<table>
<thead>
<tr>
<th><strong>Module Code</strong></th>
<th>CS7DS1</th>
</tr>
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<tbody>
<tr>
<td><strong>Module Name</strong></td>
<td>Data Analytics</td>
</tr>
<tr>
<td><strong>ECTS Weighting</strong>¹</td>
<td>10 ECTS</td>
</tr>
<tr>
<td><strong>Semester taught</strong></td>
<td>Semester 1</td>
</tr>
<tr>
<td><strong>Module Coordinator/s</strong></td>
<td>Dr. Bahman Honari</td>
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</table>

### Module Learning Outcomes

On successful completion of this module, students will be able to:

- LO1. To understand the theory and be able to apply the following techniques to a set of data
- LO2. Classification and Regression Trees
- LO3. Ensemble methods
- LO4. Bagging
- LO5. Boosting
- LO6. Random forests
- LO7. RuleFit Procedure
- LO8. Evaluation of models
- LO9. Analysis and imputation of Missing Data

### Module Content

- Overview of Field
- Handling data
- Detailed discussion of Classification and Regression trees
- General Overview of Ensemble methods
- Detailed Discussion of Bagging
  - Boosting
  - Random Forests
  - Rule Fit Procedure
- Detailed discussion of Model evaluation
- Handling unbalanced datasets.
- Other methods of growing trees
- Stacking
- Analysis and Imputation of Missing data

### Teaching and Learning Methods

- Lectures and laboratories

¹ TEP Glossary
### Assessment Details

<table>
<thead>
<tr>
<th>Assessment Component</th>
<th>Brief Description</th>
<th>Learning Outcomes Addressed</th>
<th>% of total</th>
<th>Week set</th>
<th>Week due</th>
</tr>
</thead>
<tbody>
<tr>
<td>Examination</td>
<td>2 hour written examination</td>
<td>All</td>
<td>60%</td>
<td>n/a</td>
<td>n/a</td>
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<tr>
<td>Project</td>
<td>End of semester project</td>
<td>All</td>
<td>40%</td>
<td>10</td>
<td>15</td>
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</table>

### Reassessment Details

- Examination (2 hours, 100%)

### Contact Hours and Indicative Student Workload

- **Contact Hours (scheduled hours per student over full module), broken down by:**
  - Lecture: 44 hours
  - Laboratory: 10 hours

- **Independent study (outside scheduled contact hours), broken down by:**
  - Preparation for classes and review of material (including preparation for examination, if applicable): 33 hours
  - Completion of assessments (including examination, if applicable): 7 hours

- **Total Hours:** 94 hours

### Recommended Reading List


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2 [TEP Guidelines on Workload and Assessment](#)
<table>
<thead>
<tr>
<th>Module Pre-requisites</th>
<th>Prerequisite modules: N/A</th>
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<tbody>
<tr>
<td>Other/alternative non-module prerequisites:</td>
<td>A course on Multivariate Analysis covering principal components multiple regression, clustering techniques and logistic regression. A good working knowledge of R is also required.</td>
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<tr>
<td>Module Co-requisites</td>
<td>N/A</td>
</tr>
<tr>
<td>Module Website</td>
<td>Blackboard</td>
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<tr>
<td>Last Update</td>
<td>31/08/2019 by Bahman Honari</td>
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