## Curriculum: Artificial intelligence and robotics

<table>
<thead>
<tr>
<th>ANNO DI CORSO</th>
<th>SEMESTRE</th>
<th>CODICE ESSE3</th>
<th>OBLIGATORIO</th>
<th>INSEGNAMENTO</th>
<th>CANALIZZAZIONE</th>
<th>LABORATORI</th>
<th>SSD</th>
<th>INSEGNMENTO DI UNGUERRA</th>
<th>CFU</th>
<th>ORE CORSO EROGATE</th>
<th>ORE TOTALI</th>
<th>PROVA FISCALE</th>
<th>ALTRE CONOSCENZE</th>
<th>ALTRE CONOSCENZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>1</td>
<td>INQ0091306</td>
<td>X</td>
<td>Automata, Languages and Computation</td>
<td>X 6 CFU ING-INF/05 + 3 CFU INF/01</td>
<td>9 72 225 6 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I</td>
<td>1</td>
<td>INQ0091561</td>
<td>X</td>
<td>Operations Research 1</td>
<td>X MAT/09</td>
<td>9 72 225 9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I</td>
<td>1</td>
<td>INP9087775</td>
<td>X</td>
<td>Machine Learning</td>
<td>2 canali</td>
<td>X 6 CFU ING-INF/05</td>
<td>6 48 150 6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I</td>
<td>2</td>
<td>INQ0091562</td>
<td>X</td>
<td>Artificial Intelligence</td>
<td>ING-INF/05</td>
<td>9 72 225 9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I</td>
<td>2</td>
<td>INP9087774</td>
<td>X</td>
<td>Computer Vision</td>
<td>48 lez.+24lab</td>
<td>ING-INF/05</td>
<td>9 72 225 9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>II</td>
<td>1</td>
<td>INQ0091300</td>
<td>X</td>
<td>Intelligent Robotics</td>
<td>ING-INF/05</td>
<td>9 72 225 9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>II</td>
<td>INQ0091601</td>
<td>X</td>
<td>Quality Engineering</td>
<td>ING-INF/07</td>
<td>6 48 150 sei</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>II</td>
<td>INQ0091642</td>
<td>X</td>
<td>Reinforcement Learning</td>
<td>ING-INF/05</td>
<td>6 48 150 sei</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>II</td>
<td>INQ0087836</td>
<td>X</td>
<td>Game theory</td>
<td>ING-INF/05</td>
<td>6 48 150 tre+tre</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>II</td>
<td>INQ0804359</td>
<td>X</td>
<td>Innovation, entrepreneurship and finance</td>
<td>ING-INQ/35</td>
<td>9 72 225 6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>II</td>
<td>INQ0091301</td>
<td>X</td>
<td>Industrial Robotics</td>
<td>ING-INF/13</td>
<td>9 72 225 6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>II</td>
<td>INQ0091640</td>
<td>X</td>
<td>Operations Research 2</td>
<td>MAT/09</td>
<td>6 48 150 sei</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I</td>
<td></td>
<td>X</td>
<td>Fully elective credits - A scelta</td>
<td></td>
<td></td>
<td>12 96 300 12</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I</td>
<td>A</td>
<td>INQ087943</td>
<td>(2)</td>
<td>English language B2 (productive skills)</td>
<td>300</td>
<td>3 0 75 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I</td>
<td>A</td>
<td>INQ0093091</td>
<td>(2)</td>
<td>Italian language</td>
<td>300</td>
<td>3 0 75 tre</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>II</td>
<td>A</td>
<td>INQ087862</td>
<td>(1)</td>
<td>Internship</td>
<td>900</td>
<td>9 0 225 9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>II</td>
<td>A</td>
<td>INQ0091098</td>
<td>(1)</td>
<td>Research training</td>
<td>900</td>
<td>9 0 225 nove</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>II</td>
<td>A</td>
<td>INQ087846</td>
<td>X</td>
<td>Final Project</td>
<td>525</td>
<td>21 0 525 21</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(1) uno a scelta (2) uno a scelta

RAD 2020

<table>
<thead>
<tr>
<th>minimi</th>
<th>massimi</th>
</tr>
</thead>
<tbody>
<tr>
<td>45</td>
<td>12</td>
</tr>
<tr>
<td>12</td>
<td>9</td>
</tr>
<tr>
<td>30</td>
<td>18</td>
</tr>
<tr>
<td>3</td>
<td>0</td>
</tr>
</tbody>
</table>

0-6 0-0 0-9 0-3
<table>
<thead>
<tr>
<th>ANNO DI CORSO</th>
<th>SEMESTRE</th>
<th>CODICE ESSE</th>
<th>OBBLIGATORIO</th>
<th>INSEGNAMENTO</th>
<th>CANALIZZAZIONE</th>
<th>LABORATORI INGLESE</th>
<th>SSD</th>
<th>CFU</th>
<th>ORE CORSO EROGATE</th>
<th>ORE TOTALI</th>
</tr>
</thead>
<tbody>
<tr>
<td>I 1</td>
<td>INQ0091306</td>
<td>X</td>
<td>Automata, Languages and computation</td>
<td>X</td>
<td>6 CFU ING-INF/05 + 3 CFU INF/01</td>
<td>9</td>
<td>72</td>
<td>225</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>I 1</td>
<td>INQ0091561</td>
<td>X</td>
<td>Operations Research 1</td>
<td>X</td>
<td>MAT/09</td>
<td>9</td>
<td>72</td>
<td>225</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>I 1</td>
<td>INP9087775</td>
<td>X</td>
<td>Machine learning</td>
<td>2 canali</td>
<td>X</td>
<td>6 CFU ING-INF/05</td>
<td>6</td>
<td>48</td>
<td>150</td>
<td>6</td>
</tr>
<tr>
<td>II 1</td>
<td>INQ0091582</td>
<td>X</td>
<td>Inferential Statistics</td>
<td>X</td>
<td>SECS-S/01</td>
<td>6</td>
<td>48</td>
<td>150</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>II 1</td>
<td>INQ0091581</td>
<td>X</td>
<td>Bioinformatics</td>
<td>X</td>
<td>ING-INF/05</td>
<td>9</td>
<td>72</td>
<td>225</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>II 1</td>
<td>INP9087773</td>
<td>X</td>
<td>Computational Genomics</td>
<td>X</td>
<td>3 ING-INF/06, 3 INF/01</td>
<td>6</td>
<td>48</td>
<td>150</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>II 1</td>
<td>INQ0091104</td>
<td>X</td>
<td>Learning from Networks</td>
<td>X</td>
<td>ING-INF/05</td>
<td>6</td>
<td>48</td>
<td>150</td>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>

**PRIMO GRUPPO DI INSEGNAMENTI A SCELTA VINCOLATA (24 CFU):**

| I 2 | INP7079233 | Big Data Computing | 2 canali | X | 6 CFU ING-INF/05 | 6 | 48 | 150 | set |
| I 2 | INQ0091579 | Deep Learning | X | ING-INF/05 | 6 | 48 | 150 | set |
| I 2 | INQ0091599 | Search Engines | X | ING-INF/05 | 9 | 72 | 225 | 9 |
| I 2 | INP9087843 | Web applications | X | ING-INF/05 | 8 | 48 | 150 | 6 |
| II 1 | INQ0091620 | Distributed Systems | X | ING-INF/05 | 9 | 72 | 225 | 9 |
| II 1 | INQ0091105 | Natural Language Processing | X | ING-INF/05 | 6 | 48 | 150 | set |

**SECONDO GRUPPO DI INSEGNAMENTI PER LA SCELTA:**

| II 2 | INQ0091585 | Imaging for Neuroscience | X | ING-INF/06 | 9 | 72 | 225 | n°ve |
| II 2 | INP084204 | Structural Bioinformatics | X | BIO/11 | 6 | 48 | 150 | sei |
| II 1 | INQ0091643 | Advanced Algorithm Design | X | 6 CFU ING-INF/05, 3 CFU INF/01 | 9 | 72 | 225 | sei |
| II 2 | INQ0091644 | Genomics and NGS data analysis | X | BIO/11 | 9 | 72 | 225 | n°ve |
| II 2 | INQ0091640 | Operations Research 2 | X | MAT/09 | 6 | 48 | 150 | sei |

| I A | INP9087943 | X | Fully elective credits - A scelta | 12 | 96 | 300 | 12 |
| I A | INQ0093091 | X | English language B2 (productive skills) | X | 3 | 0 | 75 | 3 |
| I A | INQ0091098 | X | Research training | X | 9 | 0 | 225 | n°ve |
| I A | INP9087862 | X | Internship | X | 0 | 9 | 225 | 9 |
| I 2 | INQ0091098 | X | Research training | X | 9 | 0 | 225 | n°ve |
| I 2 | INP9087846 | X | Final Project | X | 21 | 0 | 525 | 21 |

(1) uno a scelta (2) uno a scelta
### CORSO DI LAUREA MAGISTRALE IN COMPUTER ENGINEERING LM 32 - Ord. 2020

**COORTE A.A. 2024/2025**

#### Curriculum: High performance and big data computing

<table>
<thead>
<tr>
<th>ANNO DI CORSO</th>
<th>SEMESTRE</th>
<th>CODICE ESSE</th>
<th>OBBLIGATORIO</th>
<th>INSEGNAMENTO</th>
<th>CANALIZZAZIONE</th>
<th>LABORATORI</th>
<th>UNITÀ DIDATTICHE</th>
<th>SSD</th>
<th>CFU</th>
<th>ORE CORSO</th>
<th>ORE TOTALI</th>
<th>PROVA FINALE</th>
<th>ALTRE CONOSCenze</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>I</td>
<td>INQ0091306</td>
<td>X</td>
<td>Automata, Languages and computation</td>
<td>X 6 CFU ING-INF/05 + 3 CFU INF/01</td>
<td>9</td>
<td>72</td>
<td>225</td>
<td>6</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>I</td>
<td>INQ0091561</td>
<td>X</td>
<td>Operations Research 1</td>
<td>X MAT/09</td>
<td>9</td>
<td>72</td>
<td>225</td>
<td>9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>I</td>
<td>INP9087775</td>
<td>X</td>
<td>Machine learning</td>
<td>2 canali</td>
<td>X 6 CFU ING-INF/05</td>
<td>6</td>
<td>48</td>
<td>150</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>II</td>
<td>INQ0091582</td>
<td>X</td>
<td>Inferential Statistics</td>
<td>X SECS-S/01</td>
<td>6</td>
<td>48</td>
<td>150</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>II</td>
<td>INP7092333</td>
<td>X</td>
<td>Big Data Computing</td>
<td>2 canali</td>
<td>X 6 CFU ING-INF/05</td>
<td>6</td>
<td>48</td>
<td>150</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>II</td>
<td>INQ0091598</td>
<td>X</td>
<td>Parallel Computing</td>
<td>X ING-INF/05</td>
<td>9</td>
<td>72</td>
<td>225</td>
<td>9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>II</td>
<td>INQ0091643</td>
<td>X</td>
<td>Advanced Algorithm Design</td>
<td>X 6 CFU ING-INF/05, 3 CFU INF/01</td>
<td>9</td>
<td>72</td>
<td>225</td>
<td>6</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### PRIMO GRUPPO DI INSEGNAMENTI A SCELTA VINCOLATA (21 CFU):

|               | II       | INQ0091562  | X            | Artificial Intelligence | X ING-INF/05 | 9 | 72 | 225 | nove |
|               | II       | INQ0091581  | X            | Bioinformatics | X ING-INF/05 | 9 | 72 | 225 | nove |
|               | II       | INQ0091599  | X            | Search Engines | X ING-INF/05 | 9 | 72 | 225 | nove |
|               | II       | INQ0091579  | X            | Deep Learning | X ING-INF/05 | 6 | 48 | 150 | 6 |
|               | II       | INP9087777  | X            | Computer Networks | X ING-INF/05 | 9 | 72 | 225 | nove |
|               | II       | INQ0091104  | X            | Learning from Networks | X ING-INF/05 | 6 | 48 | 150 | 6 |
|               | II       | INQ0091620  | X            | Distributed Systems | X ING-INF/05 | 9 | 72 | 225 | 9 |
|               | II       | INQ0091641  | X            | Computers and Networks security | X ING-INF/05 | 6 | 48 | 150 | sei |

#### SECONDO GRUPPO DI INSEGNAMENTI PER LA SCELTA:

|               | II       | INP9087845  | X            | Cryptography | X MAT/02 | 6 | 48 | 150 | sei |
|               | II       | INP9087773  | X            | Computational Genomics | X 3 ING-INF/06, 3 INF/01 | 6 | 48 | 150 | sei |
|               | II       | INP9087836  | X            | Game theory | X 3 CFU ING-INF/01, 3 CFU INF/01 | 6 | 48 | 150 | tre+tre |
|               | II       | INP9086676  | X            | Stochastic Processes | X ING-INF/03 | 6 | 48 | 150 | sei |
|               | II       | INQ0091640  | X            | Operations Research 2 | X MAT/09 | 6 | 48 | 150 | sei |
|               | I        |              | X            | Fully elective credits - A scelta | 12 | 96 | 300 | 12 |
|               | I A      | INP9087943  | (2)          | English language B2 (productive skills) | X | 3 | 0 | 75 | 3 |
|               | I A      | INQ0093091  | (2)          | Italian language | X | 3 | 0 | 75 | tre |
|               | I A      | INP9087862  | (3)          | Internship | X | 9 | 0 | 225 | 9 |
|               | I A      | INQ0091098  | (3)          | Research training | X | 9 | 0 | 225 | nove |
|               | I        | INP9087846  | X            | Final Project | X | 21 | 0 | 525 | 21 |

(1) uno a scelta (2) a scelta

<table>
<thead>
<tr>
<th>RAD 2020</th>
<th>minimi</th>
<th>massimi</th>
</tr>
</thead>
<tbody>
<tr>
<td>45</td>
<td>12</td>
<td>18</td>
</tr>
<tr>
<td>72</td>
<td>36</td>
<td>15</td>
</tr>
<tr>
<td>30-6</td>
<td>0-0</td>
<td>0-9</td>
</tr>
<tr>
<td>0-3</td>
<td>0-0</td>
<td>0-9</td>
</tr>
</tbody>
</table>
## CORSO DI LAUREA MAGISTRALE IN COMPUTER ENGINEERING LM 32 - Ord. 2020
### COORTE A.A. 2024/2025

### Curriculum: Web information and data engineering

<table>
<thead>
<tr>
<th>ANNO DI CORSO</th>
<th>SEMESTRE</th>
<th>CODICE ESSE3</th>
<th>OBLIGATORIO</th>
<th>INSEGNAMENTO</th>
<th>CANALIZZAZIONE</th>
<th>LABORATORI</th>
<th>SSD</th>
<th>CFU</th>
<th>ORE CORSO EROGATE</th>
<th>ORE TOTALI</th>
</tr>
</thead>
<tbody>
<tr>
<td>I 1</td>
<td></td>
<td>INQ091306 X</td>
<td>Automata, Languages and computation</td>
<td>X</td>
<td>6 CFU ING-INF/05 + 3 CFU INF/01</td>
<td>9</td>
<td>72</td>
<td>225</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>I 1</td>
<td></td>
<td>INQ091561 X</td>
<td>Operations Research 1</td>
<td>X</td>
<td>MAT/09</td>
<td>9</td>
<td>72</td>
<td>225</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>I 1</td>
<td></td>
<td>INP9087775 X</td>
<td>Machine learning</td>
<td>2 canali</td>
<td>X</td>
<td>6 CFU ING-INF/05</td>
<td>6</td>
<td>48</td>
<td>150</td>
<td>6</td>
</tr>
</tbody>
</table>

### INSEGNAMENTI OBLIGATORI PER IL CURRICULUM

| II 1          |          | INP9087777 X | Computer Networks | X | ING-INF/05 | 9 | 72 | 225 | 9 |
| II 1          |          | INQ091599 X  | Search Engines    | X | ING-INF/05 | 9 | 72 | 225 | 9 |
| II 1          |          | INP9087843 X | Web applications  | X | ING-INF/05 | 6 | 48 | 150 | 6 |
| II 1          |          | INQ091645 X  | Graph Databases   | X | ING-INF/05 | 9 | 72 | 225 | 9 |

### PRIMO GRUPPO DI INSEGNAMENTI A SCELTA VINCOLATA (18 CFU):

| II 1          |          | INQ091600 X  | Software platforms | X | ING-INF/05 | 6 | 48 | 150 | 6 |
| II 1          |          | INQ091620 X  | Distributed Systems | X | ING-INF/05 | 9 | 72 | 225 | 9 |
| II 1          |          | INQ091623 X  | Concurrent and Real Time Programming | X | ING-INF/05 | 6 | 48 | 150 | 6 |
| II 1          |          | INQ1104081 X | Privacy Preserving Information Access | X | ING-INF/05 | 6 | 48 | 150 | 6 |
| II 1          |          | INQ091641 X  | Computers and Networks security | X | ING-INF/05 | 6 | 48 | 150 | 6 |
| II 1          |          | INQ091622 X  | Computer Engineering for Music and Multimedia | X | ING-INF/05 | 6 | 48 | 150 | 6 |
| II 1          |          | INQ091105 X  | Natural Language Processing | X | ING-INF/05 | 6 | 48 | 150 | 6 |

### SECONDO GRUPPO DI INSEGNAMENTI PER LA SCELTA:

| II 1          |          | INQ091582 X  | Inferential Statistics | X | SECS-S/01 | 6 | 48 | 150 | sei |
| II 1          |          | INQ091601 X  | Quality Engineering    | X | ING-INF/07 | 6 | 48 | 150 | sei |
| II 1          |          | INP7079233 X | Big Data Computing     | 2 canali | X | 6 CFU ING-INF/05 | 6 | 48 | 150 | sei |
| II 1          |          | INQ1097358 X | Geographic Information Systems | X | ING-INF/05 | 6 | 48 | 150 | sei |
| II 1          |          | INP9087837 X | Information security   | X | ING-INF/03 | 6 | 48 | 150 | sei |
| II 1          |          | INQ091640 X  | Operations Research 2  | X | MAT/09 | 6 | 48 | 150 | sei |
| II 1          |          | INQ3103060 X | Advanced Text Analytics | X | ING-INF/05 | 6 | 48 | 150 | sei |

### FULLY ELECTIVE CREDITS - A SCELTA

| I A          |          | INP9087943 (2) | English language B2 (productive skills) | X | 3 | 0 | 75 | 3 |
| I A          |          | INQ093091 (2)  | Italian language | X | 3 | 0 | 75 | tre |
| II A         |          | INP9087862 (1) | Internship | X | 9 | 0 | 225 | 9 |
| II A         |          | INQ091098 (1)  | Research training | X | 9 | 0 | 225 | nove |
| I            |          | INP9087846 X  | Final Project | X | 21 | 0 | 525 | 21 |

(1) uno a scelta (2) uno a scelta

RAD 2020

<table>
<thead>
<tr>
<th>minimi</th>
<th>massimi</th>
</tr>
</thead>
<tbody>
<tr>
<td>45</td>
<td>72</td>
</tr>
<tr>
<td>12</td>
<td>36</td>
</tr>
<tr>
<td>9</td>
<td>15</td>
</tr>
<tr>
<td>18</td>
<td>30</td>
</tr>
<tr>
<td>3</td>
<td>0-3</td>
</tr>
</tbody>
</table>

Sei 0-6

Tre 0-3