SELLO	EURO-INF
Higher Education Institution:	**ESCUELA TÉCNICA SUPERIOR DE INGENIEROS INFORMÁTICOS DE LA UNIVERSIDAD POLITÉCNICA DE MADRID**
Country:	**SPAIN**
State / province:	**COMUNIDAD DE MADRID**
Name of the programme:	**GRADUADO O GRADUADA EN MATEMÁTICAS E INFORMÁTICA (BACHELOR IN MATHEMATICS AND COMPUTING)**
Degree awarded:	**BACHELOR**
Qualification Level :	**FIRST CYCLE**
Programme Objectives; Profile:	*The title of Graduate in Mathematics and Informatics by the Universidad Politécnica de Madrid aims to concentrate on a single degree studies on mathematics and informatics, with special emphasis on the mathematical foundations of computer science and computer tools for mathematics.* *This title is aimed at students with interest and aptitude for mathematics, with talent for solving problems and assimilating new ideas and technologies, as well as with interest in computers and their use as tools for programming algorithms in order to solve problems of Science and Engineering.* *The proposed title responds to the current trend of offering joint studies in Informatics and Mathematics.* *The final aim of the degree is to train graduates who know the nature, methods and most relevant purposes of Mathematics, who also have knowledge and skills in Informatics, and appreciate the interrelation between both disciplines, making it possible for them to access the labor market in positions of responsibility, or to continue further studies with a high degree of autonomy in scientific or technological disciplines that require good mathematical and informatics background.* *As for the professional exits of the degree, these would be those currently occupied by graduates in Mathematics, in companies, educational institutions and administrations that make*

	extensive use of ICT, as well as those associated with graduates in Informatics, especially those where a solid mathematical background is more essential. Some of the main areas of application foreseen as professional exits of the degree are: *– Web search algorithms* *– 3D graphics and multimedia systems* *– Simulation* *– Security and cryptography* *– Data science*
Programme Duration (Semesters; in case of "terms" of different length, indicate them and the equivalent in semesters)	**EIGHT SEMESTERS**
Total Number of ECTS Credits Awarded:	**240 ECTS**
Brief Description of the Programme:	*The distribution of credits is as follows:* *– Core: 60 ECTS (25%)* *– Compulsory: 126 ECTS (52.5%)* *– Optional: 42 ECTS (17.5%)* *– Final year project (FYP): 12 ECTS (5%)* *Among the optional ECTS, 12 ECTS can be taken through an internship, up to 24 ECTS depending on whether they are added to the FYP or not.* *It is possible to take 30 ECTS credits per semester in international and national mobility programs, which may be optional credits as well as include those basic or compulsory subjects that come, provided that their contents and / or learning results are equivalent.* *The distribution of core and compulsory credits by course unit is the following, indicating for each course unit the subjects that compose it:* *MATHEMATICS (36 ECTS) (15%)* *Logic, Discrete Mathematics I, Linear Algebra, Calculus I, Calculus II, Numerical Algorithms* *DISCRETE MATHEMATICS AND ALGEBRAIC STRUCTURES (12 ECTS) (5%)* *Discrete Mathematics II, Algebraic Structures* *REAL AND COMPLEX ANALYSIS (18 ECTS) (7,5%)* *Calculus III, Differential Equations, Complex Analysis* *GEOMETRY AND TOPOLOGY (18 ECTS) (7,5%)*

	Affine and Projective Geometry, Differential Geometry, Topology *STATISTICS (15 ECTS) (6,25%)* *Probability and Statistics I, Probability and Statistics II, Operational Research* *MODELING (6 ECTS) (2,5%)* *Modeling* *ENGLISH FOR PROFESSIONAL AND ACADEMIC COMMUNICATION (6 ECTS) (2,5%)* *English for professional and academic communication* *INFORMATICS (18 ECTS) (7,5%)* *Programming I, Programming II, Algorithms and data structures* *SOFTWARE DEVELOPMENT (18 ECTS) (7,5%)* *Systems Programming, Concurrency, Functional Programming, Language Processors, Software Engineering* *COMPUTER SYSTEMS (24 ECTS) (10%)* *Computer structure, Databases, Operating systems, Networks and Communications* *ARTIFICIAL INTELLIGENCE (15 ECTS) (6,25%)* *Formal languages, automata and computability, Logic Programming, Artificial Intelligence*
Examples of Very Good Practice:	*The Universidad Politécnica de Madrid (UPM) is ranked among the 100-150 best universities in the world in the area of Computer Science according to the ranking of Shanghai (2012, 2013, 2014 and 2015) and among the top 150-200 according to the QS 2015 Ranking.* *The UPM's Technical School of Computer Engineering (ETSI-INF), in which the Degree in Mathematics and Computing is taught, belongs to the Campus de Montegancedo, distinguished as an Excellent Campus in Research and Transfer in the area of information and communication technologies, by the Ministry of Science and Innovation, since 2009.* *The Madrid Supercomputing and Visualization Center (belonging to the UPM), located in the Campus de Montegancedo, hosts the most powerful supercomputer in Spain, according to the latest Top500 ranking, the organization that collects and publishes information about the world's most powerful computers.*

	Magerit, which is the name of UPM's supercomputing system, is based on the IBM POWER7 architecture, being able to provide a peak computing power of 103.4 TeraFlops (103,400,000,000,000 operations per second) without the need of specific accelerator technologies, which gives it a great ease of programming and places it at the forefront of the world's supercomputing centers. *The ETSIINF of the UPM is a pioneer and reference in higher education in Computing in Spain. It has been designated as the best School of Computing in Spain during the last 7 years according to the "Ranking of Spanish Universities" developed by the newspaper El Mundo.* *The faculty has a wide and recognized research work, and some professors have received national and international awards and recognitions. Among the ETSIINF teachers are three of the recipients of the National Computing Awards (Aritmel award).* *The Degree in Mathematics and Computing provides a solid education, and a demanding and challenging formative environment. We train professionals with the capacity to solve a wide variety of problems of Computer Engineering through a range of application areas. Our graduates are able to work effectively in teams, and communicate knowledge, procedures, results and ideas. We train professionals capable of leading and taking the initiative in the conception and development of projects, in the adoption of innovations, and in the continuous improvement of their capacities and knowledge.*
Accredited without / with Adjustment Requirements	**ACCREDITED WITH ADJUSTMENT REQUIREMENTS**
Adjustment Requirements:	*Adjustment Requirement 1: Incorporate or increase (as appropriate) in the curriculum the contents and training activities related to several learning sub-outcomes related to Analysis, Design and Implementation and Other Professional Competences, with the aim of guaranteeing the complete acquisition of all of them by all the graduates of the title. In particular, in the case of the competences related to Analysis, Design and Implementation, the acquisition of the following sub-outcomes must be guaranteed:*

	o *"have the ability to apply their knowledge and understanding to the design of hardware and / or software that meets requirements";* o *"Being able to model and design human-computer interaction",* o *"Being able to create and thoroughly test software systems",* o *"Be familiar with existing software systems and applications and the use of their elements."* *Similarly, the acquisition of learning outcomes in the field of Other Professional Competences in which deficiencies have been identified must be ensured:* o *"Have the ability to perform tasks in different fields of application, taking into account, at the same time, the technical, economic and social context";* o *"Take into consideration the economic, social, ethical and legal conditions applicable in the computer practice";* o *"Be familiar with project and business management practices, such as risk and change management, and understand their limitations";* o *"Having the ability to pose an acceptable solution to the problem using computer science in such a way as to save costs and time";* o *"Have basic notions of estimation and measurement of cost and productivity"*
Accredited by:	***ANECA-IIE***
Accredited (from ... to ...)	*From 16 December 2016 to16 December 2018*