



## PERSONAL TRANSCRIPT OF GRADES

Ms. María Victoria Checa Martínez, Administrative Manager Escuela Politécnica Superior de la Universidad Autónoma de Madrid (\*),

### HEREBY CERTIFIES:

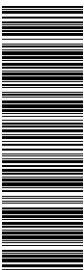
In accordance with the original documents held in the Academic Registrar's Office, Mr. Alejandro Santorum Varela, born in Lalin (Pontevedra), Spain, holding National ID/NIE/Passport number 44090946S, has attended the courses listed below in the following programme of studies:

### Graduado/a en Ingeniería Informática y Matemáticas (2019)

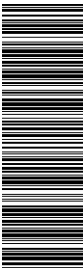
Subject (credits / type)	Academic year	Conv. 1	Conv. 2
<b>16434 CALCULUS I</b> 9,0 credits (Basic Training, First year) Branch of knowledge: Sciences Becomes effective on 06/06/2019. Adapted on the basis of the following subjects:	2016/17	E 9,0 Sobresaliente	
<b>- CALCULUS I. Taken at the: Universidad Autónoma de Madrid</b>	2016/17	E 9,0 Sobresaliente	
<b>16435 LINEAR ALGEBRA</b> 9,0 credits (Basic Training, First year) Branch of knowledge: Sciences Becomes effective on 06/06/2019. Adapted on the basis of the following subjects:	2016/17	Y 9,0 Sobresaliente	
<b>- LINEAR ALGEBRA. Taken at the: Universidad Autónoma de Madrid</b>	2016/17	Y 9,0 Sobresaliente	
<b>16436 SETS AND NUMBERS</b> 9,0 credits (Basic Training, First year) Branch of knowledge: Sciences Becomes effective on 06/06/2019. Adapted on the basis of the following subjects:	2016/17	E 7,0 Notable	
<b>- SETS AND NUMBERS. Taken at the: Universidad Autónoma de Madrid</b>	2016/17	E 7,0 Notable	



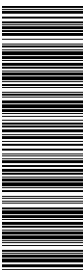
Subject (credits / type)	Academic year	Conv. 1	Conv. 2
<b>16437 CALCULUS II</b> 9,0 credits (Basic Training, First year) Branch of knowledge: Sciences Becomes effective on 06/06/2019. Adapted on the basis of the following subjects:	2016/17	Y 8,5 Notable	
<b>- CALCULUS II. Taken at the: Universidad Autónoma de Madrid</b>	2016/17	Y 8,5 Notable	
<b>17816 COMPUTER BASICS</b> 6,0 credits (Basic Training, First year) Branch of knowledge: Engineering and Architecture Becomes effective on 06/06/2019. Adapted on the basis of the following subjects:	2016/17	E 9,5 Matricula de honor	
<b>- COMPUTER BASICS. Taken at the: Universidad Autónoma de Madrid</b>	2016/17	E 9,5 Matricula de honor	
<b>17817 PROGRAMMING I</b> 6,0 credits (Basic Training, First year) Branch of knowledge: Engineering and Architecture Becomes effective on 06/06/2019. Adapted on the basis of the following subjects:	2016/17	E 8,6 Notable	
<b>- PROGRAMMING I. Taken at the: Universidad Autónoma de Madrid</b>	2016/17	E 8,6 Notable	
<b>17820 COMPUTER STRUCTURE</b> 6,0 credits (Basic Training, First year) Branch of knowledge: Engineering and Architecture Becomes effective on 06/06/2019. Adapted on the basis of the following subjects:	2016/17	Y 9,3 Sobresaliente	
<b>- COMPUTER STRUCTURE. Taken at the: Universidad Autónoma de Madrid</b>	2016/17	Y 9,3 Sobresaliente	
<b>17821 PROGRAMMING II</b> 6,0 credits (Compulsory, First year) Becomes effective on 06/06/2019. Adapted on the basis of the following subjects:	2016/17	Y 8,4 Notable	
<b>- PROGRAMMING II. Taken at the: Universidad Autónoma de Madrid</b>	2016/17	Y 8,4 Notable	
<b>17822 ELECTROMAGNETISM</b> 6,0 credits (Basic Training, First year) Branch of knowledge: Engineering and Architecture Becomes effective on 06/06/2019. Adapted on the basis of the following subjects:	2016/17	Y 9,6 Sobresaliente	
<b>- ELECTROMAGNETISM. Taken at the: Universidad Autónoma de Madrid</b>	2016/17	Y 9,6 Sobresaliente	



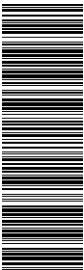
Subject (credits / type)	Academic year	Conv. 1	Conv. 2
<b>17824 LOGIC AND DISCRETE STRUCTURES</b> 6,0 credits (Basic Training, First year) Branch of knowledge: Engineering and Architecture Becomes effective on 06/06/2019. Adapted on the basis of the following subjects:	2016/17	E 8,6 Notable	
<b>- LOGIC AND DISCRETE STRUCTURES. Taken at the: Universidad Autónoma de Madrid</b>	2016/17	E 8,6 Notable	
<b>16438 LINEAR ALGEBRA AND GEOMETRY</b> 9,0 credits (Basic Training, Second year) Branch of knowledge: Sciences Becomes effective on 06/06/2019. Adapted on the basis of the following subjects:	2017/18	E 8,8 Notable	
<b>- LINEAR ALGEBRA AND GEOMETRY. Taken at the: Universidad Autónoma de Madrid</b>	2017/18	E 8,8 Notable	
<b>16439 NUMERICAL ANALYSIS</b> 9,0 credits (Basic Training, Second year) Branch of knowledge: Sciences Becomes effective on 06/06/2019. Adapted on the basis of the following subjects:	2017/18	Y 8,5 Notable	
<b>- NUMERICAL ANALYSIS. Taken at the: Universidad Autónoma de Madrid</b>	2017/18	Y 8,5 Notable	
<b>16440 LABORATORY</b> 6,0 credits (Basic Training, Second year) Branch of knowledge: Sciences Becomes effective on 06/06/2019. Adapted on the basis of the following subjects:	2017/18	Y 9,0 Sobresaliente	
<b>- LABORATORY. Taken at the: Universidad Autónoma de Madrid</b>	2017/18	Y 9,0 Sobresaliente	
<b>16446 PROBABILITY I</b> 6,0 credits (Basic Training, Second year) Branch of knowledge: Sciences Becomes effective on 06/06/2019. Adapted on the basis of the following subjects:	2017/18	Y 10,0 Matricula de honor	
<b>- PROBABILITY I. Taken at the: Universidad Autónoma de Madrid</b>	2017/18	Y 10,0 Matricula de honor	
<b>17823 PROGRAMMING PROJECT</b> 6,0 credits (Compulsory, Second year) Becomes effective on 06/06/2019. Adapted on the basis of the following subjects:	2017/18	E 9,5 Sobresaliente	
<b>- PROGRAMMING PROJECT. Taken at the: Universidad Autónoma de Madrid</b>	2017/18	E 9,5 Sobresaliente	



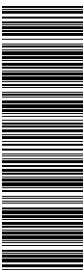
Subject (credits / type)	Academic year	Conv. 1	Conv. 2
<b>17825 ELECTRONIC CIRCUITS</b> 6,0 credits (Basic Training, Second year) Branch of knowledge: Engineering and Architecture Becomes effective on 06/06/2019. Adapted on the basis of the following subjects:	2017/18	E 7,4 Notable	
<b>- ELECTRONIC CIRCUITS. Taken at the: Universidad Autónoma de Madrid</b>	2017/18	E 7,4 Notable	
<b>17826 DATA STRUCTURES</b> 6,0 credits (Compulsory, Second year) Becomes effective on 06/06/2019. Adapted on the basis of the following subjects:	2017/18	E 8,8 Notable	
<b>- DATA STRUCTURES. Taken at the: Universidad Autónoma de Madrid</b>	2017/18	E 8,8 Notable	
<b>17827 ANALYSIS OF ALGORITHMS</b> 6,0 credits (Compulsory, Second year) Becomes effective on 06/06/2019. Adapted on the basis of the following subjects:	2017/18	E 9,0 Matricula de honor	
<b>- ANALYSIS OF ALGORITHMS. Taken at the: Universidad Autónoma de Madrid</b>	2017/18	E 9,0 Matricula de honor	
<b>17831 OPERATING SYSTEMS</b> 6,0 credits (Compulsory, Second year) Becomes effective on 06/06/2019. Adapted on the basis of the following subjects:	2017/18	Y 8,8 Notable	
<b>- OPERATING SYSTEMS. Taken at the: Universidad Autónoma de Madrid</b>	2017/18	Y 8,8 Notable	
<b>17832 SOFTWARE ANALYSIS AND DESIGN</b> 6,0 credits (Compulsory, Second year) Becomes effective on 06/06/2019. Adapted on the basis of the following subjects:	2017/18	Y 8,6 Notable	
<b>- SOFTWARE ANALYSIS AND DESIGN. Taken at the: Universidad Autónoma de Madrid</b>	2017/18	Y 8,6 Notable	
<b>17833 SOFTWARE ANALYSIS AND DESIGN PROJECT</b> 6,0 credits (Compulsory, Second year) Becomes effective on 06/06/2019. Adapted on the basis of the following subjects:	2017/18	Y 7,3 Notable	
<b>- SOFTWARE ANALYSIS AND DESIGN PROJECT. Taken at the: Universidad Autónoma de Madrid</b>	2017/18	Y 7,3 Notable	
<b>16441 ANALYSIS</b> 9,0 credits (Compulsory, Third year) Becomes effective on 06/06/2019. Adapted on the basis of the following subjects:	2018/19	E 7,2 Notable	
<b>- ANALYSIS. Taken at the: Universidad Autónoma de Madrid</b>	2018/19	E 7,2 Notable	



Subject (credits / type)	Academic year	Conv. 1	Conv. 2
<b>16442 ALGEBRAICS STRUCTURES</b> 9,0 credits (Compulsory, Third year) Becomes effective on 06/06/2019. Adapted on the basis of the following subjects:	2018/19	E 9,0 Sobresaliente	
<b>- ALGEBRAICS STRUCTURES. Taken at the: Universidad Autónoma de Madrid</b>	2018/19	E 9,0 Sobresaliente	
<b>16444 DIFFERENTIAL EQUATIONS</b> 9,0 credits (Compulsory, Third year) Becomes effective on 06/06/2019. Adapted on the basis of the following subjects:	2018/19	Y 7,0 Notable	
<b>- DIFFERENTIAL EQUATIONS. Taken at the: Universidad Autónoma de Madrid</b>	2018/19	Y 7,0 Notable	
<b>16445 GEOMETRY OF CURVES AND SURFACES</b> 9,0 credits (Compulsory, Third year) Becomes effective on 06/06/2019. Adapted on the basis of the following subjects:	2018/19	Y 8,0 Notable	
<b>- GEOMETRY OF CURVES AND SURFACES. Taken at the: Universidad Autónoma de Madrid</b>	2018/19	Y 8,0 Notable	
<b>16448 STATISTICS I</b> 6,0 credits (Compulsory, Third year) Becomes effective on 06/06/2019. Adapted on the basis of the following subjects:	2018/19	E 9,5 Sobresaliente	
<b>- STATISTICS I. Taken at the: Universidad Autónoma de Madrid</b>	2018/19	E 9,5 Sobresaliente	
<b>17830 MICROPROCESSOR-BASED SYSTEMS</b> 6,0 credits (Compulsory, Third year) Becomes effective on 06/06/2019. Adapted on the basis of the following subjects:	2018/19	Y 9,3 Matricula de honor	
<b>- MICROPROCESSOR-BASED SYSTEMS. Taken at the: Universidad Autónoma de Madrid</b>	2018/19	Y 9,3 Matricula de honor	
<b>17834 COMPUTER ARCHITECTURE</b> 6,0 credits (Compulsory, Third year) Becomes effective on 06/06/2019. Adapted on the basis of the following subjects:	2018/19	E 8,6 Notable	
<b>- COMPUTER ARCHITECTURE. Taken at the: Universidad Autónoma de Madrid</b>	2018/19	E 8,6 Notable	
<b>17835 COMMUNICATION NETWORKS I</b> 6,0 credits (Compulsory, Third year) Becomes effective on 06/06/2019. Adapted on the basis of the following subjects:	2018/19	E 9,8 Matricula de honor	
<b>- COMMUNICATION NETWORKS I. Taken at the: Universidad Autónoma de Madrid</b>	2018/19	E 9,8 Matricula de honor	

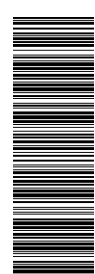


Subject (credits / type)	Academic year	Conv. 1	Conv. 2
<b>17840 ARTIFICIAL INTELLIGENCE</b> 6,0 credits (Compulsory, Third year) Becomes effective on 06/06/2019. Adapted on the basis of the following subjects:	2018/19	Y 10,0 Matricula de honor	
<b>- ARTIFICIAL INTELLIGENCE. Taken at the: Universidad Autónoma de Madrid</b>	2018/19	Y 10,0 Matricula de honor	
<b>17841 COMMUNICATION NETWORKS II</b> 6,0 credits (Compulsory, Third year) Becomes effective on 06/06/2019. Adapted on the basis of the following subjects:	2018/19	Y 9,8 Matricula de honor	
<b>- COMMUNICATION NETWORKS II. Taken at the: Universidad Autónoma de Madrid</b>	2018/19	Y 9,8 Matricula de honor	
<b>16447 TOPOLOGY</b> 6,0 credits (Compulsory, Fourth year)	2019/20	E 10,0 Sobresaliente	
<b>16449 COMPLEX ANALYSIS I</b> 6,0 credits (Compulsory, Fourth year)	2019/20	Y 9,1 Sobresaliente	
<b>16450 MODELIZATION</b> 6,0 credits (Compulsory, Fourth year)	2019/20	Y 9,1 Sobresaliente	
<b>16455 PROBABILITY II</b> 6,0 credits (Optional, Fourth year)	2019/20	Y 10,0 Matricula de honor	
<b>16456 GALOIS THEORY</b> 6,0 credits (Optional, Fourth year)	2019/20	E 7,8 Notable	
<b>16457 INTEGRATION AND MEASURE THEORY</b> 6,0 credits (Optional, Fourth year)	2019/20	E 6,0 Aprobado	
<b>17836 COMPUTER SYSTEMS I</b> 6,0 credits (Compulsory, Fourth year)	2019/20	E 8,2 Notable	
<b>17837 COMPUTER SYSTEMS PROJECT</b> 3,0 credits (Compulsory, Fourth year)	2019/20	E 9,3 Matricula de honor	
<b>17838 FORMAL LANGUAGES AND AUTOMATA</b> 6,0 credits (Compulsory, Fourth year)	2019/20	E 10,0 Sobresaliente	
<b>17839 FORMAL LANGUAGES AND AUTOMATA PROJECT</b> 3,0 credits (Compulsory, Fourth year)	2019/20	E 9,7 Sobresaliente	
<b>17842 COMPUTER SYSTEMS II</b> 6,0 credits (Compulsory, Fourth year)	2019/20	Y 9,4 Matricula de honor	





Subject (credits / type)	Academic year	Conv. 1	Conv. 2
<b>17843 SOFTWARE ENGINEERING</b> 6,0 credits (Compulsory, Fourth year)	2019/20	Y 8,7 Notable	
<b>17844 SOFTWARE ENGINEERING PROJECT</b> 6,0 credits (Compulsory, Fourth year)	2019/20	Y 10,0 Sobresaliente	
<b>40051 IDIOMAS (Certificate in Advanced English C1, CAMBRIDGE, june 2018)</b> 6,0 credits (Optional, Fifth year) Taken at the: ENG/Universidad de Cambridge. Recognition of credits and activities	2019/20	F Apto	
<b>16451 END-OF-DEGREE PROJECT</b> <b>Matrices aleatorias. Modelos de Wishart y Wigner</b> 12,0 credits (Bachelor's Degree Final Project, Fifth year)	2020/21	J 10,0 Sobresaliente	
<b>16454 NUMERICAL METHODS FOR ODE</b> 6,0 credits (Optional, Fifth year)	2020/21	E 7,8 Notable	
<b>16461 MATHEMATICAL ECONOMY AND FINANCES</b> 6,0 credits (Optional, Fifth year)	2020/21	Y 7,6 Notable	
<b>16462 STATISTICS II</b> 6,0 credits (Optional, Fifth year)	2020/21	E 8,5 Notable	
<b>16471 CRYPTOGRAPHY AND CODING THEORY</b> 6,0 credits (Optional, Fifth year)	2020/21	E 9,0 Sobresaliente	
<b>17845 TECHNOLOGICAL BUSINESS ADMINISTRATION</b> 6,0 credits (Compulsory, Fifth year)	2020/21	E 9,6 Sobresaliente	
<b>17846 DEGREE THESIS</b> <b>Desarrollo de la librería scikit-rmt en Python para la simulación y el análisis de matrices aleatorias</b> 12,0 credits (Bachelor's Degree Final Project, Fifth year)	2020/21	J 9,7 Sobresaliente	
<b>18773 NEUROCOMPUTATION</b> 6,0 credits (Optional, Fifth year)	2020/21	Y 9,4 Matricula de honor	
<b>18776 FUNDAMENTALS OF MACHINE LEARNING</b> 6,0 credits (Optional, Fifth year)	2020/21	E 9,5 Matricula de honor	
<b>40510 ENGLISH</b> (Compulsory) Taken at the: ENG/Universidad de Cambridge. Recognition of credits and activities	2019/20	F Apto	



**SUMMARY OF ACADEMIC RECORD**

The total amount of passed subjects included in this certificate is 55 out of a total of 360 credits, of the 360 that constitute the degree, broken down of the following form:

Credits passed by type	Passed
Basic Training	102,0
Compulsory	174,0
Optional	60,0
Bachelor's Degree Final Project	24,0
Academic achievements	Obtained
- First year	✓
- Second year	✓
- Third year	✓
- Fourth year	✓
- Fifth year	✓
- Graduado/a en Matemáticas	✓
- Graduado/a en Ingeniería Informática	✓
Grade point average of the subjects listed on this certificate.	
2,73*/ 8,83**	

Grade point average \* TITULADOS-0 A 4/ \*\* EXPEDIENTE-0 A 10

The key to the sittings is as follows: **E**: January, **F**: February, **J**: June, **Y**: May.

In the Spanish university system, each subject is graded on a scale from 0 to 10 points. Each numeric grade corresponds to a quality grade as follows: Suspenso: 0-4,9; Aprobado: 5-6,9; Notable: 7-8,9; Sobresaliente: 9-10; Matrícula de Honor: Means getting sobresaliente plus a special mention. To pass a subject is necessary to get at least 5 points..

Date of studies completion: June of 2021.

Date of studies completion: June of 2021.

Date in which he/she paid the diploma fees: 25 June of 2021.

(\*) Public university established by Decree 5/1968 dated 6th of June 1968.

And thereby, I sign this certificate at the request of the interested party in Madrid, June 25th, 2021.

