

Master in Membrane Engineering for Sustainable Development MESD

Erasmus Mundus Joint Master



Membrane Engineering for
Sustainable Development



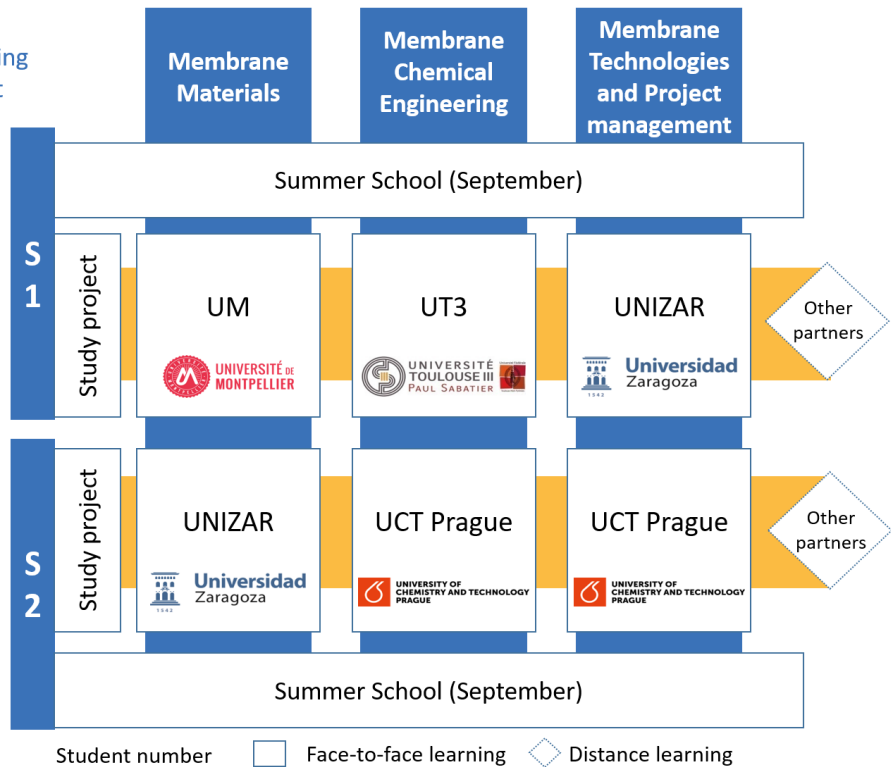
Funded by
the European Union



Overall architecture for the programme

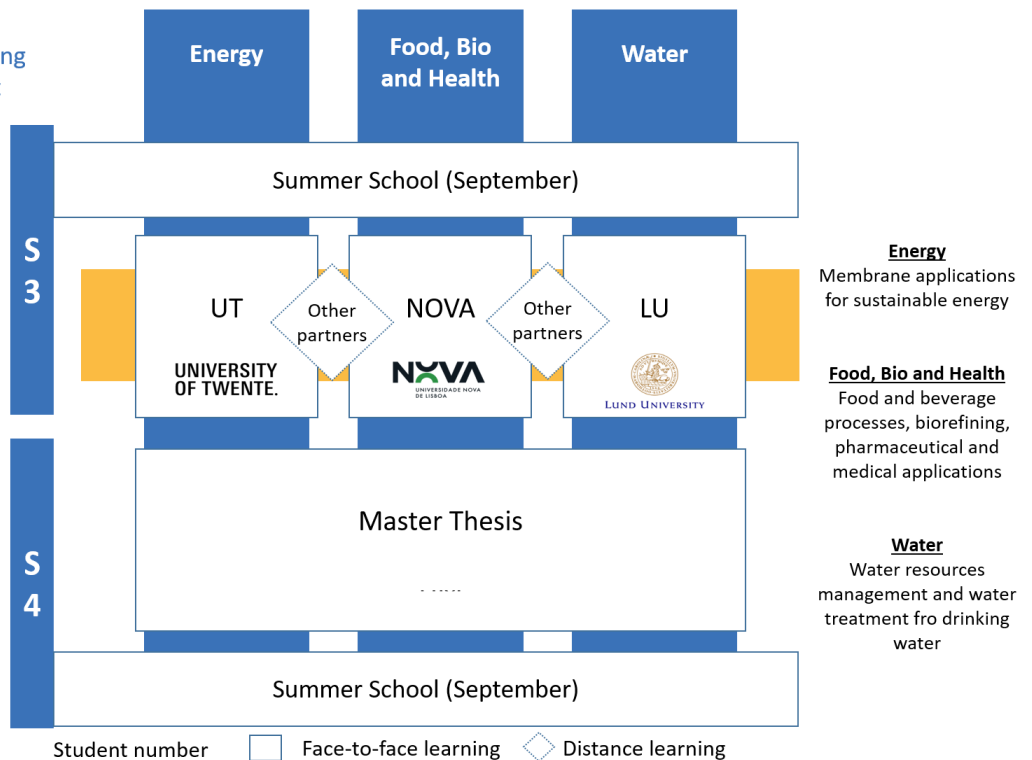
Overview of the Master in Membrane Engineering for Sustainable Development 3 specializations

1st year of Master



Overview of the Master in Membrane Engineering for Sustainable Development 3 specializations

2nd year of Master



Master 1

Membrane Materials MemMAT (30 ECTS)			
Semester 1 - UM			
Course	Type	ECTS	Responsibility
Polymers	Mandatory	2	UM
Advanced inorganic materials	Mandatory	2	UM
Polymers and biodegradable polymers for sustainable development	Mandatory	2	UM
Characterization of porous materials	Mandatory	2	UM
Design of membrane materials	Mandatory	2	UM
Transport phenomena	Mandatory	2	UM
Influence of processing properties on the properties of materials	Mandatory	2	UM
Numerical modeling and simulations	Mandatory	2	UM
Applications of membrane technologies	Mandatory	2	UM
Tutored projects	Mandatory	8	UM
Solutions, colloids, interfaces	Mandatory	2	UM
TOTAL ECTS UM		28	
External contributions			
Entrepreneurship and Innovation Online Course	Mandatory On-line	3	NOVA
Introduction to nanomaterials	Mandatory On-line	2	UNIZAR
TOTAL ECTS SEMESTER 1		33	
Semester 2 - UNIZAR			
Course	Type	ECTS	Responsibility
Individual Project	Mandatory	8	UNIZAR
Characterization I: Physical-chemical Techniques	Mandatory	6	UNIZAR
Characterisation II: Advanced microscopies	Mandatory	6	UNIZAR
Fabrication of micro and nanodevices	Mandatory	5	UNIZAR
TOTAL ECTS UNIZAR		25	
External contributions			
Hybrid and structured materials	Mandatory On-line	2	UM
TOTAL ECTS SEMESTER 2		27	
TOTAL TRACK		60	

Membrane Chemical Engineering MemENG (30 ECTS)			
Semester 1 - UT3			
Course	Type	ECTS	Responsibility
Transport phenomena	Mandatory	3	UT3
Separation Science	Mandatory	6	UT3
Colloid and surface engineering	Mandatory	3	UT3
Life cycle analysis, Security, norm and risk	Mandatory	3	UT3
Bioseparation science	Mandatory	3	UT3
Project	Mandatory	6	UT3
Practical Labs	Mandatory	3	UT3
TOTAL ECTS UT3		27	
External contributions			
Entrepreneurship and Innovation Online Course	On-line	3	NOVA
TOTAL ECTS SEMESTER 1		30	
Semester 2 - UCT PRAGUE			
Course	Type	ECTS	Responsibility
Membrane Processes	Mandatory	4	UCT PRAGUE
Process Design	Mandatory	5	UCT PRAGUE
Individual Project 2	Mandatory	7	UCT PRAGUE
Applied Reaction Kinetics	Mandatory	5	UCT PRAGUE
Human Resources Management Systems	Mandatory	6	UCT PRAGUE
Valorisation, Commercialisation and Entrepreneurship (Could be shared by 2-3 tracks S2)	Mandatory	3	UCT PRAGUE
TOTAL ECTS UCT PRAGUE		30	
TOTAL ECTS SEMESTER 2		30	
TOTAL TRACK		60	

Membrane Technologies and Project Management (30 ECTS)			
Semester 1 - UNIZAR			
Course	Type	ECTS	Responsibility
Organizations and their human resource management	Mandatory	4.5	UNIZAR
Industrial and R&D project management	Mandatory	6	UNIZAR
Economy and Industrial Organization	Mandatory	6	UNIZAR
Ecodesign and life cycle analysis	Mandatory	3	UNIZAR
Team project	Mandatory	7.5	UNIZAR
TOTAL ECTS UT3		27	
External contributions			
Entrepreneurship and Innovation Online Course	On-line	3	NOVA
TOTAL ECTS SEMESTER 1		30	
Semester 2 - UCT PRAGUE			
Course	Type	ECTS	Responsibility
Membrane Processes	Mandatory	4	UCT PRAGUE
Process Design	Mandatory	5	UCT PRAGUE
Individual Project 2	Mandatory	7	UCT PRAGUE
Applied Reaction Kinetics	Mandatory	5	UCT PRAGUE
Human Resources Management Systems	Mandatory	6	UCT PRAGUE
Valorisation, Commercialisation and Entrepreneurship available in MemENG (Could be shared with the other tracks)	Mandatory	3	UCT PRAGUE
TOTAL ECTS UCT PRAGUE		30	
TOTAL ECTS SEMESTER 2		30	
TOTAL TRACK		60	

Master 2

Energy (30 ECTS)			
Semester 3 - UT			
Course	Type	ECTS	Responsibility
Advanced colloids & Interfaces	Mandatory	5	UT
Multicomponent mass transfer	Mandatory	5	UT
Membranes for gas separations	Mandatory	5	UT
Membrane process plant design	Mandatory	5	UT
Electrochemistry: Fundamentals & Technology	Mandatory	5	UT
Capita selecta	Mandatory	5	UT
TOTAL ETCS UT		30	

Food, Bio and Health (30 ECTS)			
Semester 3 - NOVA			
Course	Type	ECTS	Responsibility
Membranes in Food Applications and Biorefinery	Mandatory	6	NOVA
Membranes in Biomedicine	Mandatory	6	NOVA
Business Project	Mandatory	6	NOVA
Engineering Project	Mandatory	6	NOVA
Membranes in Downstream Processing	Mandatory	6	NOVA
TOTAL ETCS NOVA		30	
TOTAL ECTS SEMESTER 3		30	

Water (30 ECTS)			
Semester 3 - LU			
Course	Type	ECTS	Responsibility
Integrated Water Resources Management: International Aspects VVRF01	Mandatory	7.5	LU
Water and Wastewater Treatment	Mandatory	7.5	LU
Project Course Part I	Mandatory	7.5	LU
Project Course Part II	Mandatory	7.5	LU
TOTAL ETCS LU		30	
TOTAL ECTS SEMESTER 3		30	

Master Thesis (30 ECTS)			
Semester 4			
Course	Type	ECTS	Responsibility
Research assignment in industry or university (24 weeks)	Mandatory	30	UT, NOVA, LU
TOTAL ECTS UM		30	
TOTAL ECTS SEMESTER 4		30	
TOTAL MASTER 2		60	