**Information theory and coding**

Telatar Emre

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<tr>
<th>Cursus</th>
<th>Sem.</th>
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<tr>
<td>Data Science</td>
<td>MA1, MA3</td>
<td>Opt.</td>
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<tr>
<td>Génie électrique et électronique</td>
<td>MA1, MA3</td>
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<td>Informatique et communications</td>
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<td>SC master EPFL</td>
<td>MA1, MA3</td>
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**Summary**

The mathematical principles of communication that govern the compression and transmission of data and the design of efficient methods of doing so.

**Content**

1. Mathematical definition of information and the study of its properties.
3. Communication channels and their capacity.
4. Coding for reliable communication over noisy channels.
5. Multi-user communications: multi access and broadcast channels.
7. Information Theory and statistics

**Learning Outcomes**

By the end of the course, the student must be able to:

- Formulate the fundamental concepts of information theory such as entropy, mutual information, channel capacity
- Elaborate the principles of source coding and data transmission
- Analyze source codes and channel codes
- Apply information theoretic methods to novel settings

**Teaching methods**

Ex cathedra + exercises

**Assessment methods**

With continuous control

**Resources**

- **Ressources en bibliothèque**
  - Elements of Information Theory / Cover

**Websites**