FAQ Computer Science

Sommario

Computer Science: miscellanea and some info	2
How to enroll	4
Study plan and courses	5
Courses type for semesters	11
English Language B2	13
Master Thesis	14

Computer Science: miscellanea and some info

How is it composed:

- The major works in pathways, Major and Minor.
 - The Major consisting of 5 subjects, the Minor of 2. Among the Majors there is AI, and if you want among the Minors there is one directed toward the study of data. After that you have 3 compulsory exams for all, and the other exams are optional (however there are several AI ones).
 - There are 3 Majors "Artificial intelligence", "Internet mobile and security" e "Programming languages and systems"



ARTIFICIAL INTELLIGENCE

Artificial intelligence
Machine learning
Deep learning
Vision and cognitive systems
Natural language processing



INTERNET. MOBILE AND SECURITY

Wireless networks for mobile applications
Mobile programming and multimedia
Web information management
Runtimes for concurrency and distribution
Advanced topics in computer and network
security



PROGRAMMING LANGUAGES, SYSTEMS AND ALGORITHMS

Functional languages
Languages for concurrency and distribution
Software verification
Formal methods for cyberphysical systems
Selected topics in algorithms

 There are 3 Minors – "Internet of Things and Embedded Systems", "Data and Process Management" e "Innovation and Entrepreneurship in ICT"



INTERNET OF THINGS AND EMBEDDED SYSTEMS

Mobile security
Real-time kernels and systems
Cyberphysical systems and IOT security



DATA AND PROCESS MANAGEMENT

Big data computing
Process mining
Knowledge representation and learning



INNOVATION AND ENTREPRENEURSHIP IN

ICT

IT service management
Start-up in ICT
Security and risk: management and
certifications

Reference site:

- https://informatica.math.unipd.it/en/master.html

Be sure to check out all the rules here (Italian based):

- https://didattica.unipd.it/didattica/allegati/regolamento/regolamento/1009444.pdf

Requirements to enroll:

STUDENTS WITH AN ITALIAN BACHELOR'S DEGREE:

- Computer Science, Computer Engineering, Mathematics or Statistics Bachelor Degree with at least 20 CFU of Computer Science (ssd INF/01, ING-INF/05)
- Final grade 85/110
- Language English B2 level

Students that do not match the above requirements can ask for a preliminary assessment of their curriculum

Follow the instructions in the Call for applications, usually published in June on the <u>University's website></u>

INTERNATIONAL STUDENTS:

Bachelor diploma (or equivalent): A minimum three-year undergraduate degree (or equivalent) in Computer Science, Information Engineering or related fields (e.g. Mathematics or Statisctics) is required, with proven skills in computer science.

English language level: B2 Level (CEFR) or equivalent.

please follow the instructions at this link >

Site to have more info to enroll (checking the "Avviso di ammissione" document) and checking all the deadlines in the same page:

- https://www.unipd.it/ammissioni-scienze-magistrali

You can also check all the courses here:

- https://didattica.unipd.it/off/2023/LM/SC/SC2598/percorso_formativo.pdf

We also have a Telegram channel dedicated to that:

- https://t.me/computerScienceUNIPD
- https://t.me/FIUPd (this one suited for more general info on the matters of all CS courses and master's degrees)

Check out some rules about presenting the language certifications here:

- https://www.scienze.unipd.it/en/courses/english-language/master-degree/2223/#c1713

These are the main professors:

CONTACT PERSONS Head of studies: prof. Paolo Baldan Vice Head of Studies: prof. Claudio Enrico Palazzi Study plan contact person: prof. Fabio Aiolli

How to enroll

- The general rules are listed here:
 - o https://www.unipd.it/avvisi-ammissione-lauree-magistrali (italian)
 - o https://www.unipd.it/avvisi-ammissione-lauree-magistrali-inglese (english)
- Check out the procedure and ending terms from:
 - o https://www.unipd.it/sites/unipd.it/files/2023/2023 Istruzioni magistrali V1.pdf

You first must go to the Uniweb site and completing the "Preimmatricolazione" (pre-enrollment procedure) part, so (rules in italian menu voices listed below):

- https://uniweb.unipd.it/Root.do
- Click on the hamburger menu, then select Didattica > Preimmatricolazione ad accesso libero >
 Laurea Magistrale > Computer Science and all the data should be listed there; here you can see the
 final score of you Bachelor if you already have one, otherwise, if you come from one another
 school, department, etc., you can list the courses passed singularly
 - o It's also listed the complete thing at page 1 (italian) or 7 (english) inside:
 - https://www.unipd.it/sites/unipd.it/files/2023/2023 Istruzioni magistrali V1.pdf
- In any case, select all the requirements listed here, to prove you can enroll
 - o https://apex.cca.unipd.it/pls/apex/f?p=272:1:16052251028418:::::&tz=2:00

After a few days, you receive the result from the teaching secretariat, saying you were "Eligible - Idoneo" or not; if you are, you should complete the "Immatricolazione" (enrollment procedure), so (rules in italian menu voices listed below):

- https://uniweb.unipd.it/Root.do
- Click on the hamburger menu, then select Didattica > Immatricolazione and complete all the procedure
 - o It's also listed the complete thing at page 7 (italian) or 14 (english) inside:
 - https://www.unipd.it/sites/unipd.it/files/2023/2023 Istruzioni magistrali V1.pdf

Now, if you were a student before at UniPD you should see a strange situation; infact, you should see a previous career at link "Altre carriere", where you graduated at a previous teaching course, and the course you are waiting for the enrollment procedure to complete.

Keep in mind that the procedure takes a few working days; after those, you should receive an email with all the necessary information (university matriculation number) and the first university fee of the year.

Keep also in mind that, to receive a tax reduction, you should present every year the ISEE for the Right to Study in College (Diritto Universitario); you should do it like this, and you can see all the rules inside of this:

https://www.unipd.it/isee (for international and english students)

Via Uniweb, you should do the "Richiesta di Agevolazioni", so (italian menu voices):

- https://uniweb.unipd.it/Root.do
- Click on the hamburger menu, then select Diritto allo studio, Disabilità/DSA, Corsi estivi > Richiesta di Agevolazioni and select the "Permetti all'INPS di recuperare i tuoi dati"

Study plan and courses

As stated from: https://informatica.math.unipd.it/en/master/study-plan/

A study plan must meet the following requirements.

- The total number of credits must be 120 ETCS or more, including 33 ETCS for the master's project
- It has to include
 - the following mandatory courses:
 - Computability (6 ETCS)
 - Advanced Algorithms (6 ETCS)
 - Economics and Management of Innovation (6 ETCS)
 - the B2 English language qualification, productive skills (3 ETCS)
 - at least one course (6 ETCS) in the group "Other elective courses" (see above)
- free choice courses for a total of 12 ETCS (typically two ^ ETCS courses, these can be chosen among the course units of all the Master's degrees of the University of Padua, including the Master's degree in Computer science).

A study plan is automatically approved when it includes a **Major**, i.e., it includes at least 4 course units from the groups AI, IMS and PLS (see above). The remaining 3 course units in computer science can be freely chosen between Majors and Minors. Plans that do not include a Major needs to be be discussed with a member of the Mentoring Committee before being presented.

The study plan must be submitted online by March of the second year of study.

It is recommended to define the study plan as soon as possible. On the official deadline the plan will be formalised in its bureaucratic aspects. You can contact the Mentoring Commission for any request on non-standard study plans and, in general, for any question you might have regarding the definition of the study plan.

Each academic year there are two periods for submitting the plans: one in autumn and one in spring. Deadline vary from year to year and will be communicated to students via e-mail and announcements on the website of the School of Sciences.

Study plans are submitted online on the UNIWEB platform. At the end of each period, the plans are evaluated and the response is notified to student. Students who did not get their plan approved will need to further modify it in a reserved time-frame.

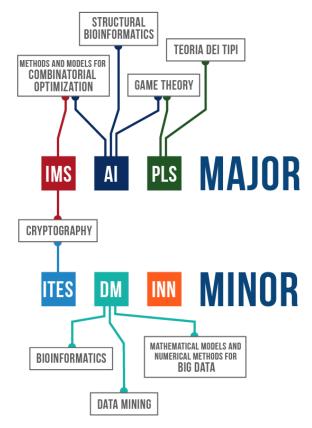
Erasmus students have to follow a special procedure for the definition of their plan, which they will submit in agreement with the Erasmus manager.

Specifically, let's talk about the bureaucratic structure of the Master. We have 120 credits in 2 years:

- 78 credits for courses (13 courses for 6 credits)
 - o 54 credits in Computer Science (9 ex.) [caratterizzanti]
 - o 12 credits for (2 ex.) in related fields (economics/math/bio/inf./theory) [affini]
 - o 12 credits for (2 ex.) in free-choice courses [liberi]
- 6 credits for other activities (seminars, internships)
- 3 credits for English B2 writing/speaking
- 33 credits for the master thesis project (one semester approximately)

These here are the "Other elective courses":

Courses in related fields with a natural connection with Majors and Minors.



One more elective course in the following group (CS related – "affini"), with natural connections to Majors/Minors

- Cryptography [IMS, ITES]
- Data mining [DM]
- Type theory [PLS]
- Game theory [AI, PLS]
- Bioinformatics [DM]
- Structural bioinformatics [AI]
- Mathematical models and numerical methods for big data [DM]
- Methods and models for combinatorial optimization [AI, IMS]

Also, 6 credits of "Other training activities", with rules listed here:

- https://stem.elearning.unipd.it/pluginfile.php/387913/mod_label/intro/Regulations-Other-Activities-Masters-Degree.pdf

So, to point this out:

- Three mandatory courses
 - Computability
 - o Advanced Algorithms
 - o Economics of Management and Innovation
- 7 additional CS courses "caratterizzanti" that need to be chosen

Advanced topics in computer and network security
Advanced topics in computer science
Advanced topics in programming languages
Artificial intelligence
Big Data Computing
Deep learning
Formal methods for cyberphysical systems
Functional languages
IT Service management
Knowledge representation and learning
Languages for concurrency and distribution
Machine learning
Mobile and IOT security
Mobile programming and multimedia
Process Mining
Real-time kernels and systems
Runtimes for concurrency and distribution
Software verification
Start-up in ICT
Vision and cognitive systems
Web information management
Wireless networks for mobile applications

These ones as said are organized in:

MAJORS

groups of 5 courses that deepen a thematic area

MINORS

groups of 3 courses with a specific focus

- 4 out of 5 courses of a Major you're interested in
- One from the "Other elective courses" listed above
- 3 credits of Oral B2
- 2 free choice courses from all the Master's degrees present, including this one of course (can be in Major or Minors, doesn't matter)

Free choice courses ["liberi"] (12 credits): chosen freely among the courses of all Master's Degree in Padua

- Coherence with the study plan
- Possibly (and typically) chosen among the courses of the Master's in Computer Science (CS or in CS related)

You fill find an unofficial but very good template of study plan here:

https://docs.google.com/document/d/1KKeVbj 22G6qgHtxQXVQluMV1ZtUgJtLloeNB3uUe9s

Another important thing:

- **6 credits of Other Training Activities**, where the full info can be found here:
 - o https://stem.elearning.unipd.it/course/view.php?id=4297

As a reference from the Welcome Day slides:

3+3 credits Other Activities

Altre conoscenze utili per il lavoro Tirocini formativi e di orientamento

- "StartUp Lab" minicourse, "ICT challenges"
- More details Non academic courses (e.g., "Soft Skills in Action Moodle
- **Short Internships** (coherent with the study plan)
- Service activities for the CS course (e.g. tutoring, revising lecture notes, etc.)
- Educational activities in computational thinking (es. CINI-MIUR initiative "Programma il Futuro" e CoderDojo)

Consider:

- The courses are in different semesters, so prepare it carefully and you will organize everything the way you want.
- Our Moodle pages for courses are here (then going inside "Computer Science"):
 - https://stem.elearning.unipd.it/course/index.php?categoryid=567
- A Moodle is basically the course page where you will have access to material, recordings in case, communications, etc.
 - Only you subscribe to a certain Moodle, you can have access to announcements aka mail from the teacher/recorded lessons (otherwise you will have no privileges to see)
- There you will select the single course and clicking the second button to Enroll in a course here, where is listed "Corso di Laurea"



- If you don't have the Moodle key, ask the teacher, classmates or the Telegram channels
 - o In case, sometimes the key works for some people, but not everyone for some reason; tell the teacher in case
- For each course, you can have reference from the FIUP group, made for all Computer Science related bachelors and masters here on Telegram:
 - o https://t.me/FIUPd
- You can also find each course group link from Telegram here (some are missing):
 - o https://t.me/fiup_menu
- We also have a dedicated group from Computer Science (refer here for courses missing):
 - o https://t.me/computerScienceUNIPD
- To have all the proper material for any course, highly advised to ask for the MEGA cloud, clicking the form here:
 - o https://goo.gl/forms/e1q9GhYeqwEh4uNn1
- There you will be accepted as soon as an admin will see your request; takes time (they all work, don't stress them out)
- Inside the following site, you can also check the timetables for each course:
 - o https://goo.gl/forms/e1q9GhYeqwEh4uNn1

Other useful things:

- MyUniPD app to see your marks and have general control of your UniPD career
- Orari UniPD to have a profile with all the courses timetables in a single app
- DM Math UniPD to also check the Department classrooms availability
 - o Also visible here for Aule Studio (classrooms made for studying, more info online):
 - https://agendastudentiunipd.easystaff.it/index.php?view=aulestudio&include=aule studio& lang=it
 - o And here for all classrooms:
 - https://agendastudentiunipd.easystaff.it/index.php?view=rooms&include=rooms& _lang=it

Courses type for semesters

As of the syllabus present here: https://www.didattica.unipd.it/off/2023/LM/SC/SC2598

You can also have a comprehensive view here: https://informatica.math.unipd.it/en/master/courses/

Inside of here, usually, you also find the STEM Moodle needed to have access to each course material and stuff.

First semester – First Year:

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There is also an additional CS course "Advanced topics in Computer Science", held by international professors, container for advanced topics and which content changes every year (counts for Other training activities)

Second semester – First Year:

COMUNE	SCQ1098249	ADVANCED ALGORITHMS Info e programma A A. 2023/24	6	I Anno (2023/24)	Secondo semestre	ENG	MICHELE SCQUIZZATO
COMUNE	6003104061	ADVANCED TOPICS IN COMPUTER SCIENCE: PROBABILISTIC AND STATISTICAL	6	I Anno	Secondo	ENG	
COMOINE	3003104001	VERIFICATION	0	(2023/24)		LINO	
		✓ Info e programma A.A. 2023/24		(2020/21)	Semestre		
COMUNE	CCD7070207	BIG DATA COMPUTING	6	I Anno	Secondo	ENG	ANDREA
COMONE	3011019291	▼ Info e programma A.A. 2023/24	0	(2023/24)		ENG	ALBERTO
		= IIIO C programma A.A. 2020/24		(2020/24)	Scilicatio		PIETRACAPRINA
COMUNE	SC01111799	DATA MINING	6	I Anno	Secondo	ENG	LIVIO FINOS
COMONE	3001111788	▼ Info e programma A.A. 2023/24	U	(2023/24)		LINO	<u>EIVIOTINOS</u>
COMUNE	CCD0007E64	· · ·	6			ENC	AL ESCANDED
COMUNE	SCP9087561	DEEP LEARNING (Ult. numero di matricola dispari) Info e programma A.A. 2023/24	ь	I Anno (2023/24)	Secondo	ENG	ALESSANDRO SPERDUTI
00141415						5110	
COMUNE	SCP9087561	DEEP LEARNING (Ult. numero di matricola pari) Info e programma A.A. 2023/24	6	I Anno (2023/24)	Secondo	ENG	ALESSANDRO SPERDUTI
						E110	SPERDUII
COMUNE	SCQ0093638	IT SERVICE MANAGEMENT	6	I Anno	Secondo	ENG	
		<u>■ Info e programma A.A. 2023/24</u>		(2023/24)			
COMUNE	SCQ0093643	KNOWLEDGE REPRESENTATION AND LEARNING	6	I Anno	Secondo	ENG	ROBERTO
		<u>■ Info e programma A.A. 2023/24</u>		(2023/24)	semestre		CONFALONIERI
COMUNE	SCQ1098228	LANGUAGES FOR CONCURRENCY AND DISTRIBUTION	6	I Anno	Secondo	ENG	PAOLO BALDAN
		<u>■ Info e programma A.A. 2023/24</u>		(2023/24)	semestre		
COMUNE	SCP7079406	MATHEMATICAL MODELS AND NUMERICAL METHODS FOR BIG DATA	6	I Anno	Secondo	ENG	WOLFGANG
		<u>■ Info e programma A.A. 2023/24</u>		(2023/24)	semestre		ERB
COMUNE	SCP7080184	MOBILE PROGRAMMING E MULTIMEDIA	6	I Anno	Secondo	ENG	OMBRETTA
		<u>■ Info e programma A.A. 2023/24</u>		(2023/24)	semestre		<u>GAGGI</u>
COMUNE	SCQ3102344	NATURAL LANGUAGE PROCESSING	6	I Anno	Secondo	ENG	
		<u>■ Info e programma A.A. 2023/24</u>		(2023/24)	semestre		
COMUNE	SCQ0093641	REAL-TIME KERNELS AND SYSTEMS	6	I Anno	Secondo	ENG	TULLIO
		<u>Implication of the programma A.A. 2023/24</u>		(2023/24)	semestre		VARDANEGA
COMUNE	SCQ0089517	SECURITY AND RISK: MANAGEMENT AND CERTIFICATIONS	6	I Anno	Secondo	ENG	
		▼ Info e programma A.A. 2023/24		(2023/24)	semestre		
COMUNE	SCQ3104063	SELECTED TOPICS IN ALGORITHMS	6	I Anno	Secondo	ENG	
		<u>■ Info e programma A.A. 2023/24</u>		(2023/24)	semestre		
COMUNE	SCP7080377	START-UP IN ICT	6	I Anno	Secondo	ENG	
		■ Info e programma A.A. 2023/24		(2023/24)	semestre		
COMUNE	SCP7079278	STRUCTURAL BIOINFORMATICS	6	I Anno	Secondo	ENG	<u>DAMIANO</u>
		<u>■ Info e programma A.A. 2023/24</u>		(2023/24)	semestre		PIOVESAN
COMUNE	SCQ1098250	TYPE THEORY	6	I Anno	Secondo	ENG	
		■ Info e programma A.A. 2023/24		(2023/24)	semestre		

It's advised from the Welcome Day slides to follow this road:

- 1st year
 - o 1st semester (5 courses)
 - o 2nd semester (5 courses)
- 2nd year
 - o 1st semester (5 courses)
 - o 2nd semester (Master project)

Keep in mind you can do whatever you want (follow as many courses as you like). No one forces you to do anything, as you can see from the structure of this degree, it's almost completely free. But this is strictly advised to not go insane and to have somewhat of an order to try your best.

English Language B2

Reference site: https://www.scienze.unipd.it/en/courses/english-language/master-degree

3 credits English Language B2 productive skills

- Managed by CLA (UNIPD Language Centre)
- No exam for students who have a certificate for the same level
- If no certificate, you can take a test at CLA (already in October)
- Courses organised by CLA
- Informations at this link (School of Science)
 https://www.scienze.unipd.it/en/courses/english-language/master-degree

This part is written because of the three credits we must recognize the needed B2 Speaking part. You can take this exam whenever you want, just before the graduation of course. You won't speak to people, it will be only you recording to a PC according to the test structure below.

Remember or notice that, if you have a certification, you can have it recognized officially via the rules listed here: https://cla.unipd.it/test-linguistici/certificazioni/

Concretely, as said inside: https://www.scienze.unipd.it/inglese-lm-2223/

- We do have to take an oral test to pass, having it booked inside the CLA website. Here you will find more information about a preparatory course (not mandatory to take the exam):
 - o https://cla.unipd.it/attivita/corsi/corso-tal-b2-speaking/
- Here you can effectively see a mock of the oral test here:
 - o https://elearning.unipd.it/cla/course/view.php?id=1723

The test, as reported, has this structure: fundamentally, it's a Moodle test in which you record text and talk for a while, summarizing or just talking.

This test is divided into three parts and requires a total of 17 minutes to complete. You have a total of 25 minutes available to allow for uploading recordings. The remaining time is displayed at the top of your page. It is essential that **you speak for the full amount of time** given for each task. Recordings which are shorter than the required time will not be evaluated and the test annulled.

You may take notes on a piece of paper.

The parts are:

- PART 1 - INTRODUCTION

You will have 1 minute to prepare and then you must speak for 2 minutes, answering the questions about yourself.

- PART 2 - SUMMARY & PERSONAL OPINION

You will be given a text to read and an audio to listen to. You will be asked to summarise the reading and listening texts.

You will have 8 minutes to prepare and then you must speak for 3 minutes

- PART 3 - VOICE MESSAGE

You will have 2 minutes to prepare and then you must speak for 1 minute, describing the problem given and asking appropriately for help.

One thing to note is that, as can be seen from the video available on the Moodle mock test page above, each time you recorded something, you must listen for it and downloading it, just to see if it worked. When you take the test, the examiners, which will repeat twice instructions in Italian and English, will tell you this. First, they will tell you the exam structure, the Moodle password, they will give you a piece of paper to take notes and the exam is just that.

Inside of: https://cla.unipd.it/test-linguistici/date-tal/

- you should check the dates for "TAL B2 Orale (computer-based)" or "TAL B2 Oral Test", in which you
 will do the test, booking in a proper Moodle the date you want to pass the English Exam and taking
 the credits.
- After one/two weeks you should receive the result of the exam. Then, inside your UniPD mail you
 will receive the proper Open Badge and your credits will soon be registered inside your record book
 (libretto)

Master Thesis

This one goes for 33 CFU, quite a lot.

33 credits are devoted to the master thesis, roughly split into 27 credits (675 hours, corresponding to about 5 months of work) for the thesis project and 6 credits (150 hours, corresponding to about one month of work) for the drafting of the thesis document. The master thesis project is carried out under the guidance of a teacher of the Master's programme.

A thesis project is a significant work, in terms of breadth and depth, which allows you to become familiar with advanced themes in computer science. It typically leads to the **development of original research results or innovative software products**.

There are various ways of carrying out the thesis project:



Internal Project

The student works under the guidance of an academic supervisor, who guides him in identifying the thesis topic, developing the project and drafting the thesis.



Internal Project with Start-Up View

This is a variant of the internal project, in which the student or group of students, in addition to developing the technical aspects of the project carries out a preliminary study on evolving the project into a start-up, with the support of a partner incubator.



Project with company internship

The student carries out the thesis project, entirely or for a relevant part, in a company or in a start-up.

The supervisor is complemented by a company tutor, who guides and supervises the student's work in the company.

As also listed from

To stimulate thesis projects with Startup-View and Internships, the course of study organizes Company-student meetings with the support of the partners.

When to start and how to find a supervisor

The Master Thesis is the concluding activity of the study path. Since it is intended to lead to the realization of a relevant piece of work, it requires the student to work regularly and with limited distractions. For these reasons, the Master Project should be started after finishing the course exams or, at least, when the number

of course exams still to be given is limited (say, 2/3 at most). Ideally, this should happen at the beginning of the second semester of the second year (but in case you are late with the exams, first concentrate on them).

When you feel ready to start, the first step consists in finding a supervisor (this applies also to the case in which you might be interested in realising your project in a company). There is no formalized procedure for this: simply contact the professors of the courses that you liked most and/or in the area where you'd like to realise your project and discuss the possible thesis themes.

- Evaluation of the Master Thesis (from July 2023)

The final degree grade is calculated as the sum of the master thesis grade and the weighted average of the exams passed, normalized on a scale of 0 to 110 (i.e., average * 110/30).

The master thesis is evaluated according to the following grading scheme:

- 0-3: sufficient
- 4-5: good
- 6-7: very good
- 8-9: excellent (requires the opinion of an independent reviewer)

The supervisor proposes a grade, possibly asking for the opinion of an independent reviewer. The student presents the thesis in front a graduation committee (the discussion is in English). The final grade is decided by the graduation committee through a majority vote. The distinction (laude) is awarded to students who demonstrated very good or excellent quality in the curriculum, in the thesis, and in the final thesis defense; it requires unanimity.

The following bonus points are added to the thesis grade:

- 1 point for completing all exams by July of the second year
- 1 point for graduation by December of the second year

More details on:

https://informatica.math.unipd.it/files/RegolamentoTesiMagistrale-EN-2023.pdf