LTTO.00.027  Data Science in Remote Sensing  
2020/2021 autumn regular studies

<table>
<thead>
<tr>
<th>Faculty/Department</th>
<th>Tartu Observatory (LTTO)</th>
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<tbody>
<tr>
<td>Amount of credits (1 ECTS=26 hours)</td>
<td>6 ECTS</td>
</tr>
<tr>
<td>Duration in semesters</td>
<td>1</td>
</tr>
<tr>
<td>Course takes place</td>
<td>every academic year</td>
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<tr>
<td>Final assessment</td>
<td>differentiated (A, B, C, D, E, F, not present)</td>
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<tr>
<td>Syllabus credits</td>
<td>6 ECTS</td>
</tr>
<tr>
<td>Lecturers</td>
<td>Krista Alikas (responsible)</td>
</tr>
<tr>
<td>Languages of instruction</td>
<td>Estonian, English</td>
</tr>
<tr>
<td>Minimum number of attendants</td>
<td>5</td>
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<tr>
<td>Maximum number of attendants</td>
<td>30</td>
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<tr>
<td>Study levels</td>
<td>master's studies, bachelor's and master's integrated studies</td>
</tr>
<tr>
<td>Forms of teaching and learning and no of hours</td>
<td>lectures: 39  seminars: 13  independent work (including e-learning): 104</td>
</tr>
<tr>
<td>Web-based learning</td>
<td>Partially</td>
</tr>
<tr>
<td>Study period (in weeks)</td>
<td>1.-13.nädal</td>
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### Curricula containing this course

- Data Science (214386)  
  - mas.  
  - 2020/2021
- Environmental Technology (2590)  
  - mas.  
  - 2020/2021
- Geography (2576)  
  - mas.  
  - 2020/2021

### Objectives

Course will focus on various methods and applications used in remote sensing of environment. Overview will be given about passive and active remote sensing. Students will learn how to combine data from various origin and sources to analyse the changes in environment.

### Learning outcomes

After the end of the course:
- students have the overview about principles used in passive, radar and lidar remote sensing and their respective application fields;
- knows the principles of spectral measurements (knows the terms spectrometer, radiance, irradiance, reflectance, atmospheric correction, calibration),
- knows the principles in water remote sensing (bio-optical modelling, adjacency effect)
- knows the principles in vegetation remote sensing (optical properties of the leaf, contribution of various features to the reflectance, leaf angles, various indices).
- student knows how to download, process and analyse remote sensing and possibly ancillary data and apply this knowledge to solve various exercises.
- they know how to plan and conduct groupwork.

### Brief description

In the beginning of the course students can select a topic which they start to solve in a smaller group. Every group has a supervisor. Course is based on a problem based learning method. Additionally lectures about various remote sensing applications will be held.

### Groups

<table>
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<tr>
<th>Mark</th>
<th>Limit of attendants</th>
<th>Lecturers</th>
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### Schedule

| 02.09.2020 | lecture - Introduction to the course  
Distribution of group work assignments  
Lecture: Introduction to Remote Sensing (RS) |
### Lecture materials and course home page

#### Web-based learning environment

http://moodle.ut.ee

#### Compulsory study materials

Øppejõud lisab info

#### Recommended study materials

Additional reading material will be provided by each lecturer about the presented topic. For the group assignment, the supervisor can recommend the material, if necessary.

#### List of independent works and their instructions

The majority of the course is based on the problem-learning method. In the first lecture, various environmental related topics will be introduced to the students from which they can select the topic of their interest and form groups. Each group has a supervisor who will be available for consultations and monitoring the progress throughout the course.

There will be weekly meetings with overview lectures on different remote sensing related topics. Each week a group has to provide an update on their progress from the last meeting and their plans for the coming week at the meeting. Short reports (max one A4 sheet) have to be sent to the group supervisor weekly.

In the end of the course, the final group project report has to be sent to the supervisor and the results have to be presented to the audience.

In the last week, there will be an exam covering the content of presented lectures during the course.

#### Requirements to be met for final assessment

Student has weekly contributed to the group work.

To obtain final grade, the following is required

Final mark will be derived based on the input to the weekly progress reports, final written report, oral presentation and exam.

#### Options for taking tests/exams at later date

Øppejõud lisab info