Master Degree in Computer Engineering

All regularly enrolled students can obtain their final degree after successfully passing the final evaluation of a series of activities accounting to a total of at least 120 CFU. Each personal training path has to be clearly specified in advance through the so-called “Individual Study Plan”, which has to be directly proposed by each student and it must comply with all national and local regulations. The submission of the Individual Study Plan is via an online submission system which is designed to help in following the mandatory constraints while highlighting what are (and their extent of) the possibilities of free choices. You are expected to submit your individual study plan as soon as possible: its acceptance does confirm you will be awarded the Master Degree as soon as you successfully pass all the chosen activities. For this academic year you can a complete your Individual Study Plan proposal until 30 September 2021. After this date you could modify your Individual Study Plan during the next academic year.

In order to help you in the process of submitting your Individual Study Plan, we have written this short guide that will hopefully clarify the main rules for producing a suitable Individual Study Plan. While preparing your Individual Study Plan you can refer to all the official documentation, mainly the so-called “Manifesto degli Studi”.

https://en.didattica.unipd.it/off/2021/LM/IN/IN2547

In general, the structure of a Study Plan of the Master Degree in Computer Engineering is the same for all the curricula, and it is divided in the following main parts:

- Core competencies: three courses that are compulsory and shared among all the curricula (for a total of 24 CFU).
  They are:
  - Automata, Languages and computation 9 CFU
  - Machine Learning 6 CFU
  - Operations Research 19 CFU

- Mandatory (core) courses: these courses characterize each curriculum and are different, in number and CFUs, for each curriculum. As the name says, they are “mandatory”.
  The courses are, divided for each curriculum:
  - Curriculum Artificial Intelligence and Robotics (a total of 24 CFU)
    - Artificial Intelligence 6 CFU
    - Computer Vision 9 CFU
    - Intelligent Robotics 9 CFU
  - Curriculum Bioinformatics (a total of 27 CFU)
    - Inferential Statistics 6 CFU
    - Bioinformatics 9 CFU
    - Computational Genomics 6 CFU
    - Learning from Networks 6 CFU
  - High Performance and Big Data Computing (a total of 30 CFU)
    - Inferential Statistics 6 CFU
    - Parallel Computing 9 CFU
    - Big Data Computing 6 CFU
• Advanced Algorithm Design 9 CFU

• Web Information and Data Engineering (a **total of 33 CFU**)
  o Computer Networks 9 CFU
  o Search Engines 9 CFU
  o Web Applications 6 CFU
  o Database 2 9 CFU

• Elective courses: they represent a set of course you can freely choose until you reach a minimum number of CFU (the minimum varies across curricula). In this way you can personalize your training path. They are, divided for each curriculum:
  • **Curriculum Artificial Intelligence and Robotics (at least 27 CFU)**
    o Big Data Computing 6 CFU
    o Deep Learning 6 CFU
    o Robotics and Control 19 CFU
    o Industrial Robotics 9 CFU
    o Learning from Networks 6 CFU
    o 3D Data Processing 6 CFU
    o Natural Language Processing 6 CFU
  • **Curriculum Bioinformatics (at least 24 CFU)**
    o Foundations of Databases 6 CFU
    o Artificial Intelligence 6 CFU
    o Big Data Computing 6 CFU
    o Web Applications 6 CFU
    o Advanced Algorithm Design 9 CFU
    o Distributed Systems 9 CFU
    o Operations Research 26 CFU
  • **High Performance and Big Data Computing (at least 21 CFU)**
    o Artificial Intelligence 6 CFU
    o Bioinformatics 9 CFU
    o Deep Learning 6 CFU
    o Search Engines 9 CFU
    o Distributed Systems 9 CFU
    o Learning from Networks 6 CFU
  • **Web Information and Data Engineering (at least 18 CFU)**
    o Foundations of Databases 6 CFU
    o Software Platforms 6 CFU
    o Concurrent and Real Time Programming 6 CFU
    o Distributed Systems 9 CFU
    o Computers and Network Security 6 CFU
    o Computer Engineering for Music and Multimedia 6 CFU
    o Natural Language Processing 6 CFU

• Other choices: You have to choose a number of courses for at least 12 CFU (and no more than 18 CFU). For each curriculum, we published three lists of courses for “other choices”, you are free to choose any course from any list for a total of at least 12 CFU.
These courses allow you to explore subjects of areas different from those required from the chosen curriculum.

- **Others**: these are mandatory activities like the final project, the language proficiency test, and the internship/research training, for a total of 33 CFU.

In case you believe the proposed schema does not fit your interest and you want to submit an Individual Study Plan that does not strictly follow the constraints on the number of CFU indicated above, you may submit a “free” study plan, together with a written statement that explains the motivations for this plan. In this situation, a committee will evaluate your proposal and decide if it is coherent and admissible with the Master Degree in Computer Science.

To be valid, the Study Plan must have at least 120 CFU credits.
An example of the steps you will see on Uniweb (example for High Performance and Big Data Computing)

Step 1: Choose “Study plan” from the menu (top right)
Step 2: Choose the type of plan: AUT (almost automatic approval), PRO (needs approval)

<table>
<thead>
<tr>
<th>Study plans</th>
<th>Amount</th>
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</thead>
<tbody>
<tr>
<td>AUT</td>
<td>0</td>
</tr>
<tr>
<td>PRO</td>
<td>0</td>
</tr>
</tbody>
</table>

Step 3: Check compulsory educational activities (core + mandatory)

- ADVANCED ALGORITHM DESIGN (IN20091542) - [CPU: 9]
- AUTOMATA, LANGUAGES AND COMPUTATION (IN20091306) - [CPU: 9]
- BIG DATA COMPUTING (NP0799233) - [CPU: 6]
- INFERENCEAL STATISTICS (IN20091382) - [CPU: 6]
- MACHINE LEARNING (NP20087775) - [CPU: 6]
- OPERATIONS RESEARCH 1 (IN20091561) - [CPU: 9]
- PARALLEL COMPUTING (IN20091598) - [CPU: 9]

Step 4: Choose elective courses

- ARTIFICIAL INTELLIGENCE (IN20091542) - [CPU: 6]
- BIOINFORMATICS (IN20091381) - [CPU: 6]
- DEEP LEARNING (IN20091376) - [CPU: 6]
- DISTRIBUTED SYSTEMS (IN20091342) - [CPU: 6]
- FOUNDATIONS OF DATABASES (IN20091340) - [CPU: 6]
- LEARNING FROM NETWORKS (IN20091386) - [CPU: 6]
- SEARCHING ENGINES (IN20091399) - [CPU: 6]

Information about the study plan you are completing

- Course of study: HIGH PERFORMANCE AND BIG DATA COMPUTING
- Year of offer: 2020
- Cohort: 2020

Activities formerly selected

- The following activities you have selected while completing your study plan. They are classified by year of course and ordered by code.

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>IN20091643</td>
<td>ADVANCED ALGORITHM DESIGN</td>
</tr>
<tr>
<td>IN20091306</td>
<td>AUTOMATA, LANGUAGES AND COMPUTATION</td>
</tr>
<tr>
<td>NP0799233</td>
<td>BIG DATA COMPUTING</td>
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<tr>
<td>IN20091382</td>
<td>INFERENCEAL STATISTICS</td>
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<td>NP20087775</td>
<td>MACHINE LEARNING</td>
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<tr>
<td>IN20091561</td>
<td>OPERATIONS RESEARCH 1</td>
</tr>
<tr>
<td>IN20091598</td>
<td>PARALLEL COMPUTING</td>
</tr>
</tbody>
</table>
Step 5: Choose “other” courses

Step 6: Language proficiency (English for Italian students, Italian for international students)

Step 7: Choose Internship or research training

Step 8: Check final project
### Step 9: Submit study plan

<table>
<thead>
<tr>
<th>Course code without year of course</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEG3031216</td>
<td>Advanced Algorithm Design</td>
</tr>
<tr>
<td>HEG2091226</td>
<td>Astrophysical Language and Computation</td>
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<tr>
<td>HEG2096102</td>
<td>Big Data Computing</td>
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<td>HEG2091292</td>
<td>Inferential Statistics</td>
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<td>HEG2087776</td>
<td>Machine Learning</td>
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<td>HEG2091297</td>
<td>Operations Research 1</td>
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<td>HEG2091296</td>
<td>Parallel Computing</td>
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<td>HEG2091295</td>
<td>Artificial Intelligence</td>
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<td>HEG2091299</td>
<td>Deep Learning</td>
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<td>HEG2091403</td>
<td>Distributed Systems</td>
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<td>HEG2097806</td>
<td>Game Theory</td>
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<td>HEG2091409</td>
<td>Operations Research 2</td>
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<tr>
<td>HEG2097902</td>
<td>Internship</td>
</tr>
<tr>
<td>HEG2097804</td>
<td>Final Project</td>
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