

Facultad de Informática

Grading System



*Description of the Qualification System,
Marks and Grading Mechanism in the
Faculty*



Grading System

*Facultad de Informática – Universidad
Politécnica de Madrid*

Overview of the Grading System

Qualification marks in Spain, as in many European Higher Education Institutions, are subjective absolute grades, rather than relative rankings, like qualification schemas in US. This means that the qualification marks are given according to an absolute evaluation of the student's performance in a general scope, not compared with rest of the students in the same subject. This leads to a grading system without a related comparison among the students in the same year, but with a comparative scale of the students of several courses.

This document provides a general overview of the Facultad and the Graduate Degree it grants, as well as the grading system in Spain, specially focused at the one implemented in our institution. As subjective absolute scale, there is no mechanism to balance the qualification marks themselves. To complement this evaluation schema, in this document we provide few additional information, based on historical records, to manage the ranks from a given student.

General overview of the Facultad de Informática

Introducing Facultad de Informática

The Facultad de Informática is one of the 19 engineering schools of Universidad Politécnica de Madrid, and was founded in 1976 from the former Instituto de Informática. In 1988 Facultad de Informática moved to **Campus de Montegancedo** 20 km West from downtown. The Facultad is divided into four main departments, a departmental section, and an intercampus department:

- Computer Architecture and Technology (**DATSI**)
- Artificial Intelligence (**DIA**)
- Languages, Computer Systems and Software Engineering (**DLSIIS**)
- Applied Mathematics (**DMA**)
- Photonic Technology (**DTF**). Departmental Section.
- Linguistics Applied to Science and Technology (**DLACT**). Intercampus Department.



Description of the Facultad de Informática

What is a *Facultad* (Faculty) in Spain? The notion of Facultad and Department is slightly different at the Universidad Politécnica de Madrid, and in Spain in general, than at other universities and may be confusing at first.

At a Facultad or School in Universidad Politécnica de Madrid (UPM) the number of students is very high – close to 2500 in the case of Facultad de Informática- and so is the number of academic staff – around 180 professors and lecturers. Therefore, instead of having a single very large Computer Science Department, as would be the case in many other Universities, UPM has one School –Facultad– with several Departments. Each Department is in charge of the teaching and practical training concerning a given area of disciplines. And these disciplines are all related to one and the same degree –**Ingeniero en Informática**, equivalent to an MSc in Computer Sciences in the European High Education Standards, which is awarded by the Facultad de Informática. This degree is divided into two cycles: first and second, both being developed at the Facultad de Informática.

Graduate Degrees Offered at the Facultad de Informática

Ingeniero en Informática. As mentioned before it consists of two cycles: first cycle with an academic development in two yearly courses: *primer curso* and *segundo curso*, and second cycle with an academic duration of three yearly courses: *tercer curso*, *cuarto curso* and *quinto curso*. At the end of the second cycle the student is committed to develop a *Proyecto Fin de Carrera* (Final Term Project), writing and defending a Final Term Dissertation.

Detailed Structure of the Degree of “Ingeniero en Informática”

The program is based on a five-year program and a Final Term Project and, because of its extension and content, it is usually compared with foreign degrees as a **combined Bachelors+Masters of Sciences degree**.

The first two years are **common** to almost all students, and they are intended to provide a broad base of computer science engineering by covering the major subjects of computing engineering in depth.

The last three years are focused on more specialized subjects and students are given the chance to match their abilities to their interests by providing a range of **optional** subjects, from which they have to choose **a given number of credits** each year.

The last step to get their degree is the **Final Term Project**, which normally involves not only application development but also some research work. Students undertake this research project at a company or at a departmental laboratory and submit a dissertation in about 6 to 9 months.



ECTS Credit System and its application in FI-UPM

The European Credit Transfer System (ECTS) is partially implemented at Facultad de Informática. It is used for Course Commitment Load estimations, and for Record Transcript interchanges with other Universities within the Erasmus Programme.

Some words have to be said on how Facultad de Informática estimates the equivalence between ECTS and UPM credits. An UPM credit is evaluated having into consideration lecturing time. If the number of hours a course is devoted to lecturing and works at the classroom is n the equivalent number of UPM credits is $n/10$, as a credit is equivalent to **10 lecturing hours**. On the other hand it is admitted that the maximum number of ECTS credits per academic year should not surpass 60. As the ECTS credit is evaluated from an equivalent of **10 working hours**, a UPM credit is equivalent to **1.5 ECTS credits** to have into account an overhead of 50% personal workload.

Course Structure Diagram

The degree is structured into five Academic Years. Each student is supposed to follow a total number of credits per year given in the table below:

Yearly Courses	Compulsory Credits (UPM/ECTS)	Optional Credits (UPM/ECTS)	Free Choice Credits (UPM/ECTS)	Total
1 st Course	63/94	0/0	9/13.5	72/108
2 nd Course	75/112	0/0	0/0	75/112
3 rd Course	54/81	15/22.5	9/23.5	78/117
4 th Course	48/72	19.5/29.5	10.5/15.5	78/117
5 th Course	33/50	28.5/42.5	10.5/15.5	78/117

A total number of 15 Free Choice UPM Credits (22.5 ECTS) may be taken within a programme of practical work in an institution outside UPM, such in Industry or a Research Institution. A Final Term Project for the total amount of 6 UPM Credits (9 ECTS) credits is compulsory to obtain the final degree.

Course Development and Examinations

Most courses are **quarterly** except some few ones, which are **annual**. The year is divided into **two terms or semesters**, the first one starting the last week of September to the last week of January with a break of two weeks for Xmas. The second one starts the last week of February to the last week of May with a break of one week for Passover. At the end of each term, during the three first weeks of February and in June, there are examinations given for each course concerning the material covered during that quarter. For annual courses there are three examination sessions: one ordinary in June, and two extraordinary in September and February,



although students can only do examinations in two sessions out of the three possible ones. For quarterly courses there are two examination sessions: one ordinary at the end of the quarter (either February or June) and one extraordinary in September.

Grading System

Grading system in Spain is ranked from 0 to 10 points, being 5 the minimum qualifications to pass a given subject. Marks below these 5 points are considered unsuccessful terms and the subject should be examined again for the next semester. In order to be granted with the degree of Ingeniero en Informática the students should pass (get 5 or more points) in all the Compulsory Courses and also in a number of Optional and Free Choice Courses to cover the minimum credits mentioned above. This qualification schema is also followed by the evaluation of the Final Term Project, which is also mandatory.

Together with the marks ranked from 0 to 10, there is also a qualitative label, which is also included in the grading system.

<i>From (>=)</i>	<i>To (<)</i>	<i>Label</i>
0	5	Suspenso / Not Passed
5	7	Aprobado / Passed
7	9	Notable / Good
9	10	Sobresaliente / Very Good
10	10	Matrícula de Honor / With Honours

The qualification of “Matricula de Honor” is a very special honour granted only to the students with the best marks (10 out of 10 points). This special label can only awarded to the top 5% of the students in a given course. Although there are only 5% of the students who can get this grant, in practice there are few less than this theoretical 5% limit (from 1% to 2% indeed) for these nominations. Any student with this special performance honour can be considered as **highly outstanding** in the matter of the course.

Qualification Grades of UPM compared with other Universities in Spain

The Universidad Politécnica de Madrid is one of the best institutions in Spain in Engineering Studies. In particular Facultad de Informática has been referred as the best School in Spain in Computer Science/Computer Engineering (see <http://www.fi.upm.es> for further details). In Europe, our University is also considered one of the best Higher Education Institutions, being member of several education networks of excellence, like ATHENS, SEFI, ETF, TEMPUS, and others.

The marks obtained by the students from our university should be considered with the standards of quality of our university. Although other universities could use the same grading system (in Spain), the amount of effort and the performance demanded to the students in our institution is quite exigent, as the statistics below show. If the qualifications would be considered compared with other universities, please take into account this exigency level.



Statistics of the Grading System

These statistics are computed as the percentage of students attending all the courses (Compulsory and the others) that have obtained each of these labelled qualifications.

In order to be as updated as possible, these data have been computed using the ordinary examination session of all the courses in the year 2003/2004. These data have been calculated with a population of 12636 evaluations.

<i>Label</i>	<i>Percentage</i>	<i>Aggregated¹</i>
<i>Matricula de Honor</i>	0,66%	0,66%
<i>Sobresaliente</i>	4,26%	4,92%
<i>Notable</i>	13,19%	18,11%
<i>Aprobado</i>	21,69%	39,81%
<i>Suspense²</i>	60,19%	100,00%

¹ This value actually means the percentage of students with this grade or better.

² This item also includes students that do not try the final examination, thus they do not pass the course.



Annexe

List of Courses and General Syllabus

FIRST COURSE

Code	Subject	Category	Type	Cred. UPM	Cred. ECTS
130	Infinitesimal Calculus	Compulsory	Annual	15	22.5
131	Programming Methodology	Compulsory	Annual	15	22.5
132	Discrete Mathematics	Compulsory	Quarterly (1Q)	7.5	11
133	Physical Foundations of Informatics	Compulsory	Quarterly (1Q)	7.5	11
134	Linear Algebra	Compulsory	Quarterly (2Q)	7.5	11
135	Foundations of Computer Hardware	Compulsory	Quarterly (2Q)	7.5	11
136	Formal Logic	Compulsory	Quarterly (2Q)	3	4.5

SECOND COURSE

Code	Subject	Category	Type	Cred. UPM	Cred. ECTS
200	Theoretical Informatics	Compulsory	Annual	9	13.5
201	Probability and Statistics	Compulsory	Quarterly (1Q)	6	9
202	Computer Technology	Compulsory	Quarterly (1Q)	4.5	6.5
203	Computer Structure	Compulsory	Quarterly (1Q)	9	13.5
204	Data Structures I	Compulsory	Quarterly (1Q)	6	9
205	Mathematical Analysis	Compulsory	Quarterly (1Q)	7.5	11
206	Data Structures II	Compulsory	Quarterly (2Q)	7.5	11
207	Systematic Program Development	Compulsory	Quarterly (2Q)	4.5	6.5
208	Operating Systems	Compulsory	Quarterly (2Q)	6	9
209	Computer Structure Laboratory	Compulsory	Quarterly (2Q)	6	9
210	Statistical Inference	Compulsory	Quarterly (2Q)	4.5	6.5
211	Computational Logics	Compulsory	Quarterly (2Q)	4.5	6.5

THIRD COURSE

Code	Subject	Category	Type	Cred. UPM	Cred. ECTS
300	Numerical Calculus	Compulsory	Annual	10.5	15.5
301	Operations Research	Compulsory	Annual	10.5	15.5
302	Computer Networks	Compulsory	Quarterly (1Q)	9	13.5
303	Computer Architecture	Compulsory	Quarterly (1Q)	9	13.5
304	Concurrent Programming	Compulsory	Quarterly (1Q)	4.5	6.5
305	English for Informatics I	Compulsory	Quarterly (2Q)	6	9
306	Program Development Model	Compulsory	Quarterly (2Q)	4.5	6.5
307	Digital System Design	Optional	Quarterly (1Q)	6	9
308	Geometric Techniques	Optional	Quarterly (1Q)	6	9
309	Enterprise Organisation and Management	Optional	Quarterly (1Q)	4.5	6.5
310	Complex Analysis	Optional	Quarterly (1Q)	6	9
311	Microcontroller Design	Optional	Quarterly (2Q)	6	9
312	Semiconductor Materials and Electronic Devices	Optional	Quarterly (1Q)	9	13.5
313	Logic Design Structuring	Optional	Quarterly (2Q)	6	9
314	Introduction to Economics	Optional	Quarterly (2Q)	4.5	6.5
315	Graph Theory	Optional	Quarterly (2Q)	4.5	6.5
316	Theory of Curves and Surfaces	Optional	Quarterly (2Q)	4.5	6.5



317	Logic Programming	Optional	Quarterly (2Q)	6	9
318	Information Theory	Optional	Quarterly (2Q)	6	9

FOURTH COURSE

Code	Subject	Category	Type	Cred. UPM	Cred. ECTS
400	Software Engineering I	Compulsory	Annual	9	13.5
401	Artificial Intelligence	Compulsory	Annual	9	13.5
402	Compilers	Compulsory	Annual	9	13.5
403	Network Architectures	Compulsory	Quarterly (1Q)	4.5	6.5
404	Operating System Design	Compulsory	Quarterly (1Q)	9	13.5
405	Data Bases	Compulsory	Quarterly (2Q)	7.5	11
406	VLSI Design	Optional	Annual	9	13.5
408	Process Control	Optional	Quarterly (1Q)	9	13.5
409	Computer Design and Evaluation	Optional	Quarterly (1Q)	6	9
410	Fractal Geometry	Optional	Quarterly (1Q)	6	9
411	Digital Signal Processing	Optional	Quarterly (1Q)	6	9
412	Numerical Method Optimisation	Optional	Quarterly (1Q)	6	9
413	Declarative Programming	Optional	Quarterly (1Q)	4.5	6.5
414	Pattern Recognition	Optional	Quarterly (1Q)	6	9
415	English for Informatics II: Reading and Comprehension of Computer Science Texts	Optional	Quarterly (1Q)	6	9
416	Computational Geometry	Optional	Quarterly (1Q)	6	9
417	Real Time Systems	Optional	Quarterly (2Q)	6	9
418	Architectures with Inner Parallelism	Optional	Quarterly (2Q)	7.5	11
419	Distributed Operating Systems	Optional	Quarterly (2Q)	9	13.5
420	Instrumentation and Data Acquisition	Optional	Quarterly (2Q)	6	9
421	Cryptography: Systems and Protocols	Optional	Quarterly (2Q)	6	9
422	Wideband Data Networks	Optional	Quarterly (2Q)	6	9
423	Graphical Techniques	Optional	Quarterly (2Q)	6	9
424	Programming Environment	Optional	Quarterly (2Q)	4.5	6.5
425	Simulation Methods	Optional	Quarterly (2Q)	6	9
426	Extensions of Logic Programming	Optional	Quarterly (2Q)	6	9
427	Connexionist Artificial Intelligence: Neural Networks	Optional	Quarterly (2Q)	6	9
428	Writing Techniques for Computer Science Technical Texts in English	Optional	Quarterly (2Q)	6	9
429	Introduction to Dynamic Systems	Optional	Quarterly (2Q)	4.5	6.5

FIFTH COURSE

Code	Subject	Category	Type	Cred. UPM	Cred. ECTS
500	Informatic Systems	Compulsory	Annual	15	22.5
501	Knowledge Engineering	Compulsory	Quarterly (1Q)	6	9
502	Software Engineering II	Compulsory	Quarterly (1Q)	12	18
503	Computability Theory	Optional	Annual	9	13.5
504	Reasoning Models	Optional	Annual	9	13.5
505	Multiprocessor Architectures	Optional	Quarterly (1Q)	6	9
506	Integration-Oriented Architectures	Optional	Quarterly (2Q)	9	13.5
507	Information Protection	Optional	Quarterly (1Q)	6	9
508	Deductive Data Bases	Optional	Quarterly (1Q)	6	9
509	Distributed Data Bases	Optional	Quarterly (1Q)	6	9
510	Engineering of Communication Protocols	Optional	Quarterly (2Q)	6	9
511	Distributed Systems: Communication Architectures	Optional	Quarterly (2Q)	6	9
512	Numeric Modelling for Engineering	Optional	Quarterly (1Q)	6	9



513	Decision Support Systems	Optional	Quarterly (1Q)	6	9
514	Optoelectronic Technology and Systems for Informatics	Optional	Quarterly (1Q)	4.5	6.5
515	Natural Language	Optional	Quarterly (1Q)	6	9
516	The Computer Science Function in the Enterprise	Optional	Quarterly (1Q)	4.5	6.5
517	Information Systems Evaluation	Optional	Quarterly (1Q)	6	9
518	Techniques for Spoken Presentation of Computer Science Topics and Conversation in the Professional Environment	Optional	Quarterly (2Q)	6	9
519	Design of Discrete Control Systems	Optional	Quarterly (1Q)	4.5	6.5
520	Scientific Computation Techniques	Optional	Quarterly (1Q)	4.5	6.5
521	Fault-Tolerant Computing	Optional	Quarterly (2Q)	6	9
523	Architec. for Signal and Image Processing	Optional	Quarterly (2Q)	9	13.5
524	Deepening in Software Engineering	Optional	Quarterly (2Q)	6	9
525	Object-Oriented Data Bases	Optional	Quarterly (2Q)	6	9
526	Design, Planning and Management of Data Communication Systems	Optional	Quarterly (2Q)	6	9
527	Techniques for Solid Modelling, Realism and Animation	Optional	Quarterly (2Q)	6	9
528	Vector and Parallel Processing	Optional	Quarterly (2Q)	7.5	11
529	Cognitive Science	Optional	Quarterly (2Q)	6	9
530	Robotics and Computational Perception	Optional	Quarterly (2Q)	6	9
531	Validation of Knowledge-Based Systems	Optional	Quarterly (2Q)	6	9
532	Automatic Learning	Optional	Quarterly (2Q)	6	9
533	Informatic Auditing	Optional	Quarterly (2Q)	4.5	6.5
534	Practical Project: Building a Software System	Optional	Quarterly (2Q)	6	9

FREE CHOICE SUBJECTS

Code	Subject	Recomm.	Type	Cred. UPM	Cred. ECTS
600	General Informatics*	1 st Course	Quarterly (1Q)	9	13.5
601	Mathematics Laboratory*	1 st Course	Quarterly (1,2Q)	4.5	6.5
602	French for Beginners*	1 st Course	Quarterly (1,2Q)	4.5	6.5
603	English Laboratory*	1 st Course	Quarterly (1,2Q)	4.5	6.5
604	Recreational Mathematics*	1 st Course	Quarterly (1,2Q)	4.5	6.5
605	Personal Computer Laboratory*	2 nd Course	Quarterly (2Q)	4.5	6.5
606	Programming Fundamentals for Operating Systems*	2 nd Course	Quarterly (1Q)	6	9
607	Domotics and Intelligent Buildings*	3 rd Course	Quarterly (2Q)	4.5	6.5
608	Administration in Windows 2000*	4 th Course	Quarterly (2Q)	6	9
609	Image Analysis and Processing in Teledetection*	4 th Course	Quarterly (1Q)	4.5	6.5
611	Professional Aspects of Software Engineering*	4 th Course	Quarterly (1Q)	4.5	6.5
612	Mathematical Structures of Neural Networks*	3 rd Course	Quarterly (2Q)	4.5	6.5
613	Digital Speech Processing*	4 th Course	Quarterly (2Q)	4.5	6.5
614	History of Computing*	4 th Course	Quarterly (2Q)	4.5	6.5
617	Frontiers of Science*	4 th Course	Quarterly (1Q)	4.5	6.5
620	Electronic Commerce*	5 th Course	Quarterly (1Q)	4.5	6.5
621	CRM and Enterprise Intelligence*	5 th Course	Quarterly (2Q)	4.5	6.5
623	Digital System Design	3 rd Course	Quarterly (1Q)	6	9
624	Geometric Techniques	3 rd Course	Quarterly (1Q)	6	9
625	Enterprise Organization and Management	3 rd Course	Quarterly (1Q)	4.5	6.5



626	Complex Analysis	3 rd Course	Quarterly (1Q)	6	9
627	Microcontroller Design	3 rd Course	Quarterly (2Q)	6	9
628	Semiconductor Materials and Electronic Devices	3 rd Course	Quarterly (1Q)	9	13.5
629	Logic Design Structuring	3 rd Course	Quarterly (2Q)	6	9
630	Introduction to Economics	3 rd Course	Quarterly (2Q)	4.5	6.5
631	Graph Theory	3 rd Course	Quarterly (2Q)	4.5	6.5
632	Theory of Curves and Surfaces	3 rd Course	Quarterly (2Q)	4.5	6.5
633	Logic Programming	3 rd Course	Quarterly (2Q)	6	9
634	Information Theory	3 rd Course	Quarterly (2Q)	6	9
635	VLSI Design	4 th Course	Annual	9	13.5
637	Process Control	4 th Course	Quarterly (1Q)	9	13.5
638	Computer Design and Evaluation	4 th Course	Quarterly (1Q)	6	9
639	Fractal Geometry	4 th Course	Quarterly (1Q)	6	9
640	Digital Signal Processing	4 th Course	Quarterly (1Q)	6	9
641	Numerical Method Optimization	4 th Course	Quarterly (1Q)	6	9
642	Declarative Programming	4 th Course	Quarterly (1Q)	4.5	6.5
643	Pattern Recognition	4 th Course	Quarterly (1Q)	6	9
644	English for Informatics II: Reading and Comprehension of Computer Science Texts	4 th Course	Quarterly (1Q)	6	9
645	Computational Geometry	4 th Course	Quarterly (1Q)	6	9
646	Real Time Systems	4 th Course	Quarterly (2Q)	6	9
647	Architectures with Inner Parallelism	4 th Course	Quarterly (2Q)	7.5	11
648	Distributed Operating Systems	4 th Course	Quarterly (2Q)	9	13.5
649	Instrumentation and Data Acquisition	4 th Course	Quarterly (2Q)	6	9
650	Cryptography: Systems and Protocols	4 th Course	Quarterly (2Q)	6	9
651	Wideband Data Networks	4 th Course	Quarterly (2Q)	6	9
652	Graphical Techniques	4 th Course	Quarterly (2Q)	6	9
653	Programming Environment	4 th Course	Quarterly (2Q)	4.5	6.5
654	Simulation Methods	4 th Course	Quarterly (2Q)	6	9
655	Extensions of Logic Programming	4 th Course	Quarterly (2Q)	6	9
656	Connexionist Artificial Intelligence: Neural Networks	4 th Course	Quarterly (2Q)	6	9
657	Writing Techniques for Computer Science Technical Texts in English	4 th Course	Quarterly (2Q)	6	9
658	Introduction to Dynamic Systems	4 th Course	Quarterly (2Q)	4.5	6.5
659	Computability Theory	5 th Course	Annual	9	13.5
660	Reasoning Models	5 th Course	Annual	9	13.5
661	Multiprocessor Architectures	5 th Course	Quarterly (1Q)	6	9
662	Integration-Oriented Architectures	5 th Course		9	13.5
663	Information Protection	5 th Course	Quarterly (1Q)	6	9
664	Deductive Data Bases	5 th Course	Quarterly (1Q)	6	9
665	Distributed Data Bases	5 th Course	Quarterly (1Q)	6	9
666	Engineering of Communication Protocols	5 th Course	Quarterly (2Q)	6	9
667	Distributed Systems: Communication Architectures	5 th Course	Quarterly (2Q)	6	9
668	Numeric Modelling for Engineering	5 th Course	Quarterly (1Q)	6	9
669	Decision Support Systems	5 th Course	Quarterly (1Q)	6	9
670	Optoelectronic Technology and Systems for Informatics	5 th Course	Quarterly (1Q)	4.5	6.5
671	Natural Language	5 th Course	Quarterly (1Q)	6	9
672	The Computer Science Function in the Enterprise	5 th Course	Quarterly (1Q)	4.5	6.5
674	Techniques for Spoken Presentation of Computer Science Topics and Conversation in the Professional Environment	5 th Course	Quarterly (2Q)	6	9



675	Design of Discrete Control Systems	5 th Course	Quarterly (1Q)	4.5	6.5
676	Scientific Computation Techniques	5 th Course	Quarterly (1Q)	4.5	6.5
677	Fault-Tolerant Computing	5 th Course	Quarterly (2Q)	6	9
679	Architectures for Signal and Image Processing	5 th Course	Quarterly (2Q)	9	13.5
681	Object-Oriented Data Bases	5 th Course	Quarterly (2Q)	6	9
682	Design, Planning and Management of Data Communication Systems	5 th Course	Quarterly (2Q)	6	9
683	Techniques for Solid Modelling, Realism and Animation	5 th Course	Quarterly (2Q)	6	9
684	Vector and Parallel Processing	5 th Course	Quarterly (2Q)	7.5	11
685	Cognitive Science	5 th Course	Quarterly (2Q)	6	9
686	Robotics and Computational Perception	5 th Course	Quarterly (2Q)	6	9
687	Validation of Knowledge-Based Systems	5 th Course	Quarterly (2Q)	6	9
688	Automatic Learning	5 th Course	Quarterly (2Q)	6	9
689	Informatic Auditing	5 th Course	Quarterly (2Q)	4.5	6.5
691	Design of WEB Services*	5 th Course	Quarterly (1Q)	6	9
692	Fundamentals of Automatic Speech Recognition*	4 th Course	Quarterly (1Q)	4.5	6.5
693	Implementation of Real-Time Speech Processing Algorithms on DSP Platforms*	4 th Course	Quarterly (2Q)	4.5	6.5
694	Computer Science Implications on the Environment*	5 th Course	Quarterly (2Q)	3	4.5
695	Video Conferencing* **	1 st and 2 nd cycles	Quarterly (1,2Q)	6 (max.)	9 (max.)
696	Introduction to Space Technology*	3 rd Course	Quarterly (1Q)	3	4.5
697	Mathematical Techniques for Computer Science Project Management*	3 rd Course	Quarterly (1Q)	4.5	6.5
698	Graphical Techniques for Planning*	3 rd Course	Quarterly (1Q)	4.5	6.5
699	Personal Software Development I*	4 th Course	Quarterly (1Q)	4.5	6.5
700	Logic and Algebraic Verification of Computer Systems*	4 th Course	Quarterly (1Q)	4.5	6.5
701	Personal Software Development II*	4 th Course	Quarterly (2Q)	4.5	6.5
702	Collaborative Work Focussing*	5 th Course	Quarterly (2Q)	4.5	6.5
703	Digital Image Processing*	4 th Course	Quarterly (2Q)	3	4.5
704	Multimedia Programming*	4 th Course	Quarterly (1Q)	4.5	6.5



Important Remarks

* The subjects marked with an asterisk are the **true Free Choice Subjects**. The remaining subjects are **Optional Subjects**, which may be taken also as **Free Choice Subjects**, except for the following ones:

517	Information Systems Evaluation	5 th Course	Quarterly (1Q)	6	9
524	Deepening in Software Engineering	5 th Course	Quarterly (2Q)	6	9
534	Practical Project: Building a Software System	5 th Course	Quarterly (2Q)	6	9

** Free Choice Subjects offered by Video Conferencing from the facilities of the Facultad de Informática:

Adaptive and Neural Systems in Artificial Intelligence	Quarterly (1Q)
Internet Resources for Research Studies in Environmental Problems	Quarterly (2Q)

Free Choice Subjects offered by Video Conference from other Schools or Universities:

History of the Books and the Written Culture	Quarterly (1Q)
Multimedia Telecommunication Systems	Quarterly (1Q)
Current View of the Universe: Relativity, Quantum Mechanics and Cosmology	Quarterly (1Q)
Creation of Enterprises	Quarterly (2Q)
Elements from the Philosophy of Science	Quarterly (2Q)