment, and legal dispute resolution. He was awarded an MSc in Engineering Geology in 2005 from Leeds University. During his BSc in Environmental Geology (2000-2004) he worked in the Contaminated Land sector where he developed an interest in historic land use change. He is an active member of the Geological Society of London and is working towards Chartered Geologist Status. He is a professional member of the International Association of Engineering Geology (IAEG) and the Geological Society of America (GSA). He has given invited lectures on urban geology at several Universities and International Conferences and his publication record includes peer reviewed publications, conference proceedings, reports, and articles.