

## 1. DESCRIPCIÓN DEL TÍTULO

### 1.1. DATOS BÁSICOS

NIVEL	DENOMINACIÓN ESPECÍFICA	CONJUNTO	CONVENIO	CONV. ADJUNTO
Máster	Ingeniería de Membranas	Internacional		Ver anexos. Apartado 1.
<b>LISTADO DE ESPECIALIDADES</b>				
Biotecnologías, Alimentos y Salud				
Nanociencia y Nanotecnología				
Energía y Medioambiente				
<b>ERASMUS</b>		<b>NOMBRE DEL CONSORCIO INTERNACIONAL</b>		
Sí		32 EM3E - Erasmus mundus Master in Membrane Engineering		
<b>NOTIFICACIÓN DE OBTENCIÓN DEL SELLO ERASMUS MUNDUS</b>				
Ver anexos. Apartado 1.1				
<b>RAMA</b>		<b>ISCED 1</b>	<b>ISCED 2</b>	
Ciencias		Procesos químicos	Química	
<b>HABILITA PARA PROF. REG.</b>	<b>PROFESIÓN REGULADA</b>	<b>RESOLUCIÓN</b>		
No				
<b>NORMA</b>		<b>AGENCIA EVALUADORA</b>	<b>UNIVERSIDAD SOLICITANTE</b>	
			Universidad de Zaragoza	
<b>LISTADO DE UNIVERSIDADES</b>				
<b>CÓDIGO</b>	<b>UNIVERSIDAD</b>			
021	Universidad de Zaragoza			
<b>LISTADO DE UNIVERSIDADES EXTRANJERAS</b>				
<b>CÓDIGO</b>	<b>UNIVERSIDAD</b>			
ORG00040541	UNIVERSITE DE MONTPELLIER II (F MONTPEL02)			
ORG00030156	UNIVERSITE PAUL SABATIER - TOULOUSE III (F TOULOUS03)			
ORG00033121	VYSOKÁ SKOLA CHEMICKO-TECHNOLOGICKÁ V PRAZE (CZ PRAHA01)			
ORG00047569	UNIVERSIDADE NOVA DE LISBOA (P LISBOA03)			
ORG00046899	UNIVERSITEIT TWENTE (NL ENSCHED01)			
<b>LISTADO DE INSTITUCIONES PARTICIPANTES</b>				
UNIVERSITÀ DELLA CALABRIA (I COSENZA01)				
KATHOLIEKE UNIVERSITEIT LEUVEN (B LEUVEN01)				
UNIVERSITÉ HASSAN II MOHAMMEDIA				

### 1.2. DISTRIBUCIÓN DE CRÉDITOS EN EL TÍTULO

CRÉDITOS TOTALES	CRÉDITOS DE FORMACIÓN BÁSICA	CRÉDITOS EN PRÁCTICAS EXTERNAS
120		0
CRÉDITOS OPTATIVOS	CRÉDITOS OBLIGATORIOS	CRÉDITOS TRABAJO FIN GRADO/MÁSTER
45	45	30
<b>LISTADO DE ESPECIALIDADES</b>		
<b>ESPECIALIDAD</b>	<b>CRÉDITOS OPTATIVOS</b>	

Bioteecnologías, Alimentos y Salud	30.0
Nanociencia y Nanotecnología	30.0
Energía y Medioambiente	30.0

### 1.3. Universidad de Zaragoza

#### 1.3.1. CENTROS EN LOS QUE SE IMPARTE

LISTADO DE CENTROS	
CÓDIGO	CENTRO
50008848	Facultad de Ciencias (ZARAGOZA)

#### 1.3.2. Facultad de Ciencias (ZARAGOZA)

##### 1.3.2.1. Datos asociados al centro

TIPOS DE ENSEÑANZA QUE SE IMPARTEN EN EL CENTRO		
PRESENCIAL	SEMPRESENCIAL	VIRTUAL
Si	No	No
PLAZAS DE NUEVO INGRESO OFERTADAS		
PRIMER AÑO IMPLANTACIÓN	SEGUNDO AÑO IMPLANTACIÓN	
30	30	
TIEMPO COMPLETO		
	ECTS MATRÍCULA MÍNIMA	ECTS MATRÍCULA MÁXIMA
PRIMER AÑO	60.0	60.0
RESTO DE AÑOS	60.0	60.0
TIEMPO PARCIAL		
	ECTS MATRÍCULA MÍNIMA	ECTS MATRÍCULA MÁXIMA
PRIMER AÑO	0.0	0.0
RESTO DE AÑOS	0.0	0.0
NORMAS DE PERMANENCIA		
<a href="http://www.em3e.eu/">http://www.em3e.eu/</a>		
LENGUAS EN LAS QUE SE IMPARTE		
CASTELLANO	CATALÁN	EUSKERA
No	No	No
GALLEGO	VALENCIANO	INGLÉS
No	No	Si
FRANCÉS	ALEMÁN	PORTUGUÉS
No	No	No
ITALIANO	OTRAS	
No	No	

## 2. JUSTIFICACIÓN, ADECUACIÓN DE LA PROPUESTA Y PROCEDIMIENTOS

Ver anexos, apartado 2.

### 3. COMPETENCIAS

3.1 COMPETENCIAS BÁSICAS Y GENERALES
<b>BÁSICAS</b>
CB6 - Poseer y comprender conocimientos que aporten una base u oportunidad de ser originales en el desarrollo y/o aplicación de ideas, a menudo en un contexto de investigación
CB7 - Que los estudiantes sepan aplicar los conocimientos adquiridos y su capacidad de resolución de problemas en entornos nuevos o poco conocidos dentro de contextos más amplios (o multidisciplinares) relacionados con su área de estudio
CB8 - Que los estudiantes sean capaces de integrar conocimientos y enfrentarse a la complejidad de formular juicios a partir de una información que, siendo incompleta o limitada, incluya reflexiones sobre las responsabilidades sociales y éticas vinculadas a la aplicación de sus conocimientos y juicios
CB9 - Que los estudiantes sepan comunicar sus conclusiones y los conocimientos y razones últimas que las sustentan a públicos especializados y no especializados de un modo claro y sin ambigüedades
CB10 - Que los estudiantes posean las habilidades de aprendizaje que les permitan continuar estudiando de un modo que habrá de ser en gran medida autodirigido o autónomo.
<b>GENERALES</b>
CG1 - Ser competente a la hora de generar, crear, desarrollar y producir ideas.
CG2 - Ser capaz de dirigir un equipo o proyecto
CG3 - Utilizar las nuevas tecnologías de la información y comunicación y los métodos y técnicas modernas de investigación.
CG4 - Ser capaz de tomar una posición de ingeniero o investigador en la industria o en un laboratorio académico.
CG5 - Realizar estudios bibliográficos incluyendo búsqueda de patentes, fuentes alternativas, contactos profesionales y sintetizar resultados.
CG6 - Elaborar un proyecto científico y escribir una propuesta de investigación
CG7 - Poseer destreza suficiente para planificar y realizar ensayos experimentales en laboratorio, modelizar, interpretar datos y analizar los resultados críticamente.
<b>3.2 COMPETENCIAS TRANSVERSALES</b>
CT1 - Ser capaz de comunicarse a un nivel profesional
CT2 - Tener una mente analítica; estar preparado para el mercado laboral.
CT3 - Tener capacidad para adaptarse a un medio multicultural e internacional
CT4 - Aprender al menos tres lenguas europeas
<b>3.3 COMPETENCIAS ESPECÍFICAS</b>
CE1 - Ser capaz de desarrollar estrategias analíticas e interpretar los resultados de las técnicas de caracterización estudiadas.
CE2 - Preparar diferentes tipos de membranas en el laboratorio.
CE3 - Ser capaz de diseñar esquemas de procesos integrados incluyendo la tecnología de membranas.
CE4 - Adquirir conocimientos sobre herramientas para monitorización de procesos y su uso en el control de procesos

### 4. ACCESO Y ADMISIÓN DE ESTUDIANTES

4.1 SISTEMAS DE INFORMACIÓN PREVIO
Ver anexos. Apartado 3.
4.2 REQUISITOS DE ACCESO Y CRITERIOS DE ADMISIÓN
Descripción del procedimiento de solicitud, selección y admisión conjunto de estudiantes. El consorcio EM3E ha acordado un procedimiento común, transparente y objetivo para la solicitud, selección y admisión de estudiantes en el programa de máster EM3E. Para establecer una estructura de gestión de proyecto en el EM3E (ver sección A3.1) se han creado comités específicos entre los que

se encuentran un Comité de Admisión y Examen, un Comité de Evaluación y una Junta de Calidad y Evaluación para asegurar una selección justa de los candidatos.

A continuación se detallan los enfoques y criterios comunes decididos por el consorcio EM3E para los diferentes procedimientos:

Procedimiento de solicitud de los estudiantes:

El consorcio EM3E ha creado un sitio web ([www.em3e.eu](http://www.em3e.eu)) en el que los estudiantes podrán descargar el procedimiento de solicitud a partir del 15 de octubre del año n-1 (es decir, el año anterior al comienzo del EM3E) y terminará dos meses después, el 15 de diciembre del año n-1. Los candidatos cumplimentarán el formulario de solicitud y solo podrán enviarlo online. Se les asignará un número personal confidencial y el Presidente del Comité de Admisión y Examen les enviará un correo electrónico como comprobante de la recepción de su formulario de solicitud.

Para completar el procedimiento, los estudiantes deberán elegir la especialidad seleccionada eligiendo las opciones para los semestres 1 y 3, proporcionar el CV detallado, especificando su experiencia científica y/o profesional y su nivel de inglés, y una carta de presentación. Ambos documentos deben estar redactados en inglés. Para matricularse en el EM3E en Europa, los candidatos de terceros países deberán explicar sus objetivos e intereses.

Además, los candidatos deben enviar por correo certificado una copia de sus certificados académicos, en los que debe constar su clasificación final incluyendo su clasificación y calificaciones en cada disciplina/asignatura, junto con el expediente académico oficial sellado y traducido, en caso de que no esté en inglés. También deberán enviar un documento oficial de la última institución, escuela universitaria, universidad o universidad técnica a la que han asistido, en el que debe constar la posición relativa del candidato en el curso de graduación correspondiente del primer ciclo de su grado del Plan Bolonia o de su Título Universitario, es decir, entre el 5%, 10% o 20% mejor.

Por último, serán necesarias 2 cartas de recomendación enviadas en un sobre sellado directamente por el autor de las mismas. Toda la correspondencia deberá ser enviada al Presidente del Comité de Admisión y Examen antes del 31 de diciembre del año n-1, anterior al comienzo del año académico del EM3E.

Procedimiento de selección y admisión:

El Comité de Admisión y Examen se compone de 6 miembros de las diferentes universidades asociadas y lo dirige un Presidente elegido cada 2 años por los miembros del Comité.

El Presidente del Comité se encarga de reunir los archivos de solicitud de los estudiantes y los documentos enviados por correo para asegurar que se archivan correctamente y para establecer una preselección basada en el criterio detallado en la Tabla 3 para crear una primera lista de 45 estudiantes.

El segundo paso del procedimiento de selección consiste en examinar las diferentes solicitudes. El Presidente dividirá los archivos entre los 6 miembros del Comité para llevar a cabo un examen justo de los mismos. Para ello, dos miembros de dos universidades examinarán, de forma independiente, el archivo de cada estudiante siguiendo el criterio de selección detallado en la Tabla 3.

Los estudiantes seleccionados serán evaluados mediante una entrevista telefónica o videoconferencia en inglés para valorar su motivación, sus habilidades y su nivel de inglés. Para asegurar la igualdad entre los estudiantes y que la entrevista sea justa y homogénea, se establecerá una lista de preguntas obligatorias que los miembros del Comité deberán realizar a los candidatos.

Una vez que los miembros del Comité hayan completado el proceso de examen, el Presidente organizará una reunión en las dos primeras semanas de enero con todos los miembros, en persona o mediante teleconferencia, para decidir una lista de selección principal de 30 estudiantes y una lista complementaria de 5 estudiantes. En este punto, se asegura el equilibrio en términos de país de origen, sexo y alumnos con desventajas.

Una vez que se haya completado el año académico, los estudiantes deberán enviar sus resultados al Presidente del Comité para validar la lista de seleccionados. El procedimiento de selección finalizará el 10 de enero del año n para los estudiantes de la categoría A (estudiantes extracomunitarios) y el 10 de mayo del año n para los estudiantes de la categoría B (estudiantes comunitarios y asimilados). En este momento del proceso, se enviará una invitación a los estudiantes mediante correo electrónico para que puedan conectarse al sitio web del EM3E, utilizando su número de registro personal, y comprobar la decisión del Comité de Admisión y Examen en relación a su solicitud.

La lista final de seleccionados estará disponible online una vez que el Comité reciba las notas finales de los estudiantes o los resultados adicionales del último periodo académico, con fecha límite de mediados de julio del año n.

Para poder solicitar la admisión en el EM3E, los estudiantes deben cumplir los siguientes requisitos:

- Disponer de un título de primer ciclo del Plan Bolonia o un Título Universitario en Química, Física, Ingeniería de Materiales, Ingeniería Química, Bioingeniería, Biociencias Relacionadas o títulos equivalentes de un Escuela Universitaria, Universidad o Universidad Técnica con prestigio reconocido

o, como alternativa, experiencia profesional reconocida en estas áreas. Los estudiantes en el último año de una titulación podrán ser admitidos siempre que presenten el certificado y los expedientes oficiales antes de matricularse.

- Pertenecer a la categoría A o B de estudiantes y enviar los formularios de solicitud completos con todos los documentos solicitados y direcciones de correo electrónico y ordinario actualizadas y correctas para asegurar una buena comunicación entre el Comité y los estudiantes.

**Tabla 3:** Criterios de Pre-selección, Evaluación y Selección.

Nota final del primer ciclo del Plan Bolonia o título universitario	Calificación		
Entre el 5% mejor – incluido entre el 5% de los mejores estudiantes del primer ciclo del Plan Bolonia o título universitario correspondiente	5		
Entre el 10% mejor – incluido entre el 10% de los mejores estudiantes del primer ciclo del Plan Bolonia o título universitario correspondiente	4		
Entre el 20% mejor – incluido entre el 20% de los mejores estudiantes del primer ciclo del Plan Bolonia o título universitario correspondiente	3		
Otros criterios	<i><b>Excelente +2</b></i>	Bien +1	Regular +0.5
Calidad del archivo de solicitud: - CV con experiencia científica y/o profesional - Carta de presentación - Cartas de recomendación Nivel de inglés Entrevista			

Todos los miembros se comprometen a evitar las discriminaciones basadas en la edad, el sexo y los criterios políticos o religiosos. El consorcio fomentará la participación de mujeres y de estudiantes con desventajas sociales (mediante el proceso de pre-selección). Todas las universidades asociadas han adoptado medidas de accesibilidad para estudiantes discapacitados con necesidades especiales.

Los procedimientos de selección se centran en la excelencia académica, que es uno de los criterios más importantes. Es responsabilidad del Comité de Admisión y Examen identificar a estudiantes con problemas socioeconómicos, aunque no exista una lista de criterios específicos. El comité les dará un lugar prioritario en las listas, siempre que reunan el nivel de excelencia académica esperado. En caso de que sean seleccionados, tendrán prioridad para acceder al alojamiento disponible en el campus. Se prestará especial atención a su integración socio-cultural en las universidades de origen y de destino.

Para asegurar el equilibrio en la participación de género, en caso de paridad en la solicitud académica y profesional, el Comité de Admisión y Examen dará prioridad a estos candidatos para lograr la igualdad.

#### 4.3 APOYO A ESTUDIANTES

#### 4.4 SISTEMA DE TRANSFERENCIA Y RECONOCIMIENTO DE CRÉDITOS

##### Reconocimiento de Créditos Cursados en Enseñanzas Superiores Oficiales no Universitarias

MÍNIMO	MÁXIMO
--------	--------

##### Reconocimiento de Créditos Cursados en Títulos Propios

MÍNIMO	MÁXIMO
--------	--------

##### Adjuntar Título Propio

Ver anexos. Apartado 4.

##### Reconocimiento de Créditos Cursados por Acreditación de Experiencia Laboral y Profesional

MÍNIMO	MÁXIMO
--------	--------

Descripción de los métodos y mecanismos de examen conjuntos de los miembros del consorcio para evaluar los logros de los estudiantes.

En el Máster EM3E se aplicará el Sistema Europeo de Transferencia y Acumulación de Créditos (ECTS). La escala de calificación utilizada será el sistema ECTS, definido por la Comisión Europea en el marco del ECTS (Tabla 4).

El Máster EM3E tiene una duración de 2 años (4 semestres), con 30 créditos ECTS cada semestre, lo que implica 120 créditos ECTS para obtener el título de Máster, que representa los resultados de aprendizaje de los estudiantes (ver detalles en el anexo 3). El título de Máster se otorgará a los estudiantes que validen cada uno de los cuatro semestres de forma individual (S1, S2, S3 y S4).

Para la validación de cada semestre será necesaria una nota media igual o superior a un APROBADO sin ningún suspenso en ninguna de las asignaturas del semestre. La nota media de cada semestre se obtendrá de la media ponderada de las notas individuales y el número de créditos ECTS atribuidos.

Para la validación individual de una asignatura será necesaria una nota igual o superior a un APROBADO. Esta nota se obtendrá combinando la evaluación continua durante el semestre en cuestión (en caso de que se realice evaluación continua en dicha asignatura) y la nota obtenida en el examen final. Los estudiantes que suspendan podrán realizar un segundo examen establecido, como mínimo, 6 semanas después de la fecha de realización del primer examen. La nota obtenida en el segundo examen sustituirá la nota del primer examen (y la posible contribución de la evaluación continua).

En el cuarto semestre (S4 – Tesis de Máster), la nota se obtendrá de la evaluación del informe escrito ( $\frac{1}{3}$  de la nota final), de la defensa oral ( $\frac{1}{3}$  de la nota final) y del comportamiento general del estudiante en el período de prácticas ( $\frac{1}{3}$  de la nota final, proporcionada por el supervisor). La defensa oral en inglés se realizará ante un comité de defensa formado como mínimo por un miembro de cada universidad asociada al Máster EM3E y por el supervisor (mediante teleconferencia).

**Tabla 4** : Escala de calificación utilizada y las notas equivalentes nacionales.



Nota	Mejor	Notas equivalentes nacionales				
		Francia	República Checa	Portugal	España	Países Bajos
A	10 %	20 - > 18	A	20 - > 18	10-9	10 - > 9
B	25 %	18 - > 16	B	18 - > 16	9-8	9 - > 10
C	30 %	16 - > 14	C	16 - > 14	8-7	8 - > 9
D	25 %	14 - > 12	D	14 - > 12	7-6	7 - > 6
E	10 %	12 - > 10	E	12 - > 10	6-5	6 - > 5.5
FX	Suspensio – se considera necesario un trabajo suplementario para la concesión de los créditos	10 - > 8	FX	10 - > 8	Suspensio	5.5 - > 5
F	Suspensio – es preciso un trabajo suplementario considerable	< 8	F	< 8	Suspensio	<5

El Comité de Admisión y Examen (ver sección A.3.1) realizará la clasificación general de las calificaciones o la escala de calificación final de los estudiantes al término de los dos años, mediante la nota media de los cuatro semestres. Los estudiantes obtendrán su título de Máster con una nota cualitativa definida en la Tabla 5.

**Tabla 5** : Escala de calificación final de los estudiantes del Máster EM3E.

Nota media	A	B	C	D	E
Distinción	Sobresaliente	Notable	Aprobado	Aprobado	Aprobado

La Universidad de Montpellier entregará a los estudiantes el Suplemento Europeo al Título, que será redactado de manera conjunta por los miembros del consorcio. El Suplemento Europeo al Título proporciona información sobre el estudiante y las habilidades adquiridas durante su formación (ver Anexo 7). Será firmado por el Presidente del Comité Ejecutivo (ver sección A.3.1) y se entregará en septiembre del segundo año.

#### 4.6 COMPLEMENTOS FORMATIVOS

## 5. PLANIFICACIÓN DE LAS ENSEÑANZAS

<b>5.1 DESCRIPCIÓN DEL PLAN DE ESTUDIOS</b>
Ver anexos. Apartado 5.
<b>5.2 ACTIVIDADES FORMATIVAS</b>
No existen datos
<b>5.3 METODOLOGÍAS DOCENTES</b>
No existen datos
<b>5.4 SISTEMAS DE EVALUACIÓN</b>
No existen datos
<b>5.5 NIVEL 1</b>
No existen elementos Nivel 1

## 6. PERSONAL ACADÉMICO

<b>PERSONAL ACADÉMICO</b>
Ver anexos. Apartado 6.
<b>6.2 OTROS RECURSOS HUMANOS</b>
Ver anexos. Apartado 6.2

## 7. RECURSOS MATERIALES Y SERVICIOS

Justificación de que los medios materiales disponibles son adecuados: Ver anexos, apartado 7.

## 8. RESULTADOS PREVISTOS

<b>8.1 ESTIMACIÓN DE VALORES CUANTITATIVOS</b>	
<b>TASA DE GRADUACIÓN %</b>	<b>TASA DE ABANDONO %</b>
<b>TASA DE EFICIENCIA %</b>	
<b>TASA</b>	<b>VALOR %</b>
No existen datos	
<b>8.2 PROCEDIMIENTO GENERAL PARA VALORAR EL PROCESO Y LOS RESULTADOS</b>	

## 9. SISTEMA DE GARANTÍA DE CALIDAD

<b>ENLACE</b>	
---------------	--

## 10. CALENDARIO DE IMPLANTACIÓN

<b>10.1 CRONOGRAMA DE IMPLANTACIÓN</b>	
<b>CURSO DE INICIO</b>	2011
Ver anexos, apartado 10.	
<b>10.2 PROCEDIMIENTO DE ADAPTACIÓN</b>	
<b>10.3 ENSEÑANZAS QUE SE EXTINGUEN</b>	
<b>CÓDIGO</b>	<b>ESTUDIO - CENTRO</b>

## 11. PERSONAS ASOCIADAS A LA SOLICITUD

<b>11.1 RESPONSABLE DEL TÍTULO</b>			
<b>NIF</b>	<b>NOMBRE</b>	<b>PRIMER APELLIDO</b>	<b>SEGUNDO APELLIDO</b>
	Miguel Angel	Ruiz	Carnicer
<b>DOMICILIO</b>	<b>CÓDIGO POSTAL</b>	<b>PROVINCIA</b>	<b>MUNICIPIO</b>
Pza. Basilio Paraiso nº 4	50005	Zaragoza	Zaragoza
<b>EMAIL</b>	<b>MÓVIL</b>	<b>FAX</b>	<b>CARGO</b>
vrpola@unizar.es	976761010	976761009	Vicerrector Política Académica
<b>11.2 REPRESENTANTE LEGAL</b>			
<b>NIF</b>	<b>NOMBRE</b>	<b>PRIMER APELLIDO</b>	<b>SEGUNDO APELLIDO</b>
	Manuel José	López	Pérez
<b>DOMICILIO</b>	<b>CÓDIGO POSTAL</b>	<b>PROVINCIA</b>	<b>MUNICIPIO</b>
Pza. Basilio Paraiso nº 4	50005	Zaragoza	Zaragoza
<b>EMAIL</b>	<b>MÓVIL</b>	<b>FAX</b>	<b>CARGO</b>
rector@unizar.es	976761010	976761009	Rector
<b>11.3 SOLICITANTE</b>			
El responsable del título es también el solicitante			
<b>NIF</b>	<b>NOMBRE</b>	<b>PRIMER APELLIDO</b>	<b>SEGUNDO APELLIDO</b>

	Miguel Angel	Ruiz	Carnicer
<b>DOMICILIO</b>	<b>CÓDIGO POSTAL</b>	<b>PROVINCIA</b>	<b>MUNICIPIO</b>
Pza. Basilio Paraiso nº 4	50005	Zaragoza	Zaragoza
<b>EMAIL</b>	<b>MÓVIL</b>	<b>FAX</b>	<b>CARGO</b>
vrpola@unizar.es	976761010	976761009	Vicerrector Política Académica

## **ANEXOS : APARTADO 1**

**Nombre :** ConvenioMembraneEngineering\_firmado.pdf

**HASH SHA1 :** /7fw4Rq+PsIGULhn3OIqQAzkj24=

**Código CSV :** 51087939310562508264161

**CONSORTIUM AGREEMENT**  
**Erasmus Mundus Master in Membrane Engineering (EM3E)**

**BY AND BETWEEN**

**Université Montpellier 2 Sciences et Techniques,**  
hereinafter referred to as "**UM2**",  
whose registered office is at 2 Place Eugène Bataillon, 34095 Montpellier cedex 5, FRANCE,  
SIREN n° 193 410 883, APE code 8542Z,  
represented by **Professor Danièle HERIN**, acting in his capacity of President  
duly authorised for the purposes hereof

hereinafter referred to **Coordinating Institution** of the Consortium of the one part,

**AND**

**Université Paul Sabatier,**  
hereinafter referred to as "**UPS**",  
whose registered office is at 118, Route de Narbonne, 31062 Toulouse, FRANCE,  
represented by **Professor Gilles FOURTANIER**, acting in his capacity of President  
duly authorised for the purposes hereof

**AND**

**Institute of Chemical Technology Prague,**  
hereinafter referred to as "**ICTP**",  
whose registered office is at Technická 5, 16628 Prague, CZECH REPUBLIC,  
represented by **doc. Ing. Josef KOUBEK, CSc**, acting in his capacity of Rector  
duly authorised for the purposes hereof

**AND**

**Universidade Nova de Lisboa,**  
hereinafter referred to as "**UNL**",  
whose registered office is at Departamento de Química, Faculdade de Ciências e Tecnologia, UNL,  
Campus da Caparica, 2829-513, Caparica, Lisboa, PORTUGAL,  
represented by **Professor Fernando SANTANA**, acting in his capacity of Dean  
duly authorised for the purposes hereof

**AND**

**Universidad de Zaragoza,**  
hereinafter referred to as "**UNIZAR**",  
whose registered office is at C/ Pedro Cerbuna 12, 5009 Zaragoza, SPAIN,  
represented by **Professor Manuel José LOPEZ PEREZ**, acting in his capacity of Rector  
duly authorised for the purposes hereof

**AND**

**University of Twente,**

hereinafter referred to as "**UTwente**"

whose registered office is at University of Twente, 7500 AE Enschede, Overijssel, THE NETHERLANDS,  
represented by **Dr. Anne H. FLIERMAN**, acting in his capacity of Chairman of the Board  
duly authorised for the purposes hereof

recognized Partner Institutions of the Consortium

**AND**

**Katholieke Universiteit Leuven,**

hereinafter referred to as "**K.U.Leuven**"

whose registered office is at Naamsestraat 22, 3000 Leuven, BELGIUM,  
represented by **Professor Mark WAER**, acting in his capacity of Rector  
duly authorised for the purposes hereof

**AND**

**Université Hassan II Mohammedia,**

hereinafter referred to as "**FSTM**",

whose registered office is at Route de Rabat BP 146, 28820 Mohammedia, Le Grand, MOROCCO,  
represented by **Professor Ahmed FAHLI**, acting in his capacity of Vicepresident  
duly authorised for the purposes hereof

**AND**

**Università della Calabria,**

hereinafter referred to as "**UNICAL**",

whose registered office is at Via Pietro Bucci, 87036 Arcavacata di Rende (CS), Calabria, ITALY,  
represented by **Professor Giovanni LATORRE**, acting in his capacity of Rector  
duly authorised for the purposes hereof

recognized Associated Partner Institutions of the Consortium

all them (the "**Partners**") of the **other part**

The Coordinating Institution of the Consortium and the Partners are hereinafter referred to as the  
"Parties".

The Parties have agreed to the following terms and conditions, including those in the annexes, which  
form an integral part of this Consortium Agreement.

## **Article 1. Objective of the present Consortium Agreement**

On the basis of the present Consortium Agreement the Partners shall together contribute to the achievement of the requirements of the Framework Partnership Agreement (FPA No. 2011-0168, **Annexe 1**) for the implementation and management of the Erasmus Mundus Master Course.

This Agreement shall specify the respective rights and obligations of the Parties with regard to the running of the joint programme Erasmus Mundus Master in Membrane Engineering (acronyme: EM3E. Project number: 511935-1-2010-1-FR-ERA MUNDUS-EMMC).

All Parties are subject to the rules and regulations set up by the Education, Audiovisual and Culture Agency (EACEA, hereafter the **Agency**) in the agreements mentioned above regarding both the responsibilities towards the Agency and towards other Parties to this Agreement.

## **Article 2. Entry into force and duration**

**2.1.** The present Consortium Agreement shall enter into force after its signature by all parts but shall have a retroactive effect from the date of acceptance from the Agency. It shall be valid long as the Framework Partnership Agreement (**Annexe 1**) is active. The validity of this agreement expires when the support from the Agency is withdrawn. It shall be renewable and modifiable by mutual agreement of the Partner institutions, and following any new proposal selected by the Agency. All changes and modifications shall be done in writing and shall be signed by the authorised representatives of each Partie.

**2.2.** Should a Partie want to leave the agreement before the end of the Framework Partnership Agreement, this Partner shall discuss this with the Consortium and shall follow the rules stipulated in the Framework Partnership Agreement (**Annexe 1**). This is not the case if the Partner should leave by force majeure.

## **Article 3. Scope and definitions**

**3.1.** The UM2 is the Coordinating Institution of a Consortium of nine (9) Universities that agreed to organize the Erasmus Mundus Masters Course (EMMC) named Erasmus Mundus Master in Membrane Engineering (hereafter EM3E) approved and funded by the Education, Audiovisual and Culture Executive Agency (EACEA, the Agency) of the Commission of the European Union (the Commission) under the Erasmus Mundus Framework Programme.

**3.2.** The EM3E Consortium is composed of nine (9) Partners (eight (8) European partners and one (1) non-European partner) where: six (6) **full partners**: Université Montpellier 2 Sciences et Techniques (UM2, France, Coordinating Institution), Université Paul Sabatier (UPS, France), Institute of Chemical Technology Prague (Vysoká škola Chemicko-Technologická v Praze) (ICTP, Czech Republic), Universidade Nova de Lisboa (UNL, Portugal), Universidad de Zaragoza (UNIZAR, Spain), University of Twente (UTwente, The Netherlands), and three (3) **associated partners**: Katholieke Universiteit Leuven (K.U.Leuven, Belgium), Université Hassan II Mohammedia (FSTM, Morocco) and Università della Calabria (UNICAL, Italy).

**3.3.** The activities to be developed by the EM3E Consortium, and approved by the Agency, are fully described in the Proposal (**Annexe 1**). Each Partie has approved its relative contribution to the realization of the described activities in compliance with the Erasmus Mundus programme rules and policies. Any divergence from this Proposal must be approved by all the Parties and, if necessary, must be validated by the Agency.

**3.4.** All the responsibilities related to the management of the grant allocated to the EM3E Consortium by the European Commission are formalized through a contract between the Agency and the Coordinating Institution: the Framework Partnership Agreement (**Annexe 1**).



**3.5.** The present Consortium Agreement describes the financial rules, other than specified in article 3.4, approved by the Partners and the Coordinating Institution and summarizes the responsibilities of each Partner within the programme.

**3.6.** The Erasmus Mundus Master in Membrane Engineering, EM3E will welcome Third-Country and European graduate students, following the Proposal (Annexe 1). Two student categories are defined by the Agency as follows:

*"Category A student means students who are nationals of a country other than those from EEA-EFTA States and candidate countries for accession to the European Union; who has already obtained a first higher education degree; who is not a resident of any of the member States or the participating countries; who has not carried out his or her main activity (studies, work, etc.) for more than a total of twelve months over the last five years in any of the Member States or the participating countries; and who has been accepted to register or is registered in an Erasmus Mundus Masters Course."*

*"Category B student means European student or student not included in the previous category A; who has already obtained a first higher education degree; and who has been accepted to register or is registered in an Erasmus Mundus Master Course."*

#### **Article 4. Background**

##### **4.1. General objectives of Erasmus Mundus programme: Preamble of Agency Framework Partnership Agreement**

**4.1.1.** The Agency has received delegation of powers from the Commission by Commission Decision C (2007) 1842 with a view to performance of tasks linked to implementation of Union programmes in the fields of education, audiovisual and culture.

**4.1.2.** The Agency is responsible for implementing the actions 1, 2 and 3 of Erasmus Mundus programme ("the programme"). The decision establishing the programme was adopted by the European Parliament and Council on 16 December 2008 (Decision No 1298/2008/EC) and covers the period 2009-2013.

**4.1.3.** For the purposes of implementing this Union programme, the Agency selects one or more beneficiaries engaged in the area of activity concerned (the Parties) with whom it shares common general objectives and wishes to establish a relationship of lasting cooperation.

**4.1.4.** The general objectives which it shares with the partner in the above-mentioned area of activity and which justify the establishment of a partnership are the following:

- to promote structured cooperation between higher education institutions and an offer of enhanced quality in higher education with a distinct European added value, attractive both within the European Union and beyond its borders, with a view to creating centres of excellence,
- to contribute to the mutual enrichment of societies by developing the qualifications of women/men so that they possess appropriate skills, particularly as regards the labour market, and are open-minded and internationally experienced through promoting mobility for the most talented students and academics from third countries to obtain qualifications and/or experience in the European Union and for the most talented European students and academics towards third countries,
- to contribute towards the development of human resources and the international cooperation capacity of higher education institutions in third countries through increased mobility streams between the European Union and third countries,

- to improve accessibility and enhance the profile and visibility of European higher education in the world as well as its attractiveness for third country nationals and citizens of the Union.

## **4.2. Summary of Erasmus Mundus Master in Membrane Engineering, EM3E**

**4.2.1. Objectives:** The nine (9) universities have joined their efforts to create the Erasmus Mundus Master degree in Membrane Engineering, EM3E, in order to promote excellence, innovation, mobility and diversity in courses of quality related to membrane science and engineering at the interface with material science and chemical engineering.

**4.2.2. Consortium:** The Erasmus Mundus Master in Membrane Engineering, EM3E is an integrated Master Programme designed by nine (9) Universities with a wide-range leadership in membrane science and engineering: Université Montpellier 2 Sciences et Techniques (UM2, France, coordinating institution), Université Paul Sabatier (UPS, France), Institute of Chemical Technology Prague (Vysoká Škola Chemicko-Technologická v Praze) (ICTP, Czech Republic), Universidade Nova de Lisboa (UNL, Portugal), Universidad de Zaragoza (UNIZAR, Spain), Universiteit Twente (UTwente, The Netherlands), Katholieke Universiteit Leuven (K.U.Leuven, Belgium), Université Hassan II Mohammedia (FSTM, Morocco) and Università della Calabria (UNICAL, Italy),

**4.2.3. Contents and organization:** The duration of the programme is two (2) years (120 ECTS) of normal study. The courses provided in the four semesters, S1-S4, bridge different scientific domains (material science, physics and chemistry, engineering and processes) while keeping a focus on relevant applications of membranes in food and health industry, industrial and chemical processing, energy, environmental control, pharmaceutical industry, biomedical applications, and other.

In the first semester (S1) dedicated to Materials Science and Chemical Engineering, the students will be directed to the UM2 (France), or the UPS (France). The second semester (S2) on fundamentals of process modelling and technologies will be organized at the ICTP (Czech Republic). The courses offered in the first year, semesters S1 and S2, will provide a broad and flexible orientation in the field of science and technology of membranes.

In the second year, semester S3, the students can specialize in one of the following three tracks: Biotechnologies, Food and Health, at FCT-UNL (Portugal); Nanoscience and Nanotechnology, at the UNIZAR (Spain) and Energy and Environment, at the UTwente (The Netherlands).

In the final semester, S4, the students prepare the Master Thesis.

**4.2.4.** Each year, around thirty (30) students are welcomed in Montpellier, France for an integrative period and an introductory programme (1 week). The teaching language is English.

**4.2.5. Degree-Awarding:** The completion of the curriculum is rewarded by a multiple Master Degree detailing both the interdisciplinary and specialized curriculum. A Diploma Supplement describing personal curriculum contents is delivered. The qualification and diplomas obtained in each university are: “*Master en Ingénierie des Membranes, Master in Membrane Engineering*” (UM2 and UPS, France); “*Inženýr – Ing. (equivalent to Master of Science, ICTP, Czech Republic)* under condition of fulfilling standard requirements; “*Master Engenharia de Membranas, Master in Membrane Engineering*” (UNL, Portugal); “*Máster en Ingeniería de Membranas, Master in Membrane Engineering*” (UNIZAR, Spain) and “*Master of Science in Chemical Engineering*” (UTwente, The Netherlands).

The final objective of the EM3E Consortium is to be able to offer a joint degree throughout all the universities participating from the consortium.

**4.2.6. Application:** The EM3E programme is open to European and non European excellent students having acquired a Bologna first cycle degree or a bachelor degree in Chemistry, Physics, Materials Engineering, Chemical Engineering, Bio Engineering, related Bioscience or equivalent degrees from a

College, University or Technical School with a recognised standing or alternatively, a recognised professional experience in these areas (students in the final year of a degree may be admitted as long as they present the certificate and official transcripts before they enrol), and with sufficient proficiency in the English language.

## **Article 5. Responsibilities**

### **Article 5.1. Coordinating Institution**

**5.1.1.** The Coordinating Institution has the financial responsibility of the programme.

**5.1.2.** The Coordinating Institution shall organize the collaboration between Partners in compliance with the Proposal (**Annexe 1**). He is the link between the Agency and the Partners and shall see to the effective application of the Proposal.

**5.1.3.** The Coordinating Institution will provide the Agency with all the required reports on the project evolution and its financial management, according to the Framework Partnership Agreement (**Annexe 1**).

**5.1.4.** The Coordinating Institution is responsible for the day-to-day coordination and management of the project and for the usage of the Union funds allocated to the project. It is also the focal point for the Agency on any matters related to the project implementation. It shall manage in particular the following activities:

- General coordination and initiation of EM3E programme activities in collaboration with the Partners.
- Coordination of the decision taking procedure.
- Sending to the Partners copies of the agreements signed with the Agency together with annexes and any other official document concerning the project.
- Payment of European grants to students and scholars involved in the EM3E Programme.
- Perception of participation fees and distribution to other Full Partner institutions.
- Providing insurance to all students enrolled in the EM3E Programme.
- Helping, where necessary, with visa requests for students at the start of EM3E Programme.
- Banking facilities for enrolled students and scholars.
- Partners' information regarding the number of students continuing their studies in each institution, and the academic data necessary for their registration at each Partner.
- Elaboration of reports (administrative and financial) to the Consortium for each edition of the EM3E Programme.

### **Article 5.2. Partners (including the Coordinating Institution and Associated partners institutions)**

**5.2.1.** The Partners shall perform and complete their share of the EM3E Programme activities (**Annexe 1**) in accordance with the requirements set out in the Framework Partnership Agreement (**Annexe 1**). Each Partner shall carry out the work in such a way that no act or omission in relation thereto shall constitute, cause, or contribute to any breach or non-compliance by the Coordinating Institution or by other Partner of any of their respective obligations under the Framework Partnership Agreement.

**5.2.2.** The Partners shall provide in due time the EM3E Coordinating Institution with the information necessary to prepare the reports required by the Agency (**Annexe 1**). The Partners shall be aware that the payment of the studentships and of the funds allocated to each Partner are subjected to the timely submission of the financial reports by the Partners to the Coordinating Institution, then by the Coordinating Institution to the Agency. The payments of the Agency are pre-financings: instalments account for 70% of the financing (**Annexe 1**). Further payment is made only when 70% of the pre-

financing have been spent, and within 90 days from the submission of the financial report, if approved by the Agency (**Annexe 1**).

**5.2.3.** When submitting invoices resulting from activities as in Article 5.1.4 to the Coordinating Institution, the Partners shall meet the financial and administrative requirements of the latter.

**5.2.4.** Each Partner shall organize and realize the EM3E programme activities in its own institution, and specifically:

- The realization and promotion of EM3E academic programme.
- To communicate to the EM3E Coordinator any information or document required by the latter and that is necessary for the management of the project.
- To accept responsibility for all information communicated to the EM3E Coordinator, including details of costs claimed and, where appropriate, expenses difficult to justify.
- The management of the funds distributed by the Coordinating Institution: the financial administration of each Partner shall guarantee the correct use of the funding for the correct destination in compliance with **Annexe 2**.
- Regarding the students and scholars visiting its institution, prior and during their stays:
  - Visa request: each Partner shall help to obtain the documents required by its national immigration policy, by providing all the explanations and documents helpful for the applicants.
  - Supervision of students' and scholars' status regarding national immigration policy during their stay; academic admission and registration.
  - Assistance.
  - Accommodation organization and booking, and students transportation (organization and payment) in case of compulsory mobility resulting not from the general organization of EM3E, but from those parts of the EM3E programme that are locally organized by the hosting Partner.

**5.2.5.** For each Partner, a Partner Coordinator, named in the Proposal (**Annexe 1**), shall organize and coordinate with his/her collaborator(s) the activities and the organisation of EM3E programme in the Partner institution. He/she is the link between Partner institution and the EM3E Coordinator.

**5.2.6.** The Partners are further assigned specific tasks (**Annexe 1**) that they shall manage and supervise in compliance with the Consortium decisions.

## **Article 6. Decision Taking and Organisational Structure**

**6.1.** In order to ensure the academic cooperation an Executive Board and three committees will be established.

### **6.1.1. Executive Board**

It has a highest advisory, strategic and decisional role.

It is composed by the Coordinator of each involved Full Partner Institutions (six members). The head of the Executive Board is elected by its members for a period of two (2) years.

It gathers four times a year by teleconference or in one of the partner universities. The EM3E Coordinator, member of the Executive Board, will insure the interface with the Agency and with the Executive Board of the Erasmus Mundus Doctorate in Membrane Engineering (EUDIME).

The Executive Board shall adopt decisions regarding: the management of the EM3E programme, the addition of new items to the programme, the modification or addition of new criteria for student selection, proposals for changes to the Proposal (**Annexe 1**) to be agreed by the Agency.

### **6.1.2. Admission and Examination Committee**

It is responsible for Admission and Examination procedures and to advise Executive Board and teachers.

It is composed of six members: one staff member per Full Partner Institution. Its members elect the head of the Committee for a period of two (2) years.

It gathers four times a year by teleconference or in one of the partner universities.

### **6.1.3. Evaluation Committee**

It is co-ordinating evaluation activities and curriculum modifications and is in charge of advising the Executive Board and the External quality and Evaluation Board.

It is composed of eleven (11) members: one staff member per Partner Institution (full and associated partners) and two (2) students' representatives (one first-year student and one second-year student). The head of the Committee is elected by its members for a period of two (2) years. It gathers twice a year by teleconference or in one of the Partner universities.

Within the Evaluation Committee, each Partner Institution has a specific role: **UM2**: organisational arrangements and cooperation mechanism within the Consortium; **UPS**: implementation and management of the e-learning platform; **ICTP**: relationships with industries and cooperation programme of Master; **UNL**: exploring and monitoring of extra-funding for assuring the sustainability of the Master; **UNIZAR**: information and promotion of the EM3E programme; **UTwente**: monitoring of the quality aspects; **K.U.Leuven**: monitoring evolution of the curriculum; **FSTM**: relationship and evolution with African Third-Countries; and **UNICAL**: assuring link with "Erasmus Mundus Doctorate in Membrane Engineering – EUDIME" and Bachelor programmes.

### **6.1.4. External Quality and Evaluation Board**

It is in charge of the external evaluation of the programme and to control the quality of the EM3E Programme. It analyses the evaluations on the educational programme, courses and semester evaluation (panel discussion). Every year, it has to submit a report based on information obtained from the evaluation committee, academic staff, students, and the EM3E management office and team. It provides its feedback to the Executive Board in order to improve administrative, pedagogical and scientific quality of the Master EM3E and to define strategic developments in terms of future research trends and employment opportunities in Europe.

It is constituted by six (6) representatives nominated by the Executive Board for two (2) years: two (2) industrialists, two (2) external academics working in the field of Membrane Science and Engineering and two (2) expert's representative of one of the three following organisations: North America Membrane Society (NAMS), Membrane Society of Japan (MSJ) and European Membrane Society (EMS). An equilibrated number of representatives from Europe, North America and Asia will be respected.

The head of the Committee is elected by its members for a period of two (2) years. It gathers one a year by teleconference or in one of the partner universities.

**6.2.** Whenever possible, decisions shall be taken during meetings or video-conference where all Partners members of the body are represented. If the Partner member of the body cannot be present in person, the Partner shall assign a substitute as the Partner's representative. If this is not possible, the Partner will send its opinion on the matters to be decided by mail or e-mail to the Head of the body and to the Coordinator. During the meeting or video-conference of the remaining Partners, this written statement will be taken into consideration and be counted as a vote.

**6.3.** In exceptional cases, decisions can also be taken on the basis of mail, e-mail or telefax consultation. In such case, all Partners members of the body shall be consulted and asked to vote for decision taking. All Partners members of the body shall acknowledge receipt of the question

submitted to them to the Head of the body and to the Coordinating Institution within four (4) calendar days, and submit their vote to the Head of the body and to the Coordinating Institution within seven (7) calendar days. Should a Partner usual representative fail to acknowledge receipt or fail to be reached within four (4) calendar days, the Head of the body shall immediately make every effort to contact a substitute of the representative to vote within seven (7) calendar days.

**6.4.** Whatever the method of decision taking, each Partner shall have one vote. Every effort will be made to reach unanimous decisions. If this is impossible, decisions shall be taken by a majority of three-quarters (3/4) of the votes, or lower in case of absence or of abstention of a Partner. Should the Partners fail to reach the majority, the Partner representing the Head of the Committee shall have an extra vote to settle the discussion. Questions shall not be submitted to vote during legal holidays.

**6.5.** Decisions regarding the activities of one Partner in particular shall not be voted in the absence of this Partner. The Partners shall commit themselves not to block a decision by purposely not participating in the decision taking-process.

**6.6.** Since a decision engages the Partner's institution, the voting Partner representative shall take every precaution to ensure his/her decision is in agreement with his/her collaborators, institution practices, and legal obligations. A Partner shall request to delay the vote by fifteen (15) calendar days to consult with its institution or to produce documents that may affect the decision.

**6.7.** A Partner that can demonstrate that a decision goes against its administrative procedures or against the Framework Partnership Agreement (**Annexe 1**) shall exercise a veto with respect to the corresponding decision or relevant part of the decision. Its demonstration shall be supported by legal documents. In case of exercise of veto, the Partners shall make every effort to resolve the matter, which occasioned the veto to the general satisfaction of all.

**6.8.** On request from a Partner, formal notice, consent or approval shall be given to confirm a decision taking. Such notices shall be signed by an authorised representative of each Partner and shall either be served personally or sent by mail with recorded delivery or telefax with receipt acknowledgement.

## **Article 7 - Funding distribution and use**

**7.1.** The Agency, acting under powers delegated by the Commission, is funding the Consortium yearly. The funds, referenced in the Framework Partnership Agreement (**Annexe 1**), are paid to the Coordinating Institution, and can be summarized as follows:

- **Consortium allocation:** A flat rate per course edition of 30 000 € (thirty thousand Euros) to cover internal management costs of the Consortium. The Agency pays this flat rate in two (2) instalments (article 5.2.2) in accordance with the payment arrangement laid down on Article 4 of the Specific Grant Agreement (**Annexe 1**).
- **Scholarship funds** for category A and category B students effectively involved in the EM3E mobility programme and for Third Country scholars effectively involved in the EM3E mobility programme.

**7.2.** The students involved in the EM3E programme pay participation costs. The annual rate of the latter are determined for the duration of the Consortium Agreement and amount to 8,000 € (eight thousand Euros) for Category A students and 4,000 € (four thousand Euros) for Category B students.

**7.3.** The participation costs shall be paid to the Coordinating Institution irrespective of the study destination. The latter shall be updated yearly, to specify the exact financial scheme according to the number of students in each category, enrolled in successive EM3E classes.

**7.4.** The participation costs shall be distributed between the Partners, including the Coordinating Institution, following the timetable given in **Annexe 2**, and according to the following rules:

- **Tuition fees (registration):** flat rate of 1,000 € (one thousand Euros) per student and per semester conducted at the hosting Partner, to be distributed integrally to the hosting Partner to cover the local tuition fees, amount at enter into force of the EM3E programme.
- **Student insurance and integration week:** flat rate of 375 € (three hundred seventy five Euros) per student and per semester to the Coordinating Institution, who is in charge of covering the costs of international insurance coverage of students and the costs of the integration week for all students and for all duration of the EM3E Programme.
- After all previous costs have been deduced from the total annual income from the participation costs of the EM3E programme, the remaining funds will be equally distributed over the Full Partners (including Coordinating Institution) for covering the cost of the running of the EM3E Programme at each hosting Partner.

**7.5.** The consortium allocation shall be distributed over Full Partners, including the Coordinating Institution, following the timetable given in **Annexe 2** and such that:

- The Coordinating Institution receives a flat rate per course edition of 6 000 € (six thousand Euros) for covering internal management costs.
- Each Full Partner (including the Coordinating Institution) receive a flat rate per course edition of 4 000 € (four thousand Euros) for covering internal management costs.

**7.6.** Should an enrolled student fail to participate to part or the totality the EM3E programme and he/she is not replaced by another student, the Coordinating Institution shall have to return part or the totality of the grant to the Agency. If clearly required by Agency, the Partners shall renounce to the funds due, and/or shall return the corresponding funds to the Coordinating Institution, including those corresponding to Registration if the enrolled student never came to the Partner institution.

## **Article 8. Liability**

**8.1.** Each Partner shall be solely liable toward the other Partners and toward third parties for loss, destruction, damage or injury resulting from its own actions in the execution of this Consortium Agreement. Notwithstanding the foregoing, a Partners' aggregate liability shall be limited to once the Partner's share of the total cost of the project, provided such damage was not caused by a wilful act or gross negligence.

**8.2.** Each Partner shall be solely liable toward the Coordinating Institution for any breach or non-compliance as described in **Article 5.2** of the present Consortium Agreement. If the Coordinating Institution has to pay any damages or penalties to the Agency for such breach or non-compliance by a Partner, the Coordinating Institution shall be entitled to full reimbursement from the said Partner.

**8.3.** Each Partner shall be fully responsible for the performance of any part of its share of the Consortium Agreement and for the requirements of Insurance and Social Security for its personnel, involved herein.

## **Article 9. Applicable law**

**9.1.** This Consortium Agreement shall be construed according to and governed by the law as provided in the Framework Partnership Agreement and Specific Agreements (**Annexe 1, article 1.7**).

**9.2.** The EM3E student is bound to the rules and regulations from the Institutes / institutions at which she/he is enrolled.

#### **Article 10. Banking information**

**10.1.** The Coordinating Institution shall transfer the funds to the Institution bank accounts (see financial identification forms in **Annexe 3**).

#### **Article 11 - Annexes**

The following annexes are part of the present Agreement:

- **Annexe 1.** Framework Partnership Agreement (FPA No. 2011-0168): contracted between the Agency and the Coordinating Institution. Specific agreements are appended, especially the Proposal (project number: 511935-1-2010-1-FR-ERA MUNDUS-EMMC), the Proposal as selected by the European Commission on July 14<sup>th</sup>, 2010. The latter document describes exhaustively the activities within EM3E programme. Annexes and supplements are appended by Agency for specific actions and partnerships.
- **Annexe 2.** Financial table, presenting the details of incomes and costs for the funding distribution by the Coordinating Institution to the Full Partners.
- **Annexe 3.** Financial identification forms of the Full Partner institutions.

#### **Article 12 – Counterparts**

This Consortium Agreement shall be executed in eighteen (18) counterparts, all of which together shall constitute one and the same instrument. Every Partner shall sign two (2) original counterparts and return them to the Coordinator for counter-signature.

The Coordinator shall countersign the two (2) original counterparts and return one to each Contractor.

**INTENDING TO BE LEGALLY BOUND**, the Partners have executed this Consortium Agreement in eighteen (18) original copies.

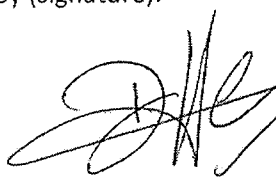



**COUNTERPART SIGNATURE PAGE**

**PARTNER # 1 & COORDINATOR: Université Montpellier 2 Sciences et Techniques**

Authorised to sign on behalf of **UM2**

By (signature):

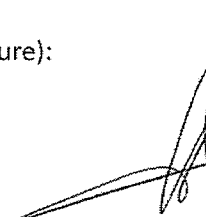
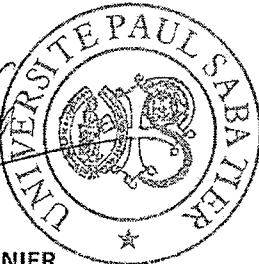
Name: **Prof. Danièle HERIN**

Position: President

**PARTNER # 2: Université Paul Sabatier**

Authorised to sign on behalf of **UPS**

By (signature):

Name: **Prof. Gilles FOURTANIER**

Position: President

Date:

**28 JAN. 2011**

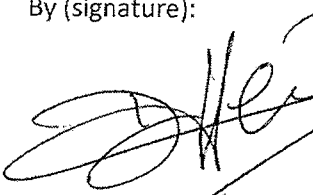
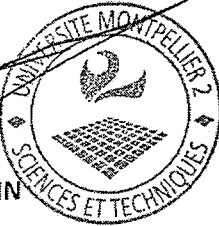
UM2 n°10843

**COUNTERPART SIGNATURE PAGE**

**PARTNER # 1 & COORDINATOR: Université Montpellier 2 Sciences et Techniques**

Authorised to sign on behalf of **UM2**

By (signature):

Name: **Prof. Danièle HERIN**

Position: President

**PARTNER # 3: Institute of Chemical Technology Prague (Vysoká Škola Chemicko-Technologická v Praze)**

Authorised to sign on behalf of **ICTP**

By (signature):



Name: **doc. Ing. Josef KOUBEK, CSc**

Position: Rector

Date: 25 -01- 2011

VYSOKÁ ŠKOLA  
CHEMICKO-TECHNOLOGICKÁ V PRAZE  
Technická 5, 166 28 Praha 6  
961/2

csv: 510889323939986666267403

**COUNTERPART SIGNATURE PAGE**

**PARTNER # 1 & COORDINATOR: Université Montpellier 2 Sciences et Techniques**

Authorised to sign on behalf of **UM2**

By (signature):


Name: **Prof. Danièle HERIN**  
Position: **President**

**PARTNER # 4: Universidade Nova de Lisboa**

Authorised to sign on behalf of **UNL**

By (signature):



Name: **Prof. Fernando SANTANA**  
Position: **Dean**

Date:

**COUNTERPART SIGNATURE PAGE**

**PARTNER # 1 & COORDINATOR: Université Montpellier 2 Sciences et Techniques**

Authorised to sign on behalf of **UM2**

By (signature):

  
Name: **Prof. Danièle HERIN**



Position: President

**PARTNER # 5: Universidad de Zaragoza**

Authorised to sign on behalf of **UNIZAR**

By (signature):

  
Name: **Prof. José Manuel LÓPEZ PÉREZ**



Name: **Prof. José Manuel LÓPEZ PÉREZ**

Position: Rector

Date:

25 ENE. 2011



UM2 n°10843

**COUNTERPART SIGNATURE PAGE**

**PARTNER # 1 & COORDINATOR: Université Montpellier 2 Sciences et Techniques**

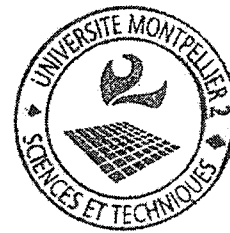
Authorised to sign on behalf of UM2

By (signature):



Name: **Prof. Danièle HERIN**

Position: President



**PARTNER # 7: Katholieke Universiteit Leuven**

Authorised to sign on behalf of K.U.Leuven

By (signature):



Name: **Prof. Mark WAER**

Position: Rector

Date: 22/2/2011



**COUNTERPART SIGNATURE PAGE**

**PARTNER # 1 & COORDINATOR: Université Montpellier 2 Sciences et Techniques**

Authorised to sign on behalf of UM2

By (signature):



**Name: Prof. Danièle HERIN**

**Position: President**

**PARTNER # 8: Université Hassan II Mohammedia**

Authorised to sign on behalf of FSTM

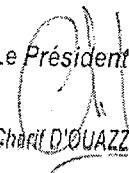

By (signature):

   
Le Doyen  
Mohamed BAFIQ

**Name: Prof. Saad CHARIF D'OUAZZANE**

**Position: president**

Date:

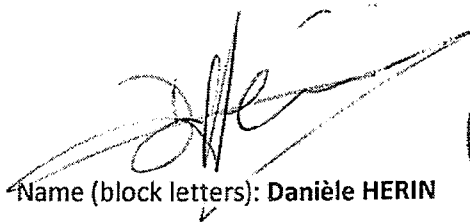
   
Le Président  
Saâd Charif D'OUAZZANE

COUNTERPART SIGNATURE PAGE

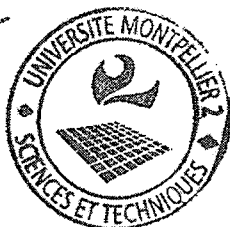
PARTNER # 1 & COORDINATOR: Université Montpellier 2 Sciences et Techniques

Authorised to sign on behalf of UM2

By (signature):



Name (block letters): Danièle HERIN



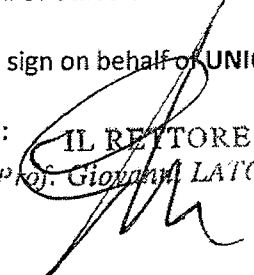
Position: President

PARTICIPANT # 9: Università della Calabria

Authorised to sign on behalf of UNICAL

By (signature):

IL RETTORE  
Prof. Giovanni LATORRE



75 FEB 2011





## Annexe 1

**Framework Partnership Agreement (FPA No. 2011-0168):** contracted between the Agency and the Coordinating Institution. Specific agreements are appended, especially the Proposal (project number: 511935-1-2010-1-FR-ERA MUNDUS-EMMC), the Proposal as selected by the European Commission on July 14th, 2010. The latter document describes exhaustively the activities within EM3E programme. Annexes and supplements are appended by Agency for specific actions and partnerships.

## Annexe 2

**Financial table, presenting the details of incomes and costs for the funding distribution by the Coordinating Institution to the Full Partners**

**1. Cost covered by the student participation costs**

<u>EM3E Participation costs</u>	non-EU students (cat. A)	4 000	€/semester
	EU students (cat. B)	2 000	€/semester
	Where Tuition fees	1 000	€/semester

	COST BY YEAR		Cost managed by
	Category A (non-EU)	Category B (EU)	
<b>Tuition fees</b>	2 000	2 000	Host university
Insurance	500	500	Coordinator
Attendance integration week	250	250	Coordinator
Library/Phone/Fax	200	200	Host university
Fieldwork	500	500	Host university
Specific services host, tutoring and academic support	4 550	550	Host university
<b>Total</b>	<b>8 000</b>	<b>4 000</b>	

**2. Distribution of the participation costs between the consortium for the 5 editions**

Total sum recovered by the consortium from the participation cost by semester:

Type	Nb of students	Participation cost (€/sem/stud)	Total participation costs (€/sem)	Tuition fees (€/sem/stud)	Total tuition fees (€/sem)	Other participation costs (€/sem/stud)	Total other costs (€/sem)
Category A (non-EU)	16	4 000	64 000	1 000	16 000	3 000	48 000
Category B (EU)	14	2 000	28 000	1 000	14 000	1 000	14 000
<i>Total (€/sem)</i>	30		<b>92 000</b>		<b>30 000</b>		<b>62 000</b>
<b>Total all project (5 Edition * 4 semesters)</b>			<b>1 840 000</b>		<b>600 000</b>		<b>1 240 000</b>

Total participations costs for 30 students = 92.000 €/semester

Where:

- tuition fees costs for 30 students = 30.000 €/semester = 60.000 €/year
- others participation costs for 30 students = 62.000 €/semester. From this sum, the costs for assurance and attendance of integration week will be managed directly by UM2 (coordinating institution) (Total 375 €/students/semester\* 30 students = 11.250 €/semester). The sum for distributing between the consortium is 62.000 – 11.250 = 50.750 €/semester = 101.500 €/year.

The distribution of the fees among the partner universities will be realised as follows:

- the tuition fees will be allocated proportionally to the number of students registered at each university for each semester.
- the other participation costs will be equally distributed to each university. The fees will be used by each university to finance a part of the functional and specific expenses for the EM3E Master.

		Distribution of Tuition Fees sum							
Partner	Student number	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	TOTAL	
UM2	15	15 000	15 000	15 000	15 000	15 000	0	75 000	
UPS	15	15 000	15 000	15 000	15 000	15 000	0	75 000	
ICTP	30	30 000	30 000	30 000	30 000	30 000	0	150 000	
UNIZAR	10	0	10 000	10 000	10 000	10 000	10 000	50 000	
UNL	10	0	10 000	10 000	10 000	10 000	10 000	50 000	
UTwente	10	0	10 000	10 000	10 000	10 000	10 000	50 000	
Training course	30	0	30 000	30 000	30 000	30 000	30 000	150 000	
<b>TOTAL</b>								<b>600 000</b>	

Distribution of Other Participation Costs sum							
Partner	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	TOTAL
UM2 Coordinator*	22 500	45 000	45 000	45 000	45 000	22 500	225 000
UM2	16 917	33 833	33 833	33 833	33 833	16 917	169 166
UPS	16 917	33 833	33 833	33 833	33 833	16 917	169 166
ICTP	16 918	33 833	33 833	33 833	33 833	16 917	169 167
UNIZAR	16 917	33 833	33 833	33 833	33 833	16 918	169 167
UNL	16 917	33 833	33 833	33 833	33 833	16 918	169 167
UTwente	16 917	33 833	33 833	33 833	33 833	16 918	169 167
Training course	0	0	0	0	0	0	0
<b>TOTAL</b>							<b>1 240 000</b>

\* As indicated below in addition UM2 will manage the costs for assurance and attendance of integration week as coordinating institution: Total: 375 €/students/semester\* 30 students = 11.250 €/semester (22 500€/year).

TOTAL distribution of Tuition Fees + Other Costs sums							
Partner	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	TOTAL
UM2	54 417	93 833	93 833	93 833	93 833	39 417	469 166
UPS	31 917	48 833	48 833	48 833	48 833	16 917	244 166
ICTP	46 918	63 833	63 833	63 833	63 833	16 917	319 167
UNIZAR	16 917	43 833	43 833	43 833	43 833	26 918	219 167
UNL	16 917	43 833	43 833	43 833	43 833	26 918	219 167
UTwente	16 917	43 833	43 833	43 833	43 833	26 918	219 167
Training course	0	30 000	30 000	30 000	30 000	30 000	150 000
<b>TOTAL</b>							<b>1 840 000</b>

### 3. Distribution of the Management budget (consortium allocation of 30.000 €/edition)

Erasmus Mundus financial contribution to the internal management costs of the EM3E consortium (30,000 €/edition), UM2 as co-ordinating institution will receive a higher financial contribution (6,000 €/edition). The remaining sum (24,000 €/edition) will be equally divided among the hosting partner universities (4,000 €/edition and university). The remaining expenses not covered by the fees will be covered by each hosting university and with local support.

	Total (€/promotion)	Total (€/year)	Total for 5 promotion
Coordinator	6 000	3 000	30 000
UM2	4 000	2 000	20 000
UPS	4 000	2 000	20 000
ICTP	4 000	2 000	20 000
UNIZAR	4 000	2 000	20 000
UNL	4 000	2 000	20 000
UTwente	4 000	2 000	20 000
<b>TOTAL</b>	<b>30 000</b>	<b>15 000</b>	<b>150 000</b>

## **ANEXOS : APARTADO 1.2**

**Nombre :** Karta\_Seleccion.pdf

**HASH SHA1 :** R7dJpbh/9Je84FpGO6AkopUJC1g=

**Código CSV :** 48693195862584106097786



Education, Audiovisual and Culture Executive Agency

Erasmus Mundus and External Cooperation

Prof. Danièle HERIN  
Université Montpellier 2 Sciences et  
Techniques  
Place Eugène Bataillon ,  
FR - 34095 Montpellier cedex 05  
**France**

Brussels, 13/08/2010  
EACEA/P4/JF/SM/dm D (2010) 303678

**Re: Erasmus Mundus Action 1.A - Joint Masters Courses – Call for Proposals  
EACEA/29/09**  
**Title: Erasmus mundus Master in Membrane Engineering**  
**Ref.: 511935-1-2010-1-FR-ERA MUNDUS-EMMC**  
*(Please quote this number in all correspondence)*

Dear Sir/Madam,

You have submitted a proposal under Action 1.A in the framework of the Erasmus Mundus Call for proposals EACEA 29/09.

I am pleased to inform you that your above-mentioned proposal has been selected.

The Agency received 181 proposals under Action 1.A – Joint Masters Courses. 29 of these proposals were selected for funding, and a further 3 are on the reserve list.

All proposals were assessed with the assistance of independent academic experts. Enclosed you will find the consolidated version of the experts' assessments of your proposal. Please take account of the fact that most of the assessments were written by non-native speakers and that the Agency cannot comment on these independent assessments.

The selection decision is based on the quality of the proposal, its relative position in comparison with the other proposals received, the budget available as well as the extent to which it addresses the priorities indicated in the Call for proposals.

EACEA – "Education, Audiovisual and Culture" Executive Agency  
Avenue du Bourget, 1 (BOUR 02/31) – 1140 Brussels – Belgium - Office : Rue Colonel Bourg, 135-139 - BE-1140 Brussels  
Telephone : direct line (32-2)295.96.92 – fax (32-2)292.13.28  
<http://eacea.ec.europa.eu> Email: [joachim.fronia@ec.europa.eu](mailto:joachim.fronia@ec.europa.eu)

G:\UNIT P4\Management & Admin. EM & EC\Internal management EM & EC\EM II management\Selection EMA1 Avr10\Notification letters\notification letters final

As mentioned in our email of 13 July, a description of your project will be published on the Erasmus Mundus website. This description will correspond to the summary sheet of your project as provided in your application or amended as a result of our 13 July email.

A Framework Partnership Agreement will be sent to you by separate mail in the course of September. If you have not done it yet, please complete a "Legal Entity" form ([http://ec.europa.eu/budget/execution/legal\\_entities\\_en.htm](http://ec.europa.eu/budget/execution/legal_entities_en.htm)) and a "Financial Identification" ([http://ec.europa.eu/budget/execution/ftiers\\_en.htm](http://ec.europa.eu/budget/execution/ftiers_en.htm)) form. Originals signed by your institution's legal representative should be returned as soon as possible to the Agency.

*Please note that in the context of the eligibility check exercise carried out by the Agency on the partner institutions and the proposed master's degree(s), the following issue(s) has(/-ve) been identified by the relevant National Structure(s):*

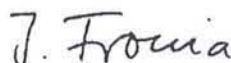
*- UNIVERSIDADE NOVA DE LISBOA (Portugal): the degree proposed to be delivered by this institution has not yet been accredited by the relevant national authorities*

*We invite you to inform the Agency and the relevant National Structure(s) as soon as the accreditation process has been concluded, and in any case, prior to the end of the student's enrolment period.*

*Furthermore, we remind you that the Agency is organising a meeting for the coordinators of newly selected Erasmus Mundus projects. This will take place in Brussels on 15 October 2010. Therefore, please book this date in your diary. We will come back to you later in the summer with more information about the event and how to register.*

Please do not hesitate to contact us should you have any further questions.

Sincerely Yours,



Joachim Fronia  
Head of Unit

**Annex:** Comments and recommendations from the academic experts who assessed your proposal.



Education, Audiovisual & Culture  
Executive Agency

## Joint Masters Course Evaluation Report

Proposal number:	511935-EM-1-2010-1-FR-ERA MUNDUS-EMMC
Proposal title:	Erasmus mundus Master in Membrane Engineering
Coordinator:	Prof. André AYRAL
Applicant organisation:	Université Montpellier 2 Sciences et Techniques

### Award Criteria

#### A.1 Academic quality - Course content (30 % of the max. score)

The needs for setting up a 120 ECTS international education and training Master Course on Membrane Engineering are very well outlined and justified.

The scientific challenges addressed for the future of Europe and for its position in the thematic field of membrane engineering are convincingly addressed. The objectives of the project addressed reveal the multidisciplinary and intersectorial character of the proposal. The added value of the proposed programme to European education and excellence is strongly presented and justified.. The proposal is in general convincing and well written; however, in section A.1.1, the sentence ".....field of membrane technology, with more than hundred of current available positions, none...." is unclear.

The number of support letters is impressive, and suggests valuable networking skills.

The uniqueness of the course is justified. The education programme envisaged for the Masters candidates is clear and convincing. The mobility component in terms of scheduled students' placements within the partner organizations is clear and justified.

Student competencies needed regarding future employment in research and/or industry in the relative thematic field offered by the proposed EMMC are adequately outlined.

The education experience of the proposed consortium set up and the expertise of the key academic staff involved is justified. The consortium is assembled by top European institutions in the field of membrane engineering. Most of the partners and associated partners have remarkable participation records in past Erasmus Mundus and Marie Curie Actions. In part B of the application form the role of University of Twente is missing. Instead, repetition of the Lisbon University role is shown.

The role of the invited scholars and their contribution to the course is properly addressed. However, information on how the consortium will identify and invite these scholars is missing.

The type of interactions with associated partners and other non-educational organizations are very well outlined. Most of the partners have close collaborations, mostly in terms of joint research activities with industrial or other research partners. A very detailed plan on how these collaborations would be facilitated in the benefit of proposed EMMC is provided.

The statement made in the proposal concerning the specific grants that may be made available by EMS is positive; however, it is an intention ('may' exist).

#### A.2 Course integration (25% of the max. score)

The proposed EMMC is organized in an integrated way offering a balanced curriculum combining jointly developed education modules. The courses offered were jointly developed by all participating HEIs focusing on different complementary areas.

The proposed course leads to multiple degrees but no joint degree (according to the proposal, Dutch law does not foresee joint degrees). Steps are being taken for course recognition; joint degree is aimed at, but so far the applicants will settle for multiple degrees.

Multiple degrees (triple) will be awarded accompanied with Diploma Supplements containing a joint description of the skills acquired. Ongoing recognition process of joint degrees has been properly addressed for all partners.

The common standards and mechanisms developed by the consortium for the application, selection, admission and examination of doctoral candidates are thoroughly addressed and clarified. No criteria were set for the linguistic skills of the applicants. Measures for positive discrimination were noted. The topic of credentials evaluation, very important when dealing with applicants coming from countries with less known higher education systems, could be addressed in greater detail.

The joint examination methods and mechanisms were very well outlined and clarified. Use of ECTS for the recognition of study periods is justified. A very detailed conversion table for the ECTS grading systems which will be applied by proposed EMMC is provided.

A very detailed examination plan in terms of individual semester marks final grading is provided. An Examination Committee is responsible for the overall classification of the qualification of the students. No external actors are members in this committee.

The participation costs are realistic and in line with normal practices applied by the participants. However, a cost analysis regarding estimated implementation costs and generated income is not provided.

#### A.3 Course management, visibility and sustainability measures (20 % of the max. score)

The course management is well organized and follows good practice. The management scheme and monitoring measures foreseen are functional for the efficient implementation of the joint programme.

The role and the commitment of each partner in the implementation tasks of the proposed Master course are clarified. Participation of students, associated partners, as well as professionals from the field of membrane engineering in the management bodies are foreseen. Specific embedding of the present programme within the administrative structure of the partners could be further developed.

A very coherent consortium agreement is provided in which the roles of each of the partners in the implementation tasks are defined. The level and quality of resources (human, technical, financial) dedicated by each partner for the implementation of the proposed EMMC is well addressed.

A solid sustainability plan is provided in terms of self-financing through other than EC funding, and in terms of strategic future development of the EM content in order to raise academic excellence.

It is welcome to find in the proposal reference to good prospects of industry financing and other support. The intention of following the master degree by a specific doctoral program is interesting; clearly, graduates of this MSc course must be well qualified for subsequent research at doctoral level, and of course, for direct employment in industry. The types of promotion mechanisms are very well outlined. The existing website will be the central promotion and communication tool for the proposed joint programme. Description of the promotion strategy via the project's website is adequately outlined. Online services for application/registration and other information materials to the benefit of the students are foreseen.

#### A.4 Students' services and facilities (15% of the max. score)

Information /support provided to students prior to their enrolment follow common practice and channels. The EM3E website will be the primary source of information provided to the students and scholars. Description of the content of the website providing all the information needed regarding the scope and the services offered in the proposed EMMC is justified.

The content of the provided Student Agreement model is not detailed. However a model student agreement is provided. The roles and obligations of the partner host institutions are sufficiently outlined. Explicit treatment of a code of ethical conduct for students is not included, which is a concern, given the wide variety of origins of the prospective candidates.

Information on the services offered by the proposed EMMC before student's arrival, upon their arrival and during their stay is clear and justified. The same holds for the hosting services provided by the partners. Measures for the proper induction of third country students specific are also foreseen. Unfortunately, no reference is made to specific problems of students that may have a family (be married and/or have children etc.) Health insurance scheme will go beyond the standard coverage of minimum requirements and will be centrally managed by the coordinating organization.

The consortium has undertaken the proper actions in order to have insurance issues settled when the new program starts. The course is run in English. Although local language teaching is foreseen at the different locations, no academic credits are given for that language learning. The linguistic training offered is linked to the completion of one of the 3 cursory semesters since students have to register in one of these at least once.

The measures that will be taken to facilitate networking among EM students are very detailed and justified. Proposed platform for e-learning with the relevant EM area is a very positive measure for the promotion and networking of the proposed project. Meetings with previous cohorts are foreseen, as well as networking meetings with PhD students. The type of networking activities with EM Alumni Association is sufficiently addressed.

Support of the European Network of excellence NanoMemPro in the development of this platform will facilitate academic and industrial networking.



A.5 Quality assurance and evaluation (10 % of the max. score)

Normal means of evaluation are foreseen by the applicants. They are presented convincingly. Internal evaluation will be conducted by establishing a quality chart. The objectives set in this chart are clear and justified. The evaluation process will be performed twice a year. A jointly developed questionnaire will be used for conducting student surveys on semester basis.

Teaching quality comments will be also collected through a designated area in the programme's website. Participation of students and scholars in the Evaluation Committee is foreseen. The evaluation methodology sought is clearly outlined. Description of monitoring mechanisms regarding the content of the course, administration and students progress and success rates is properly addressed.

The quality of the courses, as well as the evaluation of the managerial aspects of the proposed EMMC, will be regularly reviewed by the External Quality and Evaluation Board, composed of external evaluators (academia, industry). Proposed methodology is clear and convincing. In case of problems revealed from the evaluation, adjustments in the implementation of the programme are foreseen.

Evaluation of the success of the Master program in terms of employment after graduation is correctly included in the tasks of the Evaluation Committee.

Since national master awards should be granted, more information is needed regarding the national evaluation organization that will be involved in the evaluation of the individual partner universities.

The role of professional organizations and societies, in evaluation of the course, and in recognition of the expertise of graduates is not properly addressed.

Global comments

This proposal deserves to be considered for the final award.

As a particularly positive aspect, a very impressive number of relevant support letters suggest that the course may attract the attention of potential students and companies.

Proposed 2 years international education and training Master Course on Membrane Engineering technology is reliable and coherent from the content, organizational and structural points of view. The consortium set up is very appropriate to provide the proposed training in the rapidly growing field of membrane technologies. It has a strong innovation, academic and research character and can provide to the enrolled students high employment potential for further research or industrial careers. The objectives of the project reveal the multidisciplinary and intersectorial character of the proposal. The claimed impact of implementing the project at European level (to improve European competitiveness) is justified. The mobility component is very detailed in terms of complementary scheduled students' placements.

The jointly developed training programme is a result of the strong collaborations between partners within the framework of the European Research Network of Excellence NanoMemPro.

The programme leads to fully recognised multiple (triple) degrees from the three hosting universities, accompanied by Joint Diploma Supplements containing a joint description of the skills acquired.

The level and quality of resources (human, financial, technical) dedicated by each partner for the implementation of the proposed EMMC is well addressed.

Internal evaluation and other monitoring mechanisms are in place, and in which all actors within the consortium plus external evaluators will be involved.

## **ANEXOS : APARTADO 5**

**Nombre :** PlanEstudios\_esp\_revisado.pdf

**HASH SHA1 :** 3jW7du+4gxHYy33YjsQfiDL3DCU=

**Código CSV :** 48693207738449822003841

## Erasmus Mundus Máster en Ingeniería de Membrana EM3E

### Programa del Máster

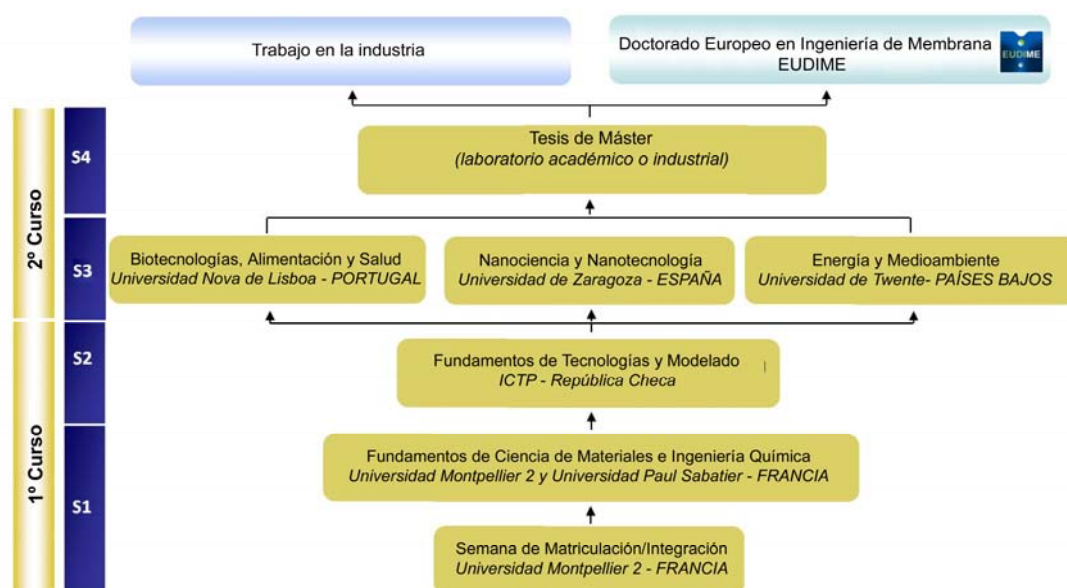
El Máster EM3E tiene una duración de 2 años (120 ECTS). Las asignaturas impartidas en los cuatro semestres, S1-S4, tratan diferentes ámbitos científicos, como la ciencia de materiales, la física y química, la ingeniería y los procesos, al mismo tiempo que se centran en aplicaciones relevantes de las membranas en la ingeniería de los alimentos y la salud, los procesos industriales y químicos, la energía, el control medioambiental, la industria farmacéutica, las aplicaciones biomédicas, etc.

Durante el semestre S1, tras la semana de matriculación e integración en la Universidad de Montpellier 2 (UM2), Francia, todos los estudiantes permanecerán en la Universidad de Montpellier 2 (UM2) (Francia) o en la Universidad de Toulouse 3 (UPS), Francia (el resto de los años académicos, la ubicación se alternará entre las dos universidades). El primer semestre se centrará en los fundamentos de la Ciencia de Materiales y la Ingeniería Química. En función de su rama de titulación y de la opción seleccionada al realizar la solicitud, los estudiantes tendrán la oportunidad de elegir entre dos especialidades (cuatro asignaturas) con un enfoque más centrado en la Ciencia de Materiales o en la Ingeniería Química.

El semestre S2 se centrará en los fundamentos del modelado y la tecnología de procesos en el Instituto de Tecnología Química de Praga (ICTP), República Checa. Las asignaturas ofrecidas durante el primer año, semestres S1 y S2, proporcionarán una orientación amplia y flexible en el campo de la ciencia y tecnología de membranas. En el segundo año, semestre S3, los estudiantes pueden especializarse en una de las siguientes ramas:

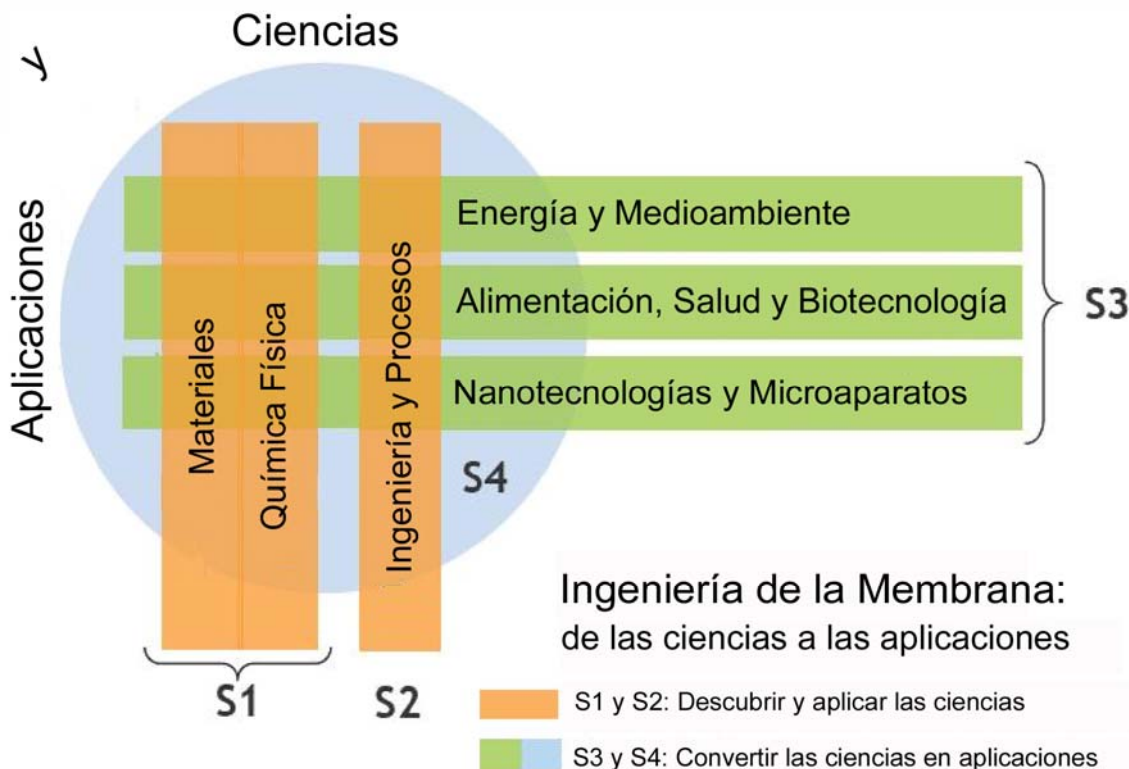
- Biotecnologías, Alimentos y Salud, en la Universidad de Lisboa (UNL), Portugal (~ 10 estudiantes)
- Nanociencia y Nanotecnología, en la Universidad de Zaragoza (UNIZAR), España (~ 10 estudiantes)
- Energía y Medioambiente, en la Universidad de Twente (UTwente), Países Bajos (~ 10 estudiantes).

En el último Semestre, S4, los estudiantes aprenderán a trabajar de forma independiente durante un período de 6 meses en un proyecto de investigación exhaustivo, en una universidad o en un entorno industrial. El estudiante será responsable de progresar, planificar y debatir con sus supervisores.



### Contenido de las asignaturas

Las asignaturas que se ofrecen en el máster están relacionadas con distintas ciencias (ciencia de materiales, química-física, ingeniería química...) que se utilizan en campos de aplicación específicos (energía, medioambiente, industria alimenticia, farmacia, aplicaciones biomédicas...).



El primer año (S1 y S2) se dedica a asignaturas relacionadas con la ciencia de materiales, la química-física y la ingeniería. El primer semestre del segundo año (S3) tiene como objetivo transformar estas ciencias en aplicaciones.

El contenido de cada semestre del Máster EM3E se desglosa a continuación.

<b>Semestre 1: UM2+UPS Francia (30 ECTS)</b>			
<b>Módulo 1.A.1 – 24 ECTS</b>			
<b>Asignatura</b>	<b>Tipo</b>	<b>ECTS</b>	<b>Responsabilidad</b>
Caracterización de materiales porosos	Obligatoria	3	UM2-UPS
Ingeniería coloidal y de superficies	Optativa	3	UPS
Caracterización estructural de los sólidos	Optativa	3	UM2
<i>Especialidad 1 – Ciencia de Materiales</i>			UM2
Materiales inorgánicos	Obligatoria	3	UM2
Materiales polímeros	Obligatoria	3	UM2
Materiales híbridos y compuestos	Obligatoria	3	UM2
Materiales para reacciones químicas/catálisis heterogéneas	Obligatoria	3	UM2
<i>Especialidad 2 – Ingeniería química</i>			
Fenómenos de transporte	Obligatoria	3	UPS
Termodinámica, cinética y radioactividad	Obligatoria	3	UPS
Química general y métodos analíticos físico-químicos	Obligatoria	3	UPS
Ciencia de separación	Obligatoria	3	UPS
Proyecto individual (estudio bibliográfico y experimental)	Obligatoria	6	UM2-UPS
<b>Módulo 1.A.2 – 6 ECTS</b>			
<b>Asignatura</b>	<b>Tipo</b>	<b>ECTS</b>	<b>Responsabilidad</b>
Seguridad, sanidad y legislación medioambiental	Obligatoria	2	UM2-UPS
Control de calidad y prácticas de laboratorio	Obligatoria	2	UM2-UPS
Ley de trabajo internacional y Europea	Obligatoria	2	UM2-UPS
Lengua y cultura francesas	Obligatoria*	-	UM2-UPS

<b>Semestre 2: ICTP, República Checa (30 ECTS)</b>			
<b>Módulo 2.1 – 24 ECTS</b>			
<i>Asignatura</i>	<i>Tipo</i>	<i>ECTS</i>	<i>Responsabilidad</i>
Procesos de membrana	Obligatoria	4	ICTP
Diseño de procesos	Obligatoria	5	ICTP
Cinética de reacción aplicada	Obligatoria	4	ICTP
Tecnología de separación	Obligatoria	5	ICTP
Proyecto individual (estudio bibliográfico y experimental)	Obligatoria	6	ICTP
<b>Módulo 2.2 – 6 ECTS</b>			
<i>Asignatura</i>	<i>Tipo</i>	<i>ECTS</i>	<i>Responsabilidad</i>
Lengua y cultura checas	Obligatoria*	-	ICTP
Gestión del capital intelectual	Obligatoria	3	ICTP
Valorización, comercialización e iniciativa empresarial	Obligatoria	3	ICTP/UTwente

<b>Semestre 3: UNL, Portugal (30 ECTS)</b>			
<b>Módulo 3.A.1 – 30 ECTS</b>			
<i>Asignatura</i>	<i>Tipo</i>	<i>ECTS</i>	<i>Responsabilidad</i>
Contactores de membrana y biorreactores	Obligatoria	6	UNL
Membranas en tratamientos secundarios	Obligatoria	6	UNL
Membranas de barrera para aplicaciones alimentarias	Obligatoria	6	UNL
Membranas en la medicina regenerativa	Obligatoria	6	UNL
Proyecto individual (estudio bibliográfico y experimental)	Obligatoria	6	UNL
<b>Módulo 3.A.2 – - ECTS</b>			
<i>Curso</i>	<i>Tipo</i>	<i>ECTS</i>	<i>Responsabilidad</i>
Lengua y cultura portuguesas	Obligatoria*	-	UNL
<b>Semestre 3: UNIZAR, España (30 ECTS)</b>			
<b>Módulo 3.B.1– 30 ECTS</b>			
<i>Curso</i>	<i>Tipo</i>	<i>ECTS</i>	<i>Responsabilidad</i>
Propiedades fundamentales de materiales nanoestructurados	Obligatoria	6	UNIZAR
Preparación de materiales nanoestructurados	Obligatoria	6	UNIZAR
Montaje y fabricación de nanoestructuras	Obligatoria	6	UNIZAR
Casos prácticos de aplicaciones industriales	Obligatoria	6	UNIZAR
Proyecto individual (estudio bibliográfico y experimental)	Obligatoria	6	UNIZAR
<b>Módulo 3.B.2 – - ECTS</b>			
<i>Curso</i>	<i>Tipo</i>	<i>ECTS</i>	<i>Responsabilidad</i>
Lengua y cultura españolas	Obligatoria*	-	UNIZAR
<b>Semestre 3: UTwente, Países Bajos (30 ECTS)</b>			
<b>Módulo 3.C.1 – 30 ECTS</b>			
<i>Curso</i>	<i>Tipo</i>	<i>ECTS</i>	<i>Responsabilidad</i>
Pilas, baterías de combustible y electrolizadores	Obligatoria	5	UTwente
Membranas de separación de gases y tratamiento de gases	Obligatoria	5	UTwente
Tratamiento del agua	Obligatoria	5	UTwente
Diseño de una planta de procesamiento de membrana	Obligatoria	5	UTwente
Microdispositivos y sensores	Obligatoria	4	UTwente
Proyecto individual (estudio bibliográfico y experimental)	Obligatoria	6	UTwente
<b>Módulo 3.C.2 – - ECTS</b>			
<i>Curso</i>	<i>Tipo</i>	<i>ECTS</i>	<i>Responsabilidad</i>
Lengua y cultura alemanas	Obligatoria*	-	UTwente

**Semestre 4: 30 ECTS**

**Módulo 4 - 24 semanas, encargo de investigación en la industria o en la universidad**

(\*) Obligatoria en al menos uno de los tres primeros semestres y asociada a la presentación oral del proyecto individual en el idioma nacional correspondiente.

#### **Tesis de Máster**

El último semestre se dedicará a una **tesis de máster** de 6 meses de duración en una universidad o industria, preferentemente dentro de la red de excelencia. La red abarca 15 laboratorios de 13 países diferentes seleccionados por la alta calidad de sus investigaciones en el área de atención.

## **ANEXOS : APARTADO 10**

**Nombre :** Cronograma.pdf

**HASH SHA1 :** gD/nAbYUVEV2ZWB4Y4U3roUjsek=

**Código CSV :** 48693214098341814633456

# CRONOGRAMA

