



UNIVERSITÀ
DEGLI STUDI
DELL'AQUILA



REALMATHS CONSORTIUM
INTERNATIONAL DOUBLE MSc DEGREE
PROGRAMME IN
MATHEMATICS FOR REAL WORLD APPLICATIONS



RealMaths

Implementation Agreement

between

Università degli Studi dell'Aquila

University of L'Aquila

(Hereinafter also referred to as "UAQ")

Palazzo Camponeschi, Piazza Santa Margherita 2, 67100 L'Aquila, Italy,

Represented by Prof. Bruno Rubino, Vice Rector for International Affairs

and

Державний вищий навчальний заклад

«Ужгородський національний університет»

State University 'Uzhhorod National University'

(Hereinafter also referred to as "UzhNU")

Uzhhorod, Pidhirna str. 46, 88000, Ukraine

Represented by Prof. Volodymyr Smolanka, Rector

2022 edition

Preamble

Having regard to Article 8 of the Consortium Agreement for the International Double MSc Degree Programme in Mathematics for Real World Applications (*RealMaths*) established on April 2022, the undersigning universities hereby agree on the following points.

Article 1 – Purpose of the Agreement

The purpose of this bilateral Implementing Agreement is to define the modalities of collaboration between the partners as of the 2022 cohort for the implementation of a Double Degree programme in *RealMaths*.

Article 2 – Legal framework and national qualifications

The study programme, which is the object of the present Agreement, is implemented in observance of the national laws and regulations in force in the respective partner institution's countries.

The local graduate programmes run at each partner institution, on which our International double degree programme relies, have both been subject to national accreditation. The executive decision of accreditation or equivalent documents are available upon request.

Such local graduate programmes grant access to doctoral programmes.

Both partner institutions are authorized to award double degrees in the framework of an International double degree programme.

Article 3 – Limits of admitted students and *Partner Students'* selection

The Parties will exchange students on a reciprocal basis. The two local coordinators can select a maximum of 15 *Partner Students* per cohort.

This provision may be modified, subject to the agreement between parties.

Each partner institution, by means of an internal commission, selects their own candidates who are highly motivated for joining the Double Degree Programme. The list of selected candidates is then submitted to the other partner institution, who may require to interview the candidates before validating the list and finalising their admission.

This process must be completed:

- By the mid of August of the cohort year if the student is going to spend the first year in the partner institution.
- By the mid of December of the cohort year if the student is going to spend the second year in the partner institution.

The selection and admission process requires submission of the following materials:

- a) Transcript of records related to undergraduate studies.
- b) Bachelor's degree certificate.
- c) Curriculum vitae.
- d) Intent letter.
- e) Two reference letters.
- f) Proof of English language proficiency.

Article 4 – Programme Organization

The programme of study is approved by the partner universities, according to the rules and procedures in force in each institution.

Each of the two universities recognizes the study and examination rules of the partner university. Both parties recognize the results obtained in the partner university.

Article 5 – Degree titles awarded by each signatory partner

After completion of the study programs at each Partner University and the corresponding degree requirements of the programme, the student is awarded a degree parchment by each of the two Institutions:

- UzhNU will award the qualification corresponding to the major specified on the Study Plan:
 - o *Applied Mathematics*;
 - o *Systems Analysis*
- UAQ will award a Master Degree in *Mathematical Engineering*.

Both Institutions also issue a transcript of records and a diploma supplement to the student.

Article 6 – Student Registration and Fees

The students of the programme enrol simultaneously at both universities.

Students register according to the rules in place at each of the partner universities.

The respective registration services of the partner universities harmonize their registration procedures as much as possible to facilitate the administrative procedures of the students concerned.

Partner Students shall pay registration and tuition fees at their home university exclusively.

Article 7 – Rights and obligations of partner institutions and the students

In addition to the obligations of each partner institution towards the Consortium (in particular with regard to collaboration in the selection of Consortium students), the obligations of the sending and receiving institutions are set out below.

a) Obligations of each partner institution vis-à-vis the students who will participate in this joint programme (home institution):

- Recruit, select and prepare Partner students who will participate in the programme.
- Ensure that the selected students meet the admission criteria (see art. 4).
- Forward the applications of the selected students according to the instructions given by the host university.
- Register their own students at their university throughout the study program.
- Ensure that students purchase the compulsory insurance (see art. 8).

b) Obligations of each partner vis-à-vis the students they will receive as part of this programme of study (receiving institution):

- Exempt students from registration and tuition fees.
- Welcome and guide students in the study programme.
- Facilitate and provide information on housing options for students.
- Provide academic supports and educational advice to participating students.
- Provide all other relevant supports and assistance.
- Transmit the statement of the results of the participating students to the local coordinator of the partner institution.

c) Obligations of students participating in the program of studies:

- Fulfil the academic obligations under the Double Degree programme.
- Obtain, where appropriate, an adequate visa from the embassy of the host country.
- Pay registration and tuition fees at their home university (*Partner students* only) in time.
- Respect the rules and regulations in force at the host university.
- Pay the expenses during their stay (food, accommodation, and other personal expenses).
- Purchase compulsory insurance, pay for medical expenses and prove liability insurance.

Article 8 – Programme and student supports

The Partners endeavour, whenever possible, to provide support for student mobility through national and/or European grants.

At UzhNU and UAQ, students have access to all services available to students including, but not limited to, academic advising, counselling and disability services, and access to academic and recreational facilities.

Article 9 – Special measures to enhance the degree of integration

The faculties and professors in charge of the double-degree programme at both institutions are committed to promoting the exchange and mobility of teaching and administrative staff.

Article 10 – Validity and duration of the Agreement

Two original copies are signed by each partner university, both texts being equally authentic.

This bilateral Implementing Agreement shall apply to the 2022 cohort subject to the authorization or accreditation of the master's degrees issued during the period concerned, and will be extended to the following two cohorts unless the local coordinators propose a revision for the 2023 cohort by April 2023 or for the 2024 cohort by April 2024.

Each university may, at any time, request the modification or termination of this Agreement, subject to informing the other partner in writing of its decision, with six months' notice. To be valid, such changes must be approved by both partners through endorsement.

Should this agreement be terminated, the universities will have to guarantee that the students who, at the time of termination, are already engaged in their studies under the Agreement, can complete them, according to the aforementioned rules.

For conditions not covered by the present Agreement, or for problems that arise during the course of the Agreement, both Parties agree to refrain from unilateral action and to consult and negotiate mutually acceptable decisions.

This Agreement may be executed in counterparts, each of which will constitute an original, and all of which together will constitute a single agreement.

Article 11 – Annexes

This Agreement contains two annexes:

Appendix A: Program of Studies

Appendix B: Rating Conversion Scale



For the University of L'Aquila

Prof. Bruno Rubino

Vice Rector for International Affairs



For State University 'Uzhhorod National University'

Prof. Volodymyr Smolanka

Rector

Date: JUL 14 2022

Date: August 04 2022

Appendix A: Program of Studies

RealMaths is designed for completion in two academic years of full-time study.

RealMaths requires students to achieve at least 30 credits per each semester to gain their final qualification.

Students will spend their First and Third semesters of study at UzhNU and their Second and Fourth semesters of study at UAQ.

An overview of how each academic year is structured is provided below.

Major: Applied Mathematics

First semester (Uzhhorod National University)

MODULE NAME	ECTS Credits	Sem.
English for professional purposes	3	I
Fundamentals of project management	3	I
Big data analytics	4	I
Mathematical methods of cryptography	4	I
Modelling of neural networks	5	I
<i>A choice between (UzhNU):</i>		
<ul style="list-style-type: none"> – Philosophy and methodology of scientific knowledge – Tolerance as a component of professional activity – Financial technologies and innovations – Scientific approach to learning and cognition 	3	I
<i>A choice between (UzhNU):</i>		
<ul style="list-style-type: none"> – Advanced topics in functional Analysis – Fourier transform and its application 	4	I
<i>A choice between (UzhNU):</i>		
<ul style="list-style-type: none"> – Mathematical insurance models – Automated systems of knowledge testing 	4	I
Total	30	

Second semester (University of L'Aquila)

MODULE NAME	ECTS Credits	Sem.
Data analytics and data driven decision		
Module 1. Intelligent Decision Support Systems (5,0 ECTS)	9	II
Module 2. Applied Data Mining systems (5,0 ECTS)		
Big data models and algorithms		
Applied Econometrics (5,0 ECTS)	6	II

Parallel computing <i>A choice between:</i> - Mathematical control methods (4,0 ECTS) - Parallel computing (4,0 ECTS)	3	II
ICT security <i>A choice between:</i> - ICT Security (4,0 ECTS) - Specialized Software for OS Protection(4,0 ECTS)	6	II
Seismology Module 1. Master's seminar (3,0 ECTS) Module 2. <i>A choice between:</i> - Advanced Topics in Applied Mathematics (4,0 ECTS) - Security-oriented management in socio-economic systems (4,0 ECTS) - Models and methods of risk (4,0 ECTS)	6	II
Total	30	

Third semester (Uzhhorod National University)

MODULE NAME	ECTS Credits	Sem.
Research internship	6	III
Pre-diploma practice	4,5	III
Master's thesis	18	III
Master's thesis defence (UzhNU)	1,5	III
Total	30	

Fourth semester (University of L'Aquila)

MODULE NAME	ECTS credits	Sem.
Kinetic theory and stochastic simulations	6	IV
<i>A choice between (UAQ):</i> - Machine learning - Machine learning for smart cities automation	6	IV
Network algorithms	6	IV
Modelling and simulation of biological and medical systems	6	IV
Mathematical control methods in life sciences	3	IV
Epidemics modelling laboratory	3	IV
Master's thesis defence (UAQ)	0	IV
Total	30	

Major: Systems Analysis

First year

First semester (Uzhhorod National University)

MODULE NAME	ECTS Credits	Sem.
English in IT	3	I
Big data analysis methods	4	I
Image processing systems and computer vision	5	I
Modeling of data analysis processes	4	I
Methodology and organization of scientific research	3	I
<i>A choice between (UzhNU):</i> – Specialized programming languages – Use of modern frameworks in WEB development	4	I
<i>A choice between (UzhNU):</i> – Technologies of distributed systems and parallel computing – Distributed systems and big data management	4	I
<i>A choice between (UzhNU):</i> – Basics of marketing and management – Entrepreneurship and launching startups	3	I
Total	30	

Second semester (University of L'Aquila)

MODULE NAME	ECTS Credits	Sem.
Data analytics and data driven decision Big data statistical methods (4,0 ECTS) Decision-making mathematical methods under uncertainty conditions (4,0 ECTS) <i>A choice between:</i> - Econometrics (4,0 ECTS) - Information product development technology (4,0 ECTS)	12	II
Nonlinear systems Problems of applied system analysis (4,0 ECTS) <i>A choice between:</i> - Information systems and technologies in scientific research (4,0 ECTS) - Cloud computing (4,0 ECTS)	6	II
Deep Neural Networks Complex-valued neural networks. Deep Learning (6,0 ECTS)	6	II
Machine Learning <i>A choice between:</i> - Data processing in the Internet of Things (4,0 ECTS) - Cross-platform programming (4,0 ECTS) - Use of modern frameworks for the development of WEB applications (4,0 ECTS)	6	II
Total	30	

Third semester (Uzhhorod National University)

MODULE NAME	ECTS Credits	Sem.
Research internship	6	III
Pre-diploma practice	4,5	III
Master's thesis	18	III
Master's thesis defence (UzhNU)	1,5	III
Total	30	

Fourth semester (University of L'Aquila)

MODULE NAME	ECTS Credits	Sem.
<i>A choice between (UAQ):</i> <ul style="list-style-type: none">– Combinatorics and cryptography– Kinetic theory and stochastic simulations	6	IV
Network algorithms	6	IV
<i>A choice between (UAQ):</i> <ul style="list-style-type: none">– Mathematics for decision making– Machine learning for smart cities automation	6	IV
Hybrid systems control and simulation	6	IV
Parallel computing	3	IV
Parallel computing laboratory	3	IV
Master's thesis defence (UAQ)	0	IV
Total	30	

Individual study plans may also be taken into account, if appropriately motivated, but they will have to be approved by the Management Board.

Article 4 – Extra conditions

To fulfil the regularisation norms from UAQ side, students must reach A2 level of Italian language during the academic year in UAQ. UAQ offers the courses of Italian language and culture for foreigners which will allow non-native students to understand and use basic local language in the most common situations of their university life. Upon successful completion of a before mentioned courses, *RealMaths* students will be awarded 6 ECTS credits, which will be acknowledged as extra credits in the student's curriculum.

Appendix B: Credit transfer policy between the two signatory partners

Student's performance is documented through the national grading system in force at each partner institution.

The transfer and recognition of grades from an institution to the other will be based on the scales below:

Grades gained at UAQ					
UAQ	UzhNU	UAQ	UzhNU	UAQ	UzhNU
30 e lode	100	23	74	OTTIMO	90
30	97	22	73	DISTINTO	85
29	94	21	70	BUONO	74
28	90	20	67	DISCRETO	65
27	88	19	64	SUFFICIENTE	60
26	85	18	60	INSUFFICIENTE	<60
25	81	<18	<60		
24	78				

Grades gained at UzhNU					
UzhNU	UAQ	UzhNU	UAQ	UzhNU	UAQ
99-100	30 e lode	85-87	26	70-72	21
97-98		81-84	25	67-69	20
94-96	30	78-80	24	64-66	19
90-93	29	74-77	23	60-63	18
88-89	28	73-74	22	<60	<18
	27				

Moreover, if necessary, grades gained at UzhNU can be transferred in UAQ as follows:

Grades gained at UzhNU		
UzhNU	UzhNU	UAQ
90-100	EXCELLENT	OTTIMO
85-89 74-84	GOOD	DISTINTO BUONO
65-73 60-64	SATISFACTORY	DISCRETO SUFFICIENTE
1-59	UNSATISFACTORY	INSUFFICIENTE