220219 - Fundamentals of Nuclear Engineering

Learning outcomes:
- Define radioactivity and describe the main features of radioactive processes.
- Identify and explain the effects of the passage of ionizing radiation through matter.
- Solve basic problems related to nuclear structure, radioactivity and interaction of ionizing radiation with matter.
- Identify some of the nuclear reactions of interest to nuclear engineering.
- Enumerate the main features of a nuclear reactor.

Study load

<table>
<thead>
<tr>
<th>Total learning time: 75h</th>
<th>Hours large group:</th>
<th>27h</th>
<th>36.00%</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Self study:</td>
<td>48h</td>
<td>64.00%</td>
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</table>
The assessment of the learning process is based on the following activities, each one having a weight of 25% in the final grade:

1. A written test, with both theoretical and practical questions.
2. A set of exercises to be delivered in written form along the extent of the course.
3. Oral presentations of the work done.
4. Short quizzes posed during class sessions.

**Bibliography**

Fundamentals of Nuclear Engineering

**Learning time:** 75h
- Theory classes: 13h 20m
- Practical classes: 7h
- Guided activities: 6h 40m
- Self study: 48h

**Description:**
- Topics:
  1. Historical background
  2. Atomic and nuclear structure. Radioactivity
  3. Radiation transport
  4. Photon interactions with matter
  5. Charged particle interactions with matter
  6. Neutron interactions with matter. Fission chain reaction
  7. Radiation detection
  8. Nuclear reactors
  9. Fuel cycle and nuclear waste management