

| Teaching Units            | Teaching modules               | Code | Hours  |                |       | ECTS      |
|---------------------------|--------------------------------|------|--------|----------------|-------|-----------|
|                           |                                |      | Course | Practical Work | Total |           |
| <b>Languages</b>          | French as a foreign language   |      | 20     |                | 20    | <b>5</b>  |
| <b>Research Project</b>   | Writing Report<br>Oral Defense |      |        |                |       | <b>10</b> |
| <b>Industrial Project</b> | Writing Report<br>Oral Defense |      |        |                |       | <b>5</b>  |

☐ **Important note:** you cannot choose courses from different blocks. You must choose courses inside one single block for Energy & Materials or Catalysis for Energy and Environment or Organic Synthesis)

| Energy & Materials                  |  |  |    |          |                |            |
|-------------------------------------|--|--|----|----------|----------------|------------|
| <b>Materials Science</b>            | Luminescent materials  |  | 15 |          | <b>15</b>      | <b>3</b>   |
|                                     | Criteria for materials selection                             |  | 3  | 12 TP    | <b>15</b>      | <b>3</b>   |
|                                     | Amorphous materials  |  | 14 |          | <b>14</b>      | <b>3</b>   |
|                                     | Application of finite elements to thermo-mechanical coupling |  |    | 12 TP    | <b>12</b>      | <b>3</b>   |
|                                     | Corrosion of materials                                       |  | 22 | 7TD-4TP  | <b>33</b>      | <b>3</b>   |
| Choice 1 (Materials for Energy)     | Fuel cells   |  | 10 | 2TD -4TP | <b>16</b>      | <b>2,5</b> |
|                                     | Thermoelectricity  |  | 10 | 2 TD     | <b>12</b>      | <b>2,5</b> |
| Choice 2 (Materials for structures) | <i>Fatigue and materials failure</i>                         |  | 12 | 5 TD     | <b>17</b>      | <b>2</b>   |
|                                     | <i>Assembly and tribology: finite elements modeling</i>      |  | 14 | 12 TP    | <b>26</b>      | <b>3</b>   |
| <b>Total</b>                        |  |  |    |          | <b>117/132</b> | <b>20</b>  |

*Courses in italics are taught in French with slides, handouts and examinations in English*

| Chemistry – Catalysis for energy and environment |  |   |    |           |            |            |
|--|--|---|----|-----------|------------|------------|
| <b>Catalysis for Energy &amp; Environment</b>    | Life cycle analysis: Application to processes          |   | 15 |           | <b>15</b>  | <b>2.5</b> |
|  | Biofuels & refining                                    |   | 15 |           | <b>15</b>  | <b>2.5</b> |
|  | Capture, recovery and hydrogenation of CO <sub>2</sub> |   | 15 |           | <b>15</b>  | <b>2.5</b> |
|  | Remediation Catalysis                                  |   | 15 |           | <b>15</b>  | <b>2.5</b> |
|  | Hydrogen and synthetic gas (SynGas)                    |   | 15 |           | <b>15</b>  | <b>2.5</b> |
| <b>Chemical Engineering</b>                      | Applied Fluid Mechanics                                | - | 10 | 5TD+16TP  | <b>31</b>  | <b>4</b>   |
|  | Engineering of separation process                      |   | 10 | 5TD 12 TP | <b>27</b>  | <b>3.5</b> |
| <b>Total</b>                                     |  |   |    |           | <b>133</b> | <b>20</b>  |

| Chemistry - Organic Synthesis                    |   |  |    |           |    |    |
|--|---|--|----|-----------|----|----|
| Analytical Chemistry and<br>Chemical engineering | Engineering of separation process                 |  | 10 | 5TD -12TP | 27 | 4  |
|  |   |  |    |           |    |    |
| Organic Synthesis                                | Retrosynthetic analysis & Total synthesis         |  | 20 |           | 20 | 3  |
|  | Asymmetric synthesis & organometallics            |  | 20 |           | 20 | 3  |
|  | <i>Heterocyclic compounds</i> -support in english |  | 20 |           | 20 | 3  |
|  | <i>Catalysis and industry</i> -support in english |  | 10 |           | 10 | 2  |
|  | <i>Heteroelements</i>                             |  | 20 |           | 20 | 3  |
|  | <i>Energy Transition</i>                          |  | 15 |           | 15 | 2  |
| <b>Total</b>                                     |   |  |    |           | 97 | 20 |

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