Lesson 00
Overview course, marking, etc

GEO1015—2018

Hugo Ledoux
Ken Arroyo Ohori
Ravi Peters

- associate-prof in 3D geoinformation
- https://3d.bk.tudelft.nl/hledoux
- BG.West.010

- postdoc 3D geoinformation
- https://3d.bk.tudelft.nl/ken
- BG.West.010 + Mexico City 🇲🇽

- postdoc 3D geoinformation
- https://3d.bk.tudelft.nl/rypeters
- BG.West.010

It’s a completely new course, be aware it might be slightly “bumpy”

Help us improve it by giving us honest and constructive feedback

Course content (1/3)

Digital terrain models (DTMs) are computer representations of the elevation of a given area, and they play an important role in understanding and analysing our built environment.

They are the necessary input for several applications (eg flood modelling, visibility, effects of climate change on the north poles, etc.), and they are also relevant for studying for seabed and other planets.

Course content (2/3)

The course provides an overview of the fundamentals of digital terrain modelling (DTM):

- different representations of DTMs: TINs, rasters, point clouds, contour lines
- reconstruction of DTMs from different sources (LiDAR, photogrammetry, InSAR)
- spatial interpolation methods
- conversion between different DTM representations
- processing of DTM: outlier detection, filtering, segmentation, and identification and classification of objects
- applications, eg runoff modelling, watershed computations, visibility
- techniques to handle and process massive datasets

Course content (3/3)

The course has both a theoretical part and a practical part where students reconstruct, manipulate, process, and extract information from DTMs.

All the labs are programming tasks (to be done with the Python programming language), and other open-source libraries and software are used.

Prerequisites

Prerequisites:

- GEO1000 (or knowledge of scripting/programming in at least one language (eg Matlab, Java or Python)
- GEO1001
- GEO1002

Study goals

- describe the characteristics of elevations datasets from different sources (LiDAR, photogrammetry, InSAR)
- describe the pros and cons of different representations of DTMs, and compare them for different applications
- explain how elevation datasets can be automatically converted to DTMs
- reconstruct and manipulate DTMs using with open-source libraries (in Python)
- explain, analyse, and discuss how DTMs can be useful in different applications related to built environment
- given a specific problem where elevation plays a role (eg visibility or flood modelling), analyse and identify which data and algorithms are needed to solve the problem, and assess the consequences of these choices;

Education methods

- **Blended-learning**: each week there are 2 main topics, and students first watch the videos and read the material at home.
- Then in a 3h session (contact hours), the most difficult parts are discussed and students get help/support for the practicals.

YouTube +  + python™

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Contact hours

- Tuesdays 13:45–16:30 (check *mytimetable* for room)
- presence not mandatory
- we’re here to help, no new material will be introduced
- but we will explain, if needed, key concepts that seem misunderstood
- bring your laptop: we help for the labs

Material used

- nothing to buy
- all the PDFs of handouts, videos, papers, chapters will be available on the website (as we progress; sorry… it's a new course)

Marking

- **final exam** **35%** (2019-02-01)
- **mid-term quiz** **5%** (2018-12-11)
- **4 assignments** **60%**

Important rules:

- a total of 6.0 or above is necessary to successfully pass the course;
- minimum 5.5 for the final exam required;
- there is *__one__* resit for each assignment (only at the end of the course if the whole course is failed; you can't just redo an assignment to aim at a higher score);
- there is *__one__* resit for the final exam;
- there is *__no__* resit for the quiz;
- if the overall 6.0 is not obtained after the resits, then the student has to redo the whole course the following year.

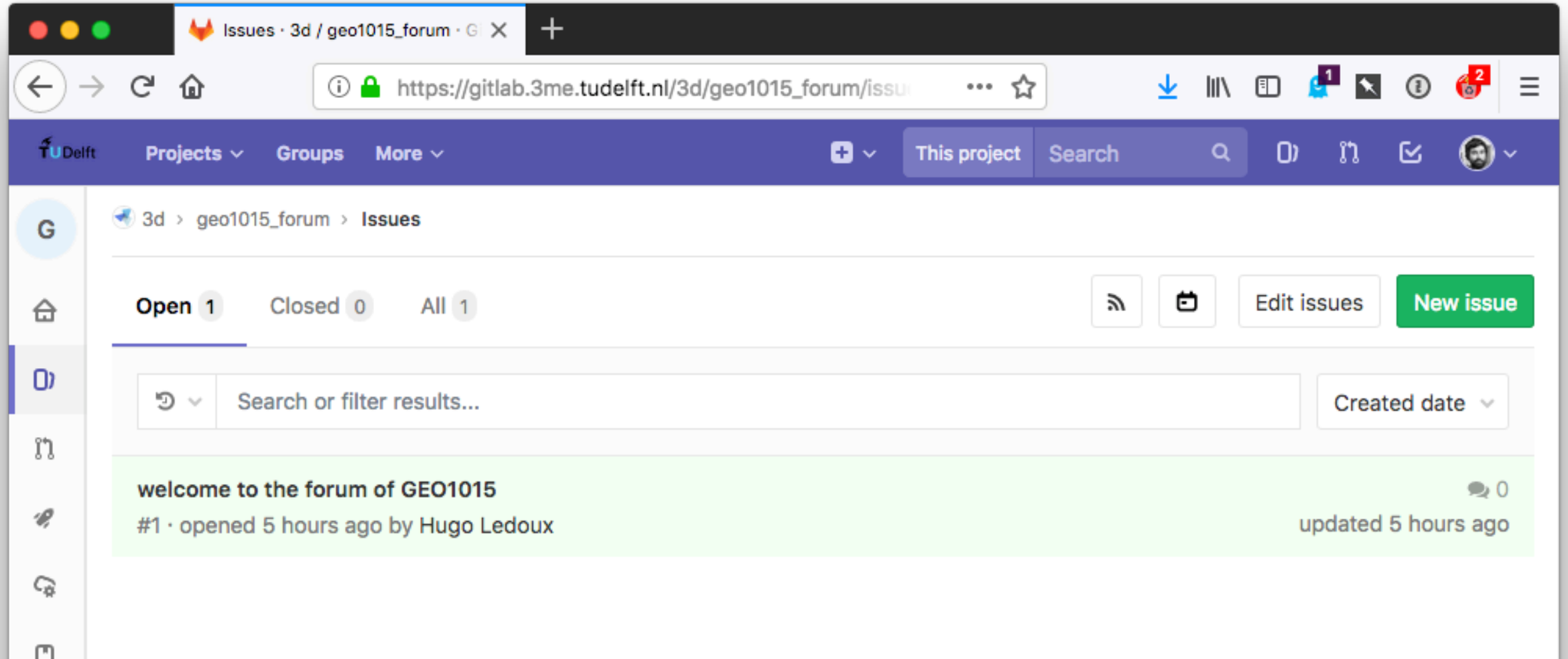
4 assignments

1. spatial interpolation
2. terrain simplification
3. (something with LiDAR)
4. computing a viewshed

All assignments involve programming in Python

Brightspace is not used

- instead: https://3d.bk.tudelft.nl/courses/geo1015/
- all announcements will be posted at https://3d.bk.tudelft.nl/courses/geo1015/news/
- questions? do ***not*** email us, we won't answer (!)
- instead use the GitLab forum: https://gitlab.3me.tudelft.nl/3d/geo1015_forum/issues (login with NetID)



https://3d.bk.tudelft.nl/courses/geo1015/