Module Overview
Urban geoscience encompasses the geological aspects of the built environment in the context of construction materials and, the underlying bedrock that affects the stability of built structures. In London, the relevance of these aspects are evident. For example, landslips can disrupt rail services and, non-uniform expansion and shrinkage of underlying clay sub-soil results in cracks in buildings. Water resource is another important consideration in the growing urban context. The nature of groundwater contaminants have changed with time with reports of caffeine and nicotine (British Geological Survey, 2007). Fluctuation of groundwater level depends on flow, recharge and discharge and must be closely monitored. Growing urbanisation also implies that the cities are increasingly becoming repositories of valuable materials that should be targets for recovery by urban mining. These critical aspects of urban geology are evident for London and will be explored, but also relevant to other expanding cities in the world.

Week One
• Introduction to common rock types and their properties and their suitability as building stones and underlying bedrock in the context of construction in London.

Week Two
• Introduction to aquifer characteristics and the processes of discharge and recharge of groundwater.
• Day Fieldtrip: Study of building stones in London.

Week Three
• Integration of geological concepts with practical approaches to urban planning and development in terms of construction, groundwater management and urban mining.
Module Aims
This module introduces students to critical aspects of urban geoscience related to suitability of building materials and construction sites, underground water resource, its contamination and fluctuation and, scope of urban mining using London as an example. The concepts learnt must be then applied to any other expanding city in the world in the same contexts of construction and water resources and, maximizing resource recovery and recycling from urban wastes.

Teaching Methods
A mixture of lectures and fieldwork in London will be used to introduce students to the interdisciplinary aspects of urban geoscience, using available resources by British Geological Survey and UCL geologists. This will be followed by discussions where the students will be encouraged to reflect on the concepts learnt and experiences gained, to apply them to any other city that they live in or is familiar with, in the perspective of an increasingly urbanised world. Reading lists will be available online via the UCL library site. Students will be directed towards class materials, further support and discussion forums on UCL’s virtual learning environment Moodle.

Learning Outcomes
Upon successful completion of this module, students will:

- Be able to identify and know common rock types and their properties used for construction in London
- Have knowledge of bedrock and soil cover in relation to suitability for construction sites
- Be able to read and understand basic information from geological maps available in the public domain (British Geological Survey)
- Understand underlying causes of fluctuating groundwater levels in terms of aquifer rock properties, rainfall and usage.
- Be able to apply concepts of urban geoscience and scope of urban mining for London, to other cities.

Assessment Methods
- 1,000-word essay (30%)
- 1,000-word coursework (50%)
- Exam (20%)

Key Texts


Module Leaders
Dr. Sudeshna Basu is a senior research associate in the department of earth sciences (http://www.ucl.ac.uk/earth-sciences/people/staff/research/basugupta) and a teaching fellow in the department of chemical engineering (http://www.ucl.ac.uk/chemeng/people/teaching-fellows). Her research experiences in geology/geochemistry complements her strength as a teacher in related fields. Her teaching responsibilities involve students from multidisciplinary backgrounds. As a part of her teaching she covers aspects of urban geology involving a trip to British library with her students. She is also experienced in leading students for field trips in UK and abroad. Dr. Basu is a fellow of Higher Education Academy, UK.

Prof. A.P. Jones from the department of earth sciences (https://www.ucl.ac.uk/earth-sciences/people/staff/academic/jones), has more than twenty five years of research and teaching experiences. He co-delivers the ‘Earth Resources and Sustainability’ module in the department, some aspects of which will be relevant to the proposed module.