MIRRI IS21
IMPLEMENTATION AND SUSTAINABILITY FOR THE 21ST CENTURY
MICROBIAL RESOURCE RESEARCH INFRASTRUCTURE

D5.3

Curriculum and teaching methods for the Specialized EuroMiRC course

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Abstract:	Deliverable D5.3 reports the implementation of a "Specialization course" including the structure and syllabus. A transparent system with clear rules for call and selection process of the participants will be established and follow the QC/QA procedures that the HEI have put in place for their accreditation system.
Keywords:	EuroMiRC Course, Microbial Resources, Quality, Specialization

Dissemination level:	Public	X
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Abstract

This deliverable, D5.3, reports the implementation of a "Specialization course" including the structure and syllabus. A transparent system with clear rules for the call and selection process of the participants will be established and follow the QC/QA procedures that the HEI have put in place for their accreditation system. The delay in the submission of this deliverable was due to the difficulties of the UCL-BELSPO establishing this kind of course within the time frame of the project. To overcome this constraint the UMinho beneficiary took over the task to organise the specialized course. The course was launched in January 2023 at: https://ismirri21.mirri.org/project-platforms/euromirc_edition_1/.

Contents

1. Introduction

1. Introduction

IS_MIRRI21 Project Beneficiaries and partners of MIRRI-ERIC assemble a critical mass of microbiologists with long and internationally recognised research, innovation, and education experience. Therefore, the partners play a key role in keeping and generating knowledge on long-term microbial preservation methods, quality control and quality management of microbial resources, biosafety and biosecurity issues, such as handling hazardous microorganisms, quarantine lists or considerations on potential biological weapon agents, etc. All this available expertise is fragmented, and in the European landscape no single Higher Education Institution (HEI) can provide, in a single course, the training needed to create a new professional profile that enables to work on microbial Culture Collections (CC) or in the more advanced concept of Microbial Resource Centres (mBRC) that integrates a quality management system. Currently, University of Minho has all the necessary human and material resources to independently guarantee the creation and operation of the European Advanced Studies Course on Microbial Resource Centres (EuroMiRC), which aims to deliver a set of desired competencies to the trainees but will also create a new generation of highly qualified professionals to work in CC/mBRC. To enrich the student's experience, the participation of outstanding recognised experts around the world that represent the diversity of expertise of both IS_MIRRI21 and MIRRI-ERIC partners, will be considered, whenever possible and by invitation. This expert enhancement will make the trainees more attractive to employers, including industry, increase their mobility in the job market, and ensure the recognition of European CC's and mBRCs. In this way, this course intends to impact beyond the borders of CC/mBRC. The existence of a well-structured programme that actively encourages lifelong learning and interactions among CC/mBRC staff coming from mature, well-structured, emergent, or even new collections will create among the alumni the sense of belonging to a professional community that will share common approaches and language, and that is knowledgeable in scientific and bioindustry areas in which specific CC/mBRC outperform. The course covers competencies required at different phases of the CC/mBRC lifecycle and it can be tailored to meet the needs of CC/mBRC in their planning, construction, and operation phases. As a matter of consequence, the course vision is to develop a new generation of CC/mBRC professionals who recognise the necessity of undergoing advanced training to acquire state-of-the-art technical and managerial skills tailored to provide and perform better CC/mBRC services to the user communities.

Historically, the European Advanced Studies Course on Microbial Resource Centres (EuroMiRC) started ten years ago to be designed under the European FP7 project 228310 European Consortium of Microbial Resources Centres (EMbaRC, http://www.embarc.eu) under the networking activities – NA2 workpackage "Users access, training and outreach" led by University of Minho-Micoteca da Universidade do Minho. During the lifetime of this project, the central core of the course was developed with the main contribution of the CABI, INRA, IP, DSMZ, UVEG-CECT, SPP-PS and KNAW-CBS partners. Later, during the FP7 project 312251 Microbial

Resource Research Infrastructure (MIRRI, https://www.mirri.org/), the workpackage 7 “Capacity building, education and training”, also led by University of Minho-Micoteca da Universidade do Minho, delivered the strategic concept for innovative learning programmes and tools with the following partners: DSMZ, CABI, IP, SPP-PS, KNAW-CBS, UGOT, UVEG, UGENT, INRA, Jacobs Uni, MUT, CSIC, VKM, IAFB and USMI. Furthermore, the current H2020 project 871129 “Implementation and Sustainability of Microbial Resource Research Infrastructure for 21st Century” (IS_MIRRI21, https://ismirri21.mirri.org/), which is developed based on all previous work and gained experience, proposes in its work package 5 ”Capacity Building, Training and Education” the establishment of an advanced course to support the activities performed on the mBRCs. This task is led by BELSPO (UCL) with participation of UMinho-MUM, UVEG-CECT, NKUA, UL-MSCL and UNITO. Other partners and third-parties, such as Universidad de Las Palmas de Gran Canaria, intend to participate by providing their expertise to the overall course syllabus.

The course creation is detailed step by step in the approved course proposal and the annexes which formally (1) approves EuroMiRC as a non-degree b-learning course at the University of Minho, (2) embeds it into the Curricular structure and information system of UMINHO, and (3) launches the call for the course between 6-15 February 2023, and the student registration will take place between 20-24 February 2023.

2. Creation of European Advanced Studies Course on Microbial Resources Centre

2. Creation of EuroMiRC

2.1. I – Proposal Context

1. Reasons for creating the Course

The Microbial Resource Research Infrastructure-European Research Infrastructure Consortium (MIRRI-ERIC) assembles a critical mass of microbiologists with long and internationally recognised research, innovation, and education experience. Therefore, the partners play a key role in keeping and generating knowledge on long-term microbial preservation methods, quality control and quality management of microbial resources, biosafety and biosecurity issues, such as handling hazardous microorganisms, quarantine lists or considerations on potential biological weapon agents, etc. All this available expertise is fragmented, and in the European landscape no single Higher Education Institution (HEI) can provide, in a single course, the training needed to create a new professional profile that enables to work on microbial Culture Collections (CC) or in the more advanced concept of Microbial Resource Centres (mBRC) that integrates a quality management system. Currently, University of Minho has all the necessary human and material resources to independently guarantee the creation and operation of the European Advanced Studies Course on Microbial Resource Centres (EuroMiRC), which aims to deliver a set of desired competencies to the trainees but will also create a new generation of highly qualified professionals to work in CC/mBRC. To enrich the student's experience, the participation of outstanding recognised experts around the world that represent the diversity of expertise of the MIRRI-ERIC partners, will be considered, whenever possible and by invitation. This expert enhancement will make the trainees more attractive to employers, including industry, increase their mobility in the job market, and ensure the recognition of European CC's and mBRCs. In this way, this course intends to impact beyond the borders of CC/mBRC. The existence of a well-structured programme that actively encourages lifelong learning and interactions among CC/mBRC staff coming from mature, well-structured, emergent, or even new collections will create among the alumni the sense of belonging to a professional community that will share common approaches and language, and that is knowledgeable in scientific and bioindustry areas in which specific CC/mBRC outperform. The course covers competencies required at different phases of the CC/mBRC lifecycle and it can be tailored to meet the needs of CC/mBRC in their planning, construction, and operation phases. As a matter of consequence, the course vision is to develop a new generation of CC/mBRC professionals who recognise the necessity of undergoing advanced training to acquire state-of-the-art technical and managerial skills tailored to provide and perform better CC/mBRC services to the user communities.

2. Institutional framework of the Course

The European Advanced Studies Course on Microbial Resource Centres (EuroMiRC) started ten years ago to be designed under the European FP7 project 228310 European Consortium of Microbial Resources Centres (EMbaRC, http://www.embarc.eu) under the networking activities – NA2 workpackage "Users access, training and outreach" led by University of Minho-Micoteca da Universidade do Minho. During the lifetime of this project, the central core of the course was developed with the main contribution of the CABI, INRA, IP, DSMZ, UVEG-CECT, SPP-PS and KNAW-CBS partners. Later, during the FP7 project 312251 Microbial Resource Research Infrastructure (MIRRI, https://www.mirri.org/), the workpackage 7 "Capacity building, education and training", also led by University of Minho-Micoteca da Universidade do Minho, delivered the strategic concept for innovative learning programmes and tools with the following partners: DSMZ, CABI, IP, SPP-PS, KNAW-CBS, UGOT, UVEG, UGENT, INRA, Jacobs Uni, MUT, CSIC, VKM, IAFB and USMI. Furthermore, the current H2020 project 871129 "Implementation and Sustainability of Microbial Resource Research Infrastructure for 21st Century" (IS_MIRRI21, https://ismirri21.mirri.org/), which is developed based on all previous work and gained experience, proposes in its work package 5 "Capacity Building, Training and Education" the establishment of an advanced course to support the activities performed on the mBRCs. This task is led by BELSPO (UCL) with participation of UMinho-MUM, UVEG-CECT, NKUA, UL-MSCL and UNITO. Other partners and third-parties, such as Universidad de Las Palmas de Gran Canaria, intend to participate by providing their expertise to the overall course syllabus.

Finally, this course is the first one of a series of advanced courses that are expected to be delivered under the umbrella of MIRRI-ERIC, which headquarter is situated at University of Minho (Braga, Portugal).

3. Justification of the partnership

Not applicable.

4. General objectives of the Course

- To integrate scientific competences and management skills to access, preserve and supply microbial genetic resources and other related services;
- To manage Microbial Resources Centres under quality control standards and in compliance with the legal frameworks;
- To appraise the valorisation chain of the microbial diversity long-term preservation.

5. Target-public

Doctoral students (3rd cycle), post-doctoral researchers and professionals that want to acquire high-level international and management-oriented competencies on Microbial Resources Centres.

6. Conditions for admission and enrolment in the Course

The basic entry requirement for EuroMiRC is at least a master's degree (2nd cycle) in relevant areas such as Biology, Natural Sciences, Bioengineering, Biochemistry, Microbiology and Biotechnology. Other backgrounds, e.g., Food Sciences, Veterinary and Health Sciences, or other related scientific fields being admissible, providing the Scientific Committee gives its approval. Applicants must demonstrate sufficient levels of English proficiency (written and spoken functional command), documented by a certificate of English language proficiency (minimum proficiency level: TOEFL low-intermediate or equivalent, through recognized organizations such as the British Council or others). No difference in entry conditions is foreseen now between Associated or Third Countries and European applicants.

7. Training profile to be provided by the Course, including learning outcomes

By the end of this course, students will be able to:

- explain the role of CC/mBRC resources as an asset for the advancement of life sciences and biotechnology;
- describe the most frequent long-term microbial preservation methods;
- formulate strategies to implement a long-term microbial preservation plan;
- design operation strategies taking into consideration the long-term impact of quality control and risk assessment at CC/mBRC;
- implement strategies on CC/mBRC to fitness for the intended purpose under different legal, standards and regulatory requirements
- recognise the different options to apply information technologies and data management tools to CC/mBRC
- develop a field study to write an academic monograph.

8. Place and operating regime (cf. article 132.º of RAUM)

University of Minho, Biological Engineering Department, Building 7, Campus de Gualtar, Braga, Portugal

Opening hours: mixed

Operating mode: *b-learning*

Concentration on time: intensive regime

Given the characteristics of the course, namely the involvement of different institutions working in Microbial Resource Centres, the face-to-face component of this course is limited to two moments: the start of the course and the conclusion of it. The involvement in the training activities of most of the participant entities will be in the form of distance learning (*e-learning*).

9. Availability of human, technical and material resources

Material and technical resources are those normally required in courses with a face-to-face teaching component and are already available, including classrooms, projectors, access to the Blackboard, and ethernet connection points. The necessary human resources (listed in point 6 of the Course Characterization) comprise a group of professors and researchers from the University of Minho, and a group of professors and researchers from partner entities of the H2020 IS_MIRRI21 project (Consortium Agreement; concession contract reference 871129, which supersedes any additional memorandum of understanding).

10. Teacher training for teaching in *e-learning*

The indicated teaching team is trained to teach in *e-learning*.

2.2. II - General characterisation of the course

1. Course Title and Acronym

European Advanced Studies Course on Microbial Resource Centres (EuroMiRC)

2. Course Type

Advanced Studies

3. Proponent Organic Unit

School of Engineering

4. Partner Institutions, if applicable

Universitat de València-Estudi General (UVEG-CECT)

Universidad de Las Palmas de Gran Canaria (ULPGC-BEA)

University of Latvia (UL-MSCL)

National and Kapodistrian University of Athens (NKUA-CCUoA)

Universita Degli Studi Di Torino (UNITO-MUT)

Université Catholique de Louvain (UCL-BELSPO/MUCL)

Université de Liége (ULiége-BELSPO/ULC)

Institut National de Recherche pour l'Agriculture, l'alimentation et l'Environnement (INRAE)

Institut Pasteur

Westerdijk Institute – KNAW

Institute of Agricultural and Food Biotechnology – IAFB

5. Course Director

Armando Albino Dias Venâncio | Associate Professor | Biological Engineering Department, School of Engineering, University of Minho | Full Time

6. Course teaching team

Nelson Manuel Viana da Silva Lima | Full Professor | Institute of Education, University of Minho | Full Time

Célia Maria Gonçalves Soares | Junior Researcher| School of Engineering, University of Minho | Full Time

Paulo Alexandre da Costa Araújo Sampaio | Associate Professor | School of Engineering, University of Minho | Full Time

Miguel Francisco de Almeida Pereira Rocha | Associate Professor | School of Engineering, University of Minho | Full Time

Annick Wilmotte | Senior Research Associate FRS-FNRS | Faculty of Sciences, University of Liège | Full Time

Aurora Zuzuarregui Miró | Senior Research Technician | Spanish Type Culture Collection, University of Valencia | Full Time

Cony Decock | Senior Scientist | Earth and Life Institute, Université Catholique de Louvain | Full Time

Dominique Clermont | Expert Engineer | Collection de l'Institut Pasteur (CIP), Institut Pasteur | Full Time

Giovanna Cristina Varese | Professor | Dept. Life Sciences and Systems Biology, University of Torino | Full Time

Heide-Marie Daniel | Senior Scientist | Earth and Life Institute, Université Catholique de Louvain | Full Time

Indrikis Muiznieks | Full Professor | Faculty of Biology, University of Latvia | Full Time

José Miguel López Coronado | Senior Research Technician | Spanish Type Culture Collection, University of Valencia | Full Time

Marco Beccuti | Associate Professor | Computer Science Sept., University of Turin | Full Time

Raquel Hurtado-Ortiz | Head of Collection/Biobank | Microbiology Department, Institut Pasteur | Full Time

Rosa Aznar Novella | Full Professor | Faculty of Biology, University of Valencia | Full Time

Stéphane Declerck | Professor | Earth and Life Institute, Université Catholique de Louvain | Full Time

Vincent Van de Perre | Quality Manager | Faculty of Bioscience Engineering, VUB - Free University of Brussels; KULeuven - Catholic University of Leuven | Full Time

Virginie Storms | Communication Manager | Faculty of Science, University of Ghent | Full Time

7. Predominant scientific area of the Course

Chemical and Biological Engineering

8. Number of ECTS credits required to obtain the Diploma

30 ECTS

9. Title of Diploma awarded by the Course

Diploma in Advanced Studies on Microbial Resources Centre

10. Duration of the course

6 months

11. Working language

English

12. Proposed number of openings

15

13. Opening hours (cf. article 132.º of RAUM)

º Daytime

o After-work

● Mixed. The face-to-face mode will be in daytime; the face-to-face (study) and the *e-learning* (asynchronous or synchronous) mode will be mainly after work hours

14. Operating mode (cf. article 132.º of RAUM)

○ Face-to-face

● *b-learning*

○ *e-learning*

15. Concentration on time (cf. article 132.º of RAUM)

○ Regular regime

● Intensive regime

2.3. III - Curricular Structure, Study Plan and Course Operation

16. Curricular structure

Scientific area		**ECTS**		**Obs.**
Designation	**Initials**	**Mandatory**	**Elective**	
Informatics	I	5	-	
Industrial and Systems Engineering	EIS	5	-	
Chemical and Biological Engineering	EQB	20	-	
No. of ECTS - Partial Total		**30**	-	
No. of ECTS of the Course		**30**		

17. Study Plan and Course Operation

17.1. For Courses in *b-learning*

A) General structure

Curricular Units (CU)	**Teacher(s)**	**Scientific area**	**Duration** (Months)	**ECTS**	**Work hours**			**Teacher training for *e-learning***
					Total	**Face-to-face**	***e-learning***	
Principles and Foundations of Microbial Resource Centres	Nelson Lima	EQB	2	5	140	18	52	Yes
Decision-Making on Microbial Preservation	Célia Soares	EQB	2	5	140	18	52	Yes
Quality Standards and Biorisk Regulations	Paulo Sampaio	EIS	1	5	140		140	Yes
Organisation and Management of Microbial Resource Centres	Nelson Lima	EQB	2	5	140		140	Yes
Information Technologies and Data Management	Miguel Rocha	I	2	5	140		140	Yes

Curricular Units (CU)	**Teacher(s)**	**Scientific area**	**Duration** (Months)	**ECTS**	**Work hours**			**Teacher training for *e-learning***
					Total	**Face-to-face**	***e-learning***	
Project in Management of Microbial Resource Centres	Armando Venâncio	EQB	2	5	140	16	48	Yes
Total			**6**	**30**	**840**	**52** **8%**	**572** **92%**	

B) CU characteristics and operating regime

Curricular Units (1)	**Total work hours** (1)	**Face-to-face component**								**Component in *e-learning***					**Obs.**
		Work hours (1)								**Work hours** (1)					
		T (2)	**TP** (2)	**PL** (2)	**FW** (2)	**S** (2)	**I** (2)	**TG** (2)	**Another**	**Synchronous** (3)	**Autonomous** (4)	**Asynchronous** (5)	**Practical** (6)	**Other**	
Principles and Foundations of Microbial Resource Centres	140					12		6		12	20	6	14		
Decision-Making on Microbial Preservation	140					12		6		12	20	6	14		
Quality Standards and Biorisk Regulations	140									30	90	6	14		
Organisation and Management of Microbial Resource Centres	140									30	90	6	14		
Information Technologies and Data Management	140									30	90	6	14		
Project in Management of Microbial Resource Centres	140					2		14		8		40			

(1) According to the General Structure; (2) T – Theoretical; TP - Theoretical-Practical; PL – Practical Laboratory; FW - field work; S – Seminar; I – Internship; TG - Tutorial Guidance; (3)

Chat Type; (4) Study Type, Performing Tasks; (5) Type of Forum; (6) Type of Data Collection, Stage

18. Places of Internships or in-service training periods (if applicable)

Not applicable

19. Comments

2.4. IV – ANNEX TO THE COURSE

4.1 - Course Units

CU ID Card

Designation of the Course Unit (CU)

Principles and Foundations of Microbial Resource Centres

Responsible teacher and number and type(s) of hours (face-to-face or synchronous) he/she teaches

Nelson Lima (18h face-to-face; 7h synchronous)

Other teachers who teach the CU and the respective number and type(s) of hours (face-to-face or synchronous)

Indrikis Muiznieks (2h synchronous)

Rosa Aznar Novella (2h synchronous)

Giovanna Cristina Varese (1h synchronous)

CU objective(s) / purpose(s)

This UC aims to provide students with introductory principals and foundations of the culture collections (CC) and microBiological Resource Centres (mBRC) concepts, their evolution based on recommendations from different worldwide organisations, and their value as research infrastructures with impact in the life sciences and biotechnology domains.

Learning outcomes

LO 1- Describe the origin and evolution of CC/mBRC concepts.

LO 2- Explain the value of the CC/mBRC holdings for the advance of life sciences and biotechnology.

LO 3- Analyse the impact of different worldwide and regional organisations and their initiatives on the CC/mBRC activities.

LO 4- Evaluate the role of CC/mBRC as research infrastructures.

Syllabus

Origin and history of CCs. From the centenary culture collections up to the present, including private and public collections. The mBRC concept and the OECD initiative for the consolidation of the concept.

World-wide and regional initiatives involving mBRCs (WFCC, ECCO, ACM, FELACC, MIRRI, etc.)

CC/mBRC as research infrastructures and service providers to the life sciences and biotechnology users' communities. mBRCs as key players (tools) to foster bioeconomy. The CC/mBRC as key-players with other organisations such as UNEP, UN-FAO, UN-WIPO, OCDE, EC, GBIF, EoL, ToL, etc.

Teaching and learning methodologies

Interactive theoretical classes undertaken by the teachers (in synchronous *e-learning* format) and webinars given by guest lecturers (in asynchronous *e-learning* format) will have expository nature and will discuss the different topics covered in the syllabus. Active learning methodologies, centred on students, using strategies such as Team Based Learning, will be used. These activities will be complemented with individual and group works leading to the preparation of reports and/or seminars that constitute teaching/learning elements but also of evaluation. The Blackboard Collaborate Ultra platform adopted by UMinho will be used as tool to the teaching and learning activities. In addition, Zoom platform will be used as a last resort. A large of diversity of study materials will be made available to students, including webinars, video capsules, databases, scientific papers, book chapters and books, reports and statistics from international organisations.

To monitor student involvement in CU the presence and the participation will be registered and 2/3 of attendance is necessary to accomplish the minimum requirement to be assessed.

Learning assessment methodologies

The assessment will be based on the students´ participation and discussion, including the team activities (accounting for 30-40%), and individual written assignments (60-70%).

Essential bibliography

Overmann, J. (2015) Significance and future role of microbial resource centers. System Appl Microbiol. 38:258-265. https://doi.org/10.1016/j.syapm.2015.02.008

Boundy-Mills, K., et al. (2020) Preserving US microbe collections sparks future discoveries. J Appl Microbiol. 129(2):162-174. https://doi.org/10.1111/jam.14525

OECD (2007) Best Practice Guidelines for Biological Resource Centres. https://www.oecd.org/sti/emerging-tech/oecdbestpracticeguidelinesforbiologicalresourcecentres.htm

WFCC (1990) 100 years of culture collections. International House, Osaka. ISBN4-938693-01-1. https://wfcc.info/static/pdf/100%20YEARS%20OF%20CULTURE%20COLLECTIONS.pdf

Schüngel, M., Stackebrandt, E. (2015) Microbial Resource Research Infrastructure (MIRRI): Infrastructure to foster academic research and biotechnological innovation. Biotechnol J. 10:17-19. https://doi.org/10.1002/biot.201400481

CU ID Card

Designation of the Course Unit (CU)

Decision-Making on Microbial Preservation

Responsible teacher and number and type(s) of hours (face-to-face or synchronous) he/she teaches

Célia Soares (16h face-to-face; 7h synchronous)

Other teachers who teach the CU and the respective number and type(s) of hours (in person or synchronous)

Stéphane Declerck (2h synchronous)

Cony Decock (1h face-to-face; 1h synchronous)

Rosa Aznar Novella (1h synchronous)

Giovanna Cristina Varese (1h synchronous)

Annick Wilmotte (1h face-to-face)

CU objective(s) / purpose(s)

This UC aims to provide students with theoretical principals and applications of the different microbial preservation techniques and empower them for the decision-making on the use of cost-effective microbial preservation techniques.

Learning Outcomes (LO)

LO 1- Identify the different microbial preservation techniques.

LO 2- Select the suitable preservation techniques according to the target microbial groups.

LO 3- Assess the quality control (QC) and quality assurance (QA) on preservation procedures.

LO 4- Design decision-support and cost-effectiveness tools to establish a plan on microbial preservation.

Syllabus

Preservation techniques: cryopreservation, freeze-drying, L-drying, mineral water, serial subculturing.

Advantages and disadvantages of short- and long-term preservation techniques.

Microbial biological structures and molecules of interest for preservation.

Quality control and quality assurance concepts and their application to the preservation procedures.

Tools and approaches to support decision-making.

Cost-effective analysis: key points to perform an economic analysis to compare relative costs and outcomes of different preservation techniques while meeting the needs of user communities.

Teaching and learning methodologies

Interactive theoretical classes undertaken by the teachers (in synchronous *e-learning* format) and webinars given by guest lecturers (in asynchronous *e-learning* format) will have expository nature and will discuss the different topics covered in the syllabus. Active learning methodologies, centred on students, using strategies such as Team Based Learning, will be used. These activities will be complemented with individual and group works leading to the preparation of reports and/or seminars that constitute teaching/learning elements but also of evaluation. The Blackboard Collaborate Ultra platform adopted by UMinho will be used as tool to the teaching and learning activities. In addition, Zoom platform will be used as a last resort. A large of diversity of study materials will be made available to students, including webinars, video capsules, databases, scientific papers, book chapters and books, reports and statistics from international organisations.

To monitor student involvement in CU the presence and the participation will be registered and 2/3 of attendance is necessary to accomplish the minimum requirement to be assessed.

Learning assessment methodologies

The assessment will be based on the students´ participation and discussion, including the team activities (accounting for 30-40%), and individual written assignments (60-70%).

Essential bibliography

Adams, G. (2007). The Principles of Freeze-Drying. In: Day, J.G., Stacey, G.N. (eds) Cryopreservation and Freeze-Drying Protocols. Methods in Molecular Biology™, vol 368. Humana Press. https://doi.org/10.1007/978-1-59745-362-2_2

Day, J.G. (2007). Cryopreservation of Microalgae and Cyanobacteria. In: Day, J.G., Stacey, G.N. (eds) Cryopreservation and Freeze-Drying Protocols. Methods in Molecular Biology™, vol 368. Humana Press. https://doi.org/10.1007/978-1-59745-362-2_10

Smith, D., Onions, A.H.S. (1994) The preservation and maintenance of living fungi. 2nd edition. IMI Technical Handbooks, Vol. 2. CAB International, Wallingford, UK. https://doi.org/10.1111/j.1365-3164.1994.tb00033.x

Kirsop, B.E., Doyle, A. (1991) Maintenance of microorganisms and culture cells: A manual of laboratory methods. Academic Press, London. ISBN 0124103510.

Ryan, M.J., Smith, D., Jeffries, P. (2000) A decision-based key to determine the most appropriate protocol for the preservation of fungi. World J Microbiol Biotechnol 16:183-186. https://doi.org/10.1023/A:1008910006419

Peiren J., et al. (2015) Improving survival and storage stability of bacteria recalcitrant to freeze-drying: a coordinated study by European culture collections. Appl Microbiol Biotechnol. 99(8):3559-71. https://doi.org/10.1007/s00253-015-6476-6

CU ID Card

Designation of the Course Unit (CU)

Quality Standards and Biorisk Regulations

Responsible teacher and number and type(s) of hours (face-to-face or synchronous) he/she teaches

Paulo Sampaio (22h synchronous)

Other teachers who teach the CU and the respective number and type(s) of hours (in person or synchronous)

Heide-Marie Daniel (2h synchronous)

Raquel Hurtado-Ortiz (1h synchronous)

Vincent Van de Perre (2h synchronous)

Aurora Zuzuarregui Miró (3h synchronous)

CU objective(s) / purpose(s)

This UC aims to provide a thorough overview of the most relevant guidelines, quality standards and regulations applicable to CC/mBRCs activity, giving the students the necessary tools to define operation strategies taking into consideration the long-term impact of quality control and risk assessment.

Learning outcomes

LO 1- Identify different quality standards and biorisk regulations applicable for CC/mBRC operation.

LO 2- Select the most suitable guideline/standard/regulation applicable to different CC/mBRC implementation steps and operation procedures.

LO 3- Recommend strategies for CC/mBRC operation in accordance with the necessary standards and regulations.

LO 4- Determine the long-term impact of quality control and risk assessment on CC/mBRC management and sustainability.

Syllabus

Quality Control Standards and Best Practices Guidelines: ISO 9001:2015 (Quality management systems - Requirements); ISO 17025:2017 (General requirements for the competence of testing and calibration laboratories); The ISO/Technical Committee 276 (Biotechnology); ISO

20387:2018 and ISO/TR 22758:2020 (General requirements for biobanking and Implementation guide); ISO/CD 24088-1 (Requirements for the collection, processing, storage and transportation of microorganisms/ Part 1: Bacteria and Archaea); OECD Best Practices Guidelines for mBRCs; Principles of quality by testing versus quality by design.

International legal binding documents: Convention on Biological Diversity and Conference of the Parties; Budapest Treaty; Nagoya Protocol and EU regulation 511/2014 (Material Deposit Agreements and Material Transfer Agreements).

Biorisk Concepts and Regulations: Biosafety, Biosecurity, Code of Conduct on Biosecurity; Transport of biological resources / IATA Dangerous Goods Regulations; WHO classifications of microorganisms according to risk groups; Quarantine regulations and Phytosanitary passports.

Teaching and learning methodologies

Interactive theoretical classes undertaken by the teachers (in synchronous *e-learning* format) and webinars given by guest lecturers (in asynchronous *e-learning* format) will have expository nature and will discuss the different topics covered in the syllabus. Active learning methodologies, centred on students, using strategies such as Team Based Learning, will be used. These activities will be complemented with individual and group works leading to the preparation of reports and/or seminars that constitute teaching/learning elements but also of evaluation. The Blackboard Collaborate Ultra platform adopted by UMinho will be used as tool to the teaching and learning activities. In addition, Zoom platform will be used as a last resort. A large of diversity of study materials will be made available to students, including webinars, video capsules, databases, scientific papers, book chapters and books, reports and statistics from international organisations.

To monitor student involvement in CU the presence and the participation will be registered and 2/3 of attendance is necessary to accomplish the minimum requirement to be assessed.

Learning assessment methodologies

The assessment will be based on the students´ participation and discussion, including the team activities (accounting for 30-40%), and individual written assignments (60-70%).

Essential bibliography

OECD (2007) Best practice guidelines on biosecurity for BRCS. https://www.oecd.org/sti/emerging-tech/38778261.pdf

Secretariat of the Convention on Biological Diversity (2011) Nagoya protocol on Access to genetic resources and the fair and equitable sharing on benefits arising from their utilization to the convention on biological diversity. https://www.cbd.int/abs/doc/protocol/nagoya-protocol-en.pdf

World Health Organization (2020) WHO guidance on implementing regulatory requirements for biosafety and biosecurity in biomedical laboratories – a stepwise approach. Geneva. ISBN 978-

92-4-151626-6. https://apps.who.int/iris/bitstream/handle/10665/332244/9789241516266-eng.pdf

Smith, D., et al. (2017) Microorganisms: Good or Evil, MIRRI Provides Biosecurity Awareness. Curr Microbiol. 74(3):299-308. https://doi.org/10.1007/s00284-016-1181-y

Smith, D., et al. (2017) Explanation of the Nagoya Protocol on Access and Benefit Sharing and its implication for microbiology. Microbiology (Reading). 163(3):289-296. https://doi.org/10.1099/mic.0.000425

Verkley, G., et al. (2020) New ECCO model documents for Material Deposit and Transfer Agreements in compliance with the Nagoya Protocol. FEMS Microbiol Lett. 367(5):fnaa044. https://doi.org/10.1093/femsle/fnaa044

CU ID Card

Designation of the Course Unit (CU)

Organisation and Management of Microbial Resource Centres

Responsible teacher and number and type(s) of hours (face-to-face or synchronous) he/she teaches

Nelson Lima (23h synchronous)

Other teachers who teach the CU and the respective number and type(s) of hours (in person or synchronous)

Dominique Clermont (1h synchronous)

Aurora Zuzuarregui Miró (2h synchronous)

Virginie Storms (2h synchronous)

Giovanna Cristina Varese (2h synchronous)

CU objective(s) / purpose(s)

This UC aims to provide students with key aspects of CC/mBRCs organisation and management, including compliance to best practices guidelines, implementation of integrated management systems, formulation of business and financial plans.

Learning outcomes

LO 1- Identify different models of CC/mBRC organisation and management.

LO 2- Employ the best practices guidelines for CC/mBRC operation.

LO 3- Formulate business and financial plans for CC/mBRC operation.

LO 4- Evaluate the CC/mBRC fitness for the intended purpose.

Syllabus

Organisational life-cycle model.

Functions and Governance of mBRCs.

Best Practices Guidelines for mBRCs (Premises, Equipment, Calibration testing and maintenance records, Packing and Transport).

Policy Compliance Management System: integrated management system (governance, risk, responsibility, science); quality management system; quality assurance.

Business plan: market analysis; organisation and management; legal structure; provided services; marketing; financial projections.

Financial plan formulation: strategic plan creation and review; financial projection; funding sources; contingencies; monitoring.

Evaluation using key performance indicators (KPIs).

Teaching and learning methodologies

Interactive theoretical classes undertaken by the teachers (in synchronous *e-learning* format) and webinars given by guest lecturers (in asynchronous *e-learning* format) will have expository nature and will discuss the different topics covered in the syllabus. Active learning methodologies, centred on students, using strategies such as Team Based Learning, will be used. These activities will be complemented with individual and group works leading to the preparation of reports and/or seminars that constitute teaching/learning elements but also of evaluation. The Blackboard Collaborate Ultra platform adopted by UMinho will be used as tool to the teaching and learning activities. In addition, Zoom platform will be used as a last resort. A large of diversity of study materials will be made available to students, including webinars, video capsules, databases, scientific papers, book chapters and books, reports and statistics from international organisations.

To monitor student involvement in CU the presence and the participation will be registered and 2/3 of attendance is necessary to accomplish the minimum requirement to be assessed.

Learning assessment methodologies

The assessment will be based on the students´ participation and discussion, including the team activities (accounting for 30-40%), and individual written assignments (60-70%).

Essential bibliography

National Academies of Sciences, Engineering, and Medicine (2020) Biological Collections: Ensuring Critical Research and Education for the 21st Century. Washington, DC: The National Academies Press. https://doi.org/10.17226/25592

Schindel, D. E. and the Economic Study Group of the Interagency Working Group on Scientific Collections (2020) Economic Analyses of Federal Scientific Collections: Methods for Documenting Costs and Benefits. Report. Washington, DC: Smithsonian Scholarly Press. https://doi.org/10.5479/si.13241612

Overmann, J., Hartman Scholz, A. (2017) Microbiological Research Under the Nagoya Protocol: Facts and Fiction. Trends in Microbiology. 25(2):85-88 http://doi.org/10.1016/j.tim.2016.11.001

Smith, D., McCluskey, K., Stackebrandt, E. (2014) Investment into the future of microbial resources: culture collection funding models and BRC business plans for biological resource centres. Springerplus. 3:81. https://doi.org/doi:10.1186/2193-1801-3-81

Martin, D., et al. (2015) MIRRI Promoting Quality Management Systems for Microbiology. EC Microbiology. 2(2): 278-287.

De Vero, L., et al. (2019) Preservation, Characterization and Exploitation of Microbial Biodiversity: The Perspective of the Italian Network of Culture Collections. Microorganisms. 7(12):685. https://doi.org/10.3390/microorganisms7120685

CU ID Card

Designation of the Course Unit (CU)

Information Technologies and Data Management

Responsible teacher and number and type(s) of hours (face-to-face or synchronous) he/she teaches

Miguel Rocha (23h synchronous)

Other teachers who teach the CU and the respective number and type(s) of hours (in person or synchronous)

José Miguel López Coronado (5h synchronous)

Marco Beccuti (2h synchronous)

CU objective(s) / purpose(s)

This UC aims to provide students with key concepts to the establishment of an effective Data Management Plan through the use of Information Technologies to create, process, store, retrieve, and exchange data and information associated with CC/mBRCs microbial holdings.

Learning outcomes

LO 1- Describe the context and importance of information technologies to data management.

LO 2- Differentiate available databases in terms of requirements and provided information.

LO 3- Organise data under defined protocols and standards, namely following FAIR data principles.

LO 4- Determine which data sets should be collected and integrated for a variety of processes and activities as part of a data management plan.

Syllabus

Evolution of microorganisms' data systematization in Europe (MINE, CABRI, StrainInfo, MIRRI-IS).

Databases and relevant websites.

The importance of structured microorganisms' data in catalogues: database design basics; identifiers - make your resources unique; ontologies - powerful tools to organise your data; metadata - the context to your data.

FAIR data principles.

A Data Management Plan user case: the MIRRI-IS specifications.

Teaching and learning methodologies

Interactive theoretical classes undertaken by the teachers (in synchronous *e-learning* format) and webinars given by guest lecturers (in asynchronous *e-learning* format) will have expository nature and will discuss the different topics covered in the syllabus. Active learning methodologies, centred on students, using strategies such as Team Based Learning, will be used. These activities will be complemented with individual and group works leading to the preparation of reports and/or seminars that constitute teaching/learning elements but also of evaluation. The Blackboard Collaborate Ultra platform adopted by UMinho will be used as tool to the teaching and learning activities. In addition, Zoom platform will be used as a last resort. A large of diversity of study materials will be made available to students, including webinars, video capsules, databases, scientific papers, book chapters and books, reports and statistics from international organisations.

To monitor student involvement in CU the presence and the participation will be registered and 2/3 of attendance is necessary to accomplish the minimum requirement to be assessed.

Learning assessment methodologies

The assessment will be based on the students´ participation and discussion, including the team activities (accounting for 30-40%), and individual written assignments (60-70%).

Essential bibliography

ISO 21710:2020 Biotechnology — Specification on data management and publication in microbial resource centers

Becker, P. et al. (2019) Public Microbial Resource Centers: Key Hubs for Findable, Accessible, Interoperable, and Reusable (FAIR) Microorganisms and Genetic Materials. Appl Environ Microbiol. 85(21):e01444-19. https://doi.org/10.1128/AEM.01444-19

M. Wilkinson et al. The FAIR Guiding Principles for scientific data management and stewardship, Scientific Data 3, 160018 (2016)

K. Briney. Data Management for researchers. Pelagic Publishing, 2014

T. Koltay. Research Data Management and Data Literacies. Elsevier, 2021

A. Via, k. Rother and A. Tramontano. Managing Your Biological Data with Python. Chapman & Hall, 2014

The FAIR Cookbook. Available at: https://faircookbook.elixir-europe.org/content/home.html

CU ID Card

Designation of the Course Unit (CU)

Project in Management of Microbial Resource Centres

Responsible teacher and number and type(s) of hours (face-to-face or synchronous) he/she teaches

Armando Venâncio (16h face-to-face; 8h synchronous)

Other teachers who teach the CU and the respective number and type(s) of hours (in person or synchronous)

All course teaching team members entitled as supervisor (14h seminar and 8h synchronous each)

CU objective(s) / purpose(s)

To deepen knowledge in a particular applied scientific area by developing a critical case-study essay.

Learning outcomes

LO 1- Review the most relevant bibliography on a given topic to be developed.

LO 2- Categorize and compare information on a given topic.

LO 3- Write a monograph where the topic is framed, presented, and discussed.

LO 4- Synthesize and present the key take-home messages on the topic before colleagues and a jury.

Syllabus

The topic of the Project in Management of Microbial Resource Centres should be aligned with one of the scientific areas covered in the Course and will be selected by the student, under the supervision of one of the Course Teaching team members.

Teaching and learning methodologies

Independent work guided by a tutor that will include research and consultation of bibliographic sources.

Learning assessment methodologies

The assessment will be based on the students´ individual written monograph and its presentation and discussion before a jury (100%).

Essential bibliography

Documentation resulting from bibliographic research carried out under the supervision of the Project in Management of Microbial Resource Centres tutor.

4.2 - Curriculum Sheets for Teachers

Teacher Curricular Form

Personal data

Name	**Armando Albino Dias Venâncio**
Higher Education Institution (HEI)	University of Minho
Organic unit	School of Engineering
Category	Associate Professor
Higher academic degree	PhD
Scientific area of this academic degree	Chemical and Biological Engineering
Year in which this academic degree was obtained	1996
Institution that awarded this academic degree	University of Minho
Time regime at HEI	100 %

Other academic degrees or titles

Year	Degree or title	Area	Institution	Classification
1991	Licenciatura	Engenharia Química	Universidade do Porto	14

Relevant professional experience for the Course

Over 20 years' experience in academic activities (including teaching in the field of Biological Engineering, Course Director, Head of Department, Erasmus Academic coordinator, among others)
Coordinator in the last 5 years of curricular units, in different degrees, closely related with 'Project in Management of Microbial Resource Centres' Unit of the current Course
Section editor and reviewer of scientific journal in the field of microbial metabolites (e.g., World Mycotoxin Journal)

Research experience relevant to the Course

Co-Coordinator of the H2020 EU project IS_MIRRI21 (www.ismirri21.org)
Guimarães A, **Venâncio A**. The Potential of Fatty Acids and Their Derivatives as Antifungal Agents: A Review. Toxins, 14(3):188, 2022. [10.3390/toxins14030188] http://hdl.handle.net/1822/76433
Rodrigues P., Silva D., Costa P., Abrunhosa L., **Venâncio A.**, Teixeira, A. Mycobiota and mycotoxins in Portuguese pork, goat and sheep dry-cured hams. Mycotoxin Research, 35(4), 405-412, 2019 [10.1007/s12550-019-00374-8] http://hdl.handle.net/1822/61856

CU to teach in the Course

Course Unit	Contact hours to teach in the Course	
	Face-to-face component	Component in *e-learning*(1)
Project in Management of Microbial Resource Centres	16 h	8 h

(1) Consider synchronous hours

Teacher Curricular Form

Personal data

Name	**Nelson Manuel Viana da Silva Lima**
Higher Education Institution (HEI)	University of Minho
Organic unit	Institute of Education
Category	Full Professor
Higher academic degree	PhD
Scientific area of this academic degree	Science Engineering (Biotechnology)
Year in which this academic degree was obtained	1993
Institution that awarded this academic degree	University of Minho
Time regime at HEI	Full Time

Other academic degrees or titles

Year	Degree or title	Area	Institution	Classification
1983	1st Degree	Teaching in Biology and Geology	University of Minho	15/20
2003	Habilitation	Study of the physical environment and elementary mathematics	University of Minho	Approved

Relevant professional experience for the Course

Board member of the FCT PhD Programme on Applied and Environmental Microbiology
Vice-President of the Portuguese Society of Microbiology
Coordinator of the Portuguese MIRRI Node

Research experience relevant to the Course

Coordinator of the H2020 EU project IS_MIRRI21 (www.ismirri21.org)

Martins, A., Martins da Silva, J.F., Sampaio, P., **Lima, N**. (2022) Quality and competence management in microbial biobanks. *In*: Kurtböke, I. (Ed) Importance of microbiology teaching and microbial resource management for sustainable futures. Chap. 7, pp. 158:192. Academic Press: London. ISBN: 978-0-12-818272-7.
Santos, C., Galeano, P., Lima-Neto, R., Oliveira, M.M.E., **Lima, N.** (2021) MALDI-TOS MS and its requirements for fungal identification. *In*: Bridge, P., Smith, D. & Stackebrandt, E. (Eds) Trends in the systematics of bacteria and fungi. Chap. 8, pp. 119-139. CAB International: Gloucester. ISBN: 978-1-78-924498-4.

CU to teach in the Course

Course Unit	Contact hours to teach in the Course	
	Face-to-face component	Component in *e-learning*(1)
Principles and Foundations of Microbial Resource Centres	18	7
Organisation and Management of Microbial Resource Centres	0	23

(1) Consider synchronous hours

Teacher Curricular Form

Personal data

Name	**Célia Maria Gonçalves Soares**
Higher Education Institution (HEI)	University of Minho
Organic unit	School of Engineering
Category	Junior Researcher
Higher academic degree	PhD
Scientific area of this academic degree	Chemical and Biological Engineering
Year in which this academic degree was obtained	2012
Institution that awarded this academic degree	University of Minho
Time regime at HEI	Full time

Other academic degrees or titles

Year	Degree or title	Area	Institution	Classification
2007	Master	Technology, Science and Food Safety	University of Porto	Very good
2004	1st Degree	Teaching in Biology and Geology	University of Minho	15/20

Relevant professional experience for the Course

Invited Assistant Professor Master on Biological Engineering on Food Mycology (2021/2022)
Invited Assistant Professor Graduation Course in Microbiology - Lecturer of Mycology Course (2018/2019)
Curator of Micoteca da Universidade do Minho culture collection

Research experience relevant to the Course

Rodriguez, R.; Santos, C.; Simões, M.F.; Soares, C.; Santos, C.; Lima, N, 2019. Polyphasic, Including MALDI-TOF MS, Evaluation of Freeze-Drying Long-Term Preservation on *Aspergillus* (section *Nigri*) Strains. Microorganisms, 7, 291. Doi: doi.org/10.3390/microorganisms7090291
Decontardi, S., Soares, C., Lima, N., Battilani, P., 2018. Polyphasic identification of Penicillia and Aspergilli isolated from Italian grana cheese. Food Microbiology 73, 137-149. DOI: 10.1016/j.fm.2018.01.012
Costa, J., Rodriguez, R., Santos, C., Soares, C., Lima, N., Santos, C., 2020. Mycobiota in Chilean chilli *Capsicum annuum* L. used for production of Merkén. International Journal of Food Microbiology, 334(108833). DOI: 10.1016/j.ijfoodmicro.2020.108833

CU to teach in the Course

Course Unit	Contact hours to teach in the Course	
	Face-to-face component	Component in *e-learning*(1)
Decision-Making on Microbial Preservation	16	7

(1) Consider synchronous hours

Teacher Curricular Form

Personal data

Name	**Paulo Alexandre da Costa Araújo Sampaio**
Higher Education Institution (HEI)	University of Minho
Organic unit	School of Engineering
Category	Associate Professor
Higher academic degree	PhD
Scientific area of this academic degree	Industrial Engineering and Management
Year in which this academic degree was obtained	2008
Institution that awarded this academic degree	University of Minho
Time regime at HEI	Full Time

Other academic degrees or titles

Year	Degree or title	Area	Institution	Classification
2002	Graduation	Industrial Engineering and Management	University of Minho	17/20

Relevant professional experience for the Course

Dias, A., Carvalho, A., Sampaio, P. (2022) “Quality 4.0: literature review analysis, definition, and impacts of the digital transformation process on quality”, International Journal of Quality and Reliability Management, Vol. 39, Nº 6, pp. 1312-1335.
Ramires, F., Sampaio, P. (2022) “Process mining and lean six sigma: a novel approach to analyze the supply chain quality of a hospital”, International Journal of Lean Six Sigma, Vol. 13, Nº 3, pp. 594-621.
Correia, F., Carvalho, A., Campbell-Allen, N., Sampaio, P. (2021) “A new approach to organizational excellence for small and medium enterprises: the QOE-SME Model”, Total Quality Management and Business Excellence, Vol. 32, Nº 12, pp. 1359-1383.

Research experience relevant to the Course

SMART-QUAL: structured indicators to manage HEI Quality System Entidade financiadora: European Commission/Erasmus+/KA2; Entidade promotora: CONEXX – EUROPE, Bélgica; Referência: KA203-908CDBE6; Período: Outubro de 2020 - … Equipa: Consórcio Europeu composto por universidades e empresas europeias Posição: Investigador Responsável na UMinho Orçamento: 19.656,00€ para a UMinho (Orçamento Global: 187.213,00€)
Advanced Decision Making in productive systems through Intelligent Networks Entidade financiadora: AICEP/P2020; Entidade promotora: Sonae Arauco; Co-promotores: Universidade do Minho e Centro de Computação Gráfica; Referência: T589877752-00064356; Período: Abril de 2021 - … Posição: Investigador Responsável na UMinho Orçamento: 806.334,75€ para a UMinho (Orçamento Global: 2.123.253,47€)
Innovative Car HMI Driving Change / Supply Chain Quality Management Entidade financiadora: Compete 2020; Entidade promotora: Bosch Car Multimedia; Co-promotor: Universidade do Minho; Referência: Projecto nº 002814, iFACTORY – SI&IDT – I&D Empresas em Co-promoção; Período: Julho 2015 – Julho 2018 Posição: Coordenador da Linha de Investigação (Investigador Responsável) Orçamento da Linha de Investigação: 145.120,00€ (Orçamento Global: 32.310.800,89€; Orçamento UMinho: 12.754.548,61€)

CU to teach in the Course

Course Unit	Contact hours to teach in the Course	
	Face-to-face component	Component in *e-learning*(1)
Quality Standards and Biorisk Regulations	0	22

(1) Consider synchronous hours

Teacher Curricular Form

Personal data

Name	**Miguel Francisco de Almeida Pereira da Rocha**
Higher education institution	University of Minho
Organic unit	School of Engineering
Category	Associate Professor
Higher academic degree	PhD
Scientific area of this academic degree	Informatics
Year in which this academic degree was obtained	2004
Institution that awarded this academic degree	University of Minho
Time regime at UMinho	Full time

Other academic degrees or titles

Year	Degree or title	Area	Institution	Classification
1998	MSc	Informatics	University of Minho	Very good
1995	1st degree (licenciatura)	Systems and Informatics Engineering	University of Minho	17 (out of 20)

Relevant professional experience for the Course (3 references; last 5 years)

President of the Board of the BIP4DAB association (Biodata.pt) since 2021
Founder of the spin-offs SilicoLife (2010) and OmniumAI (2021)
PI of the Bioinformatics and Systems Biology team at the Centre of Biological Engineering https://www.ceb.uminho.pt/biosystems/Research/Lab?lab=1

Research experience relevant to the Course (3 projects and/or papers; last 5 years)

PI of the UMinho team in the H2020 project Shikifactory100 (https://www.shikifactory100.eu/)
Book**:** Rocha M. e Ferreira P. (2017) Análise e exploração de dados com R. FCA
Pedagogical publication: Lino-Neto, T., Ribeiro, E., Rocha, M., & Costa, M. J. (2021). Going virtual and going wide: comparing Team-Based Learning in-class versus online and across disciplines. Education and Information Technologies, 1-19.

CU to teach in the Course

Course Unit	Contact hours to teach in the Course	
	Face-to-face component	Component in *e-learning*(1)
Information Technologies and Data Management	0	23

(1) Consider synchronous hours

Teacher Curricular Form

Personal data

Name	**Annick Wilmotte**
Higher Education Institution (HEI)	University of Liège
Organic unit	Faculty of Sciences
Category	Senior Research Associate FRS-FNRS
Higher academic degree	PhD
Scientific area of this academic degree	Botany
Year in which this academic degree was obtained	1989
Institution that awarded this academic degree	University of Liège
Time regime at HEI	100%

Other academic degrees or titles

Year	Degree or title	Area	Institution	Classification
1985	Teacher upper secondary education	Biology	University of Liège	Great distinction

Relevant professional experience for the Course

Director and manager of the BCCM/ULC public collection of cyanobacteria since 2011 (curator till 2017)
Project leader of research group on biodiversity, taxonomy, ecology, and evolution of cyanobacteria since 1996
Scientific advisor to the Belgian delegation at the Committee for Environmental Protection of the Antarctic Treaty since 2008

Research experience relevant to the Course

Haande, S., Jasser, I., Gugger, M., Hagman, C. H., Wilmotte, A., & Ballot, A. (2017). Isolation, Purification, and Cultivation of Toxigenic Cyanobacteria. In R. Kurmayer, K. Sivonen, A.

Wilmotte, & N. Salmaso, *Molecular Tools for the Detection and Quantification of Toxigenic Cyanobacteria* (This edition first published 2017, pp. 43-78). Hoboken, United States - New Jersey: John Wiley and sons LTD. https://hdl.handle.net/2268/212165
Becker, P, Bosschaerts, M, Chaerle P, Daniel, HM, Hellemans, A, Olbrechts, A, Rigouts, L, Wilmotte, A, Hendrick M (2019) Public microbial resource centers: key hubs for findable, accessible, interoperable, and reusable (FAIR) microorganisms and genetic material. Appl. Env. Microbiol.85: e01444-19. DOI 10.1128/AEM.01444-19.
Hughes, K., Constable, A., Frenot, Y., Lopez-Martinez, J., McIvor, E., Njåstad, B., Terauds, A., Liggett, D., Roldan, G., Wilmotte, A., & Xavier, J. C. (May 2018). Antarctic environmental protection: strengthening the links between science and governance. *Environmental Science and Policy, 83*, 86-95. doi:10.1016/j.envsci.2018.02.006

CU to teach in the Course

Course Unit	Contact hours to teach in the Course	
	Face-to-face component	Component in *e-learning*(1)
Decision-Making on Microbial Preservation	1	

(1) Consider synchronous hours

Teacher Curricular Form

Personal data

Name	**Aurora Zuzuarregui Miró**
Higher Education Institution (HEI)	University of Valencia
Organic unit	Spanish Type Culture Collection
Category	Senior Research Technician
Higher academic degree	PhD
Scientific area of this academic degree	Biology (Microbiology)
Year in which this academic degree was obtained	2005
Institution that awarded this academic degree	University of Valencia
Time regime at HEI	100%

Other academic degrees or titles

Year	Degree or title	Area	Institution	Classification
2001	Degree	Biochemistry	U. Valencia	8,63/10
2000	Degree	Biology	U. Valencia	8,39/10

Relevant professional experience for the Course

Quality management officer at the Spanish Type Culture Collection (CECT) since 2011
Microbial Resources Manager at the CECT since 2013
CECT liaison officer for Nagoya Protocol issues since 2017

Research experience relevant to the Course

Researcher at Project reference: INFRADEV03 RIA GA Nº 871129 Title: Implementation and Sustainability of Microbial Resource Research Infrastructure for 21st Century (IS_MIRRI21) Principal investigator (UVEG): Rosa Aznar

Financing entity: European Commission Duration: 01/02/2020 - 30/01/2023
Gerard Verkley, Giancarlo Perrone, Mery Piña, Amber Hartman Scholz, Jörg Overmann, Aurora Zuzuarregui, Iolanda Perugini, Benedetta Turchetti, Marijke Hendrickx, Glyn Stacey, Samantha Law, Julie Russell, David Smith, Nelson Lima, New ECCO model documents for Material Deposit and Transfer Agreements in compliance with the Nagoya Protocol, *FEMS Microbiology Letters*, Volume 367, Issue 5, March 2020, fnaa044, https://doi.org/10.1093/femsle/fnaa044
Researcher at Project reference: RMP2015-00001-00-00 Title: Sustainable preservation of Spanish microbial resources under quality standards through an integrative approach and enhancing their visibility Principal investigator: Rosa Aznar Financing entity: INIA – AEI – Spanish Ministry of Science, Innovation and Universities Duration: 01/04/2017 - 31/12/2021

CU to teach in the Course

Course Unit	Contact hours to teach in the Course	
	Face-to-face component	Component in *e-learning*(1)
Quality Standards and Biorisk Regulations	0	3
Organisation and Management of Microbial Resource Centres	0	2

(1) Consider synchronous hours

Teacher Curricular Form

Personal data

Name	**Cony Decock**
Higher Education Institution (HEI)	Université Catholique de Louvain
Organic unit	Earth and Life Institute
Category	Senior Scientist
Higher academic degree	PhD
Scientific area of this academic degree	Engineering Sciences (Biotechnology)
Year in which this academic degree was obtained	2000
Institution that awarded this academic degree	Université Catholique de Louvain
Time regime at HEI	100%

Other academic degrees or titles

Year	Degree or title	Area	Institution	Classification
1989	Diplom Ingenieur (MSc)	Agronomy	Université Catholique de Louvain	Grande distinction

Relevant professional experience for the Course

Curator of Filamentous fungi at the BCCM/MUCL collection, continued since 2006

Research experience relevant to the Course

David Navarro, Delphine Chaduli, Sabine Taussac, Laurence Lesage-Meessen, Sacha Grisel1, Mireille Haon, Philippe Callac, Régis Courtecuisse, Cony Decock, Joëlle Dupont, Florence Richard-Forget, Jacques Fournier, Jacques Guinberteau, Christian Lechat, Pierre-Arthur Moreau, Laetitia Pinson-Gadais, Bernard Rivoire, Lucile Sage, Stéphane Welti, Marie-Noëlle Rosso, Jean-Guy Berrin, Bastien Bissaro, Anne Favel. 2021. Large-scale phenotyping of 1,000 fungal strains for the degradation of non-natural, industrial Compounds. Nature Communication Biology. https://doi.org/10.1038/s42003-021-02401-w/

CU to teach in the Course

Course Unit	Contact hours to teach in the Course	
	Face-to-face component	Component in *e-learning*(1)
Decision-Making on Microbial Preservation	1	1

(1) Consider synchronous hours

Teacher Curricular Form

Personal data

Name	**Dominique Clermont**
Higher Education Institution (HEI)	Institut Pasteur
Organic unit	Collection de l'Institut Pasteur (CIP)
Category	Expert engineer
Higher academic degree	PhD + habilitation
Scientific area of this academic degree	Microbiology
Year in which this academic degree was obtained	1993
Institution that awarded this academic degree	University of Odontology, Paris VII, France
Time regime at HEI	100%

Other academic degrees or titles

Year	Degree or title	Area	Institution	Classification
1983	Doctor of dental surgery	Dentistry	University of Odontology, Lyon, France	/

Relevant professional experience for the Course

Twenty years at the CIP and Head of the CIP since 2019
Scientific Officer au board de l'ECCO (European Culture Collection's Organisation) de 2013 à 2019
Responsible for several hours of courses at the University, organization of a BRC training session in the OHEJP-CARE project

Research experience relevant to the Course

Constitution of a reference strain collection for *S. aureus*, *B. cereus* and *C. perfringens* in the OHEJP-Tox-Detect project 2018-2021

Setting of a collection of anaerobic strains isolated from the human gut microbiome
Population structure analysis and laboratory monitoring of Shigella by core-genome multilocus sequence typing I.Yassine, S. Lefèvre , E. E. Hansen, C. Ruckly, I. Carle, M. Lejay-Collin, L. Fabre, R. Rafei, **D. Clermont**, M. Pardos de la Gandara, F. Dabboussi, N. R. Thomson & F-X Weill NATURE COMMUNICATIONS | (2022) 13:551 | https://doi.org/10.1038/s41467-022-28121-1

CU to teach in the Course

Course Unit	Contact hours to teach in the Course	
	Face-to-face component	Component in *e-learning*(1)
Organisation and Management of Microbial Resource Centres	0	1

(1) Consider synchronous hours

Teacher Curricular Form

Personal data

Name	**Giovanna Cristina Varese**
Higher Education Institution (HEI)	University of Torino
Organic unit	Department of Life Sciences and Systems Biology
Category	Full Professor
Higher academic degree	PhD
Scientific area of this academic degree	Biology (Microbiology)
Year in which this academic degree was obtained	2019
Institution that awarded this academic degree	University of Torino
Time regime at HEI	Full Time

Other academic degrees or titles

Year	Degree or title	Area	Institution	Classification
2006	Head of MUT	Mycology	University of Torino	
1999	Technician at MUT	Microbiology	University of Torino	
1993	Degree	Biology	University of Torino	110/110 cum laude

Relevant professional experience for the Course

Scientific Head of the Mycotheca Universitatis Taurinensis (MUT) since 2002
Follow-up of student during degree and Master Thesis
Coordinator of the Joint research Unit MIRRI-IT since 2017

Research experience relevant to the Course

Principal investigator (UNITO); Project reference: INFRADEV03 RIA GA Nº 871129

Title: Implementation and Sustainability of Microbial Resource Research Infrastructure for 21st Century (IS_MIRRI21) Financing entity: European Commission Duration: 01/02/2020 - 30/01/2023
Coordinator (UNITO); Project reference: PNRR SUS-MIRRI.IT Title: Strengthening the Mirri Italian Research Infrastructure for Sustainable Bioscience and Bioeconomy Financing entity: Italian Ministry of Research (MUR)s Duration: 01/07/2021 - 30/06/2024
Deposit of microbial strains in public service collections as part of the publication process to underpin good practice in science. E. Stackebrandt, D. Smith, S. Casaregola, **G.C. Varese**, G. Verkleij, N. Lima, P. Bridge. SpringerPlus. £ (!) 1-4.

CU to teach in the Course

Course Unit	Contact hours to teach in the Course	
	Face-to-face component	Component in *e-learning*(1)
Principles and Foundations of Microbial Resource Centres	0	1
Decision-Making on Microbial Preservation	0	1
Organisation and Management of Microbial Resource Centres	0	2

(1) Consider synchronous hours

Teacher Curricular Form

Personal data

Name	**Heide-Marie Daniel**
Higher Education Institution (HEI)	Université Catholique de Louvain
Organic unit	Earth and Life Institute
Category	Senior Scientist
Higher academic degree	PhD
Scientific area of this academic degree	Engineering Sciences (Biotechnology)
Year in which this academic degree was obtained	2002
Institution that awarded this academic degree	Technische Universität Berlin
Time regime at HEI	100%

Other academic degrees or titles

Year	Degree or title	Area	Institution	Classification
1997	Diplom Ingenieur (MSc)	Biotechnology	Technische Universität Berlin	Approved

Relevant professional experience for the Course

Curator of yeasts at the BCCM/MUCL collection, continued since 2006
Internal auditor for the Quality Management System according to the ISO 9001 at BCCM/MUCL, continued since 2009

Research experience relevant to the Course

Boundy-Mills, KL, Glantschnig E, Roberts IN, Yurkov A, Casaregola S, Daniel HM, Groenewald M, Turchetti B (2016) Yeast culture collections in the twenty-first century: new opportunities and challenges. Yeast DOI 10.1002/yea.3171
Becker, P, Bosschaerts, M, Chaerle P, Daniel, HM, Hellemans, A, Olbrechts, A, Rigouts, L, Wilmotte, A, Hendrick M (2019) Public micobial resource centers: key hubs for findable,

accessible, interoperable, and reusable (FAIR) microorganisms and genetic material. Appl. Env. Microbiol.85: e01444-19. DOI 10.1128/AEM.01444-19.

CU to teach in the Course

Course Unit	Contact hours to teach in the Course	
	Face-to-face component	Component in *e-learning*(1)
Quality Standards and Biorisk Regulations	0	2

(1) Consider synchronous hours

Teacher Curricular Form

Personal data

Name	**Indrikis Muiznieks**
Higher Education Institution (HEI)	University of Latvia (UL)
Organic unit	Faculty of Biology University of Latvia
Category	Full Professor
Higher academic degree	Dr.habil.biol.
Scientific area of this academic degree	Microbiology and Biotechnology
Year in which this academic degree was obtained	1997
Institution that awarded this academic degree	University of Latvia
Time regime at HEI	100%

Other academic degrees or titles

Year	Degree or title	Area	Institution	Classification
1997	Habilitation	Investigations on microbial synthesis of immunomodulators	UL	Approved
1976	1st Degree	Microbiology and Biotechnology	UL	Approved

Relevant professional experience for the Course

Head of the Department of Microbiology and Biotechnology Faculty of Biology UL since 1998
Dean of the Faculty of Biology UL (1997-2000)
Rector and acting Rector University of Latvia, since 2015.

Research experience relevant to the Course

Team leader of MSCL-UL in the Horizon 2020 project “IS_MIRRI21” since February 2020.

Cooperation project of the Latvian Council of Science: “Development of research and technology potential for new nanostructured materials and their applications” since 2019.
Malinovskis U., Dutovs A., Poplausks R., Jevdokimovs D., Graniel O., Bechelany M., I Muiznieks I., Erts D. Prikulis J. (2021) Visible Photoluminescence of Variable-Length Zinc Oxide Nanorods Embedded in Porous Anodic Alumina Template for Biosensor Applications. Coatings 11, 756. https://doi.org/10.3390/coatings11070756.

CU to teach in the Course

Course Unit	Contact hours to teach in the Course	
	Face-to-face component	Component in *e-learning*(1)
Principles and Foundations of Microbial Resource Centres	0	2

(1) Consider synchronous hours

Teacher Curricular Form

Personal data

Name	**José Miguel López Coronado**
Higher Education Institution (HEI)	Universidad de Valencia
Organic unit	Spanish Type Culture Collection
Category	Senior Research Technician
Higher academic degree	PhD
Scientific area of this academic degree	Biology (Biochemistry)
Year in which this academic degree was obtained	1999
Institution that awarded this academic degree	Universidad Politécnica de Valencia
Time regime at HEI	100%

Other academic degrees or titles

Year	Degree or title	Area	Institution	Classification
1994	Degree	Biology	U. Valencia	8.01/10

Relevant professional experience for the Course

IT officer at the Spanish Type Culture Collection (CECT) since 2000
Patent officer at the CECT since 2000
IT representative at the ECCO board from 2012 to 2021

Research experience relevant to the Course

Researcher at Project reference: INFRADEV03 RIA GA Nº 871129 Title: Implementation and Sustainability of Microbial Resource Research Infrastructure for 21st Century (IS_MIRRI21) Principal investigator (UVEG): Rosa Aznar Financing entity: European Commission

Duration: 01/02/2020 - 30/01/2023
Researcher at Project reference: INFRAEOSC-04-2018 RIA GA Nº 824087 Title: Providing an open collaborative space for digital biology in Europe (EOSC-Life) Principal investigator (UVEG): Rosa Aznar Financing entity: European Commission Duration: 01/03/2019 - 28/02/2023
Researcher at Project reference: RMP2015-00001-00-00 Title: Sustainable preservation of Spanish microbial resources under quality standards through an integrative approach and enhancing their visibility Principal investigator: Rosa Aznar Financing entity: INIA – AEI – Spanish Ministry of Science, Innovation and Universities Duration: 01/04/2017 - 31/12/2021

CU to teach in the Course

Course Unit	Contact hours to teach in the Course	
	Face-to-face component	Component in *e-learning*(1)
Information Technologies and Database Management	0	5

(1) Consider synchronous hours

Teacher Curricular Form

Personal data

Name	**Marco Beccuti**
Higher Education Institution (HEI)	University of Turin
Organic unit	Computer Science Dept.
Category	Associate Professor
Higher academic degree	Doctor of Philosophy (Ph.D.)
Scientific area of this academic degree	Computer Science
Year in which this academic degree was obtained	2008
Institution that awarded this academic degree	University of Turin and University of Paris Dauphin.
Time regime at HEI	Full time

Other academic degrees or titles

Year	Degree or title	Area	Institution	Classification
2004	Master ‘s degree	Computer Science	University of Piemonte Orientale	110/100 cum laude

Relevant professional experience for the Course

Scientific coordinator of InfoLife National Laboratory of CINI, technical coordinator of ELIXIR Node of Univ. of Turin, scientific coordinator of the laboratory "HPC for biomed and AI" in ICxT, Chair of the Scientific Committee of the "HPC4AI" laboratory" at the Univ. of Turin, and scientific co-coordinator of q-Bio group.
Co-author of 98 papers published in highly recognized international scientific journals (Total IF: 195.946 Average IF:4.17, Total number of citations: 2145 (Scopus), H-index (Scopus): 16). He was member of Programme Committees for more than 30 International conferences since 2013, and chair of Workshop/Special Section for more than 10 International conferences in the same period.

Scientific Organizer and Instructor of several courses among which: • Whole Transcriptome Data Analysis in European Molecular Biology Laboratory (EMBL), Heidelberg. Dates: (1)28 June-1 July 2016; (2)3-7 October 2016; (3)5-9 June 2017; (4)3-6 October 2017; (5)4-8 June 2018; (6)7-11 October 2018, (7)3-7 June 2019; (8)30 September - 4 October 2019; (9)29 May - 3 Jun 2022. • Elixir course Docker an reproducibility in Molecular Biotechnology Center, Turin, Italy, 13-14 June 2019. • Instructor at IEEE Winter School on Imaging Genetics, November 26-29, 2019 Verona. (http://igs.di.univr.it) • Advanced Statistics: Machine Learning for the Doctoral School in Systems Medicine at European School of Molecular Medicine (SEEM) , Milan, Ital: Dates: (1)10 March 2021, (2)24 March 2021.

Research experience relevant to the Course

WP leader in SUS-MIRRI.IT (PNRR IR): Strengthening the MIRRI Italian Research Infrastructure for Sustainable Bioscience and Bioeconomy (2022, 36 months, total cost 17M€)
UNIT leader in EUMaster4HPC (EC H2020 RIA, EuroHPC-2020-03): HPC European Consortium Leading Education Activities (2022, 36 months, total cost 7M€, G.A. 101051997)
N. Kulkarni, L. Alessandrì, R. Panero, M. Arigoni, M. Olivero, F. Cordero, M. Beccuti and R. A. Calogero. *Reproducible Bioinformatics Project: A community for reproducible bioinformatics analysis pipelines.* BMC Bioinformatics, Volume 19, Issue 10, pages 211-219, October 2018.

CU to teach in the Course

Course Unit	Contact hours to teach in the Course	
	Face-to-face component	Component in *e-learning*(1)
Information Technologies and Database Management	0	2

(1) Consider synchronous hours

Teacher Curricular Form

Personal data

Name	**Raquel Hurtado-Ortiz**
Higher Education Institution (HEI)	Institut Pasteur
Organic unit	Microbiology Department
Category	Head of a Collection/Biobank
Higher academic degree	PhD
Scientific area of this academic degree	Microbiology, Immunology
Year in which this academic degree was obtained	2008
Institution that awarded this academic degree	National Polytechnic Institute of Mexico
Time regime at HEI	100 %

Other academic degrees or titles

Year	Degree or title	Area	Institution	Classification
2004	Master's degree	Immunology	National Polytechnic Institute of Mexico	Approved (High Honours)
2001	Bachelor's degree	Chemist Bacteriologist Parasitologist	National Polytechnic Institute of Mexico	Approved

Relevant professional experience for the Course

Head of the National Collection of Cultures of Microorganisms (CNCM), since 2018
Manager of the performance and biological risk management of the Biosafety Level 3 laboratory of the CNCM.
Responsible for the compliance of regulations on high-risk pathogens and toxins before the National Agency for Medicines and Health Products Safety of the biological material held in the CNCM.

Research experience relevant to the Course

Scholz AH, Freitag J, Lyal CHC, Sara R, Cepeda ML, Cancio I, Sett S, Hufton AL, Abebaw Y, Bansal K, Benbouza H, Boga HI, Brisse S, Bruford MW, Clissold H, Cochrane G, Coddington JA, Deletoille AC, GarcÃ¬a-Cardona F, Hamer M, **Hurtado-Ortiz R**, Miano DW, Nicholson D, Oliveira G, Bravo CO, Rohden F, Seberg O, Segelbacher G, Shouche Y, Sierra A, Karsch-Mizrachi I, da Silva J, Hautea DM, da Silva M, Suzuki M, Tesfaye K, Tiambo CK, Tolley KA, Varshney R, Zambrano MM, Overmann J. Multilateral benefit-sharing from digital sequence information will support both science and biodiversity conservation. Nature communications; 2022-02-23. DOI: 10.1038/s41467-022-28594-0
Hurtado-Ortiz R, Hébreu A, Bégaud E, Bizet-Pinson C. Implementation of the Nagoya Protocol within the Collection of Institut Pasteur. Access Microbiol. 2019 Jan DOI: 10.1099/acmi.0.000008
Hazbón MH, Rigouts L, Schito M, Ezewudo M, Kudo T, Itoh T, Ohkuma M, Kiss K, Wu L, Ma J, Hamada M, Strong M, Salfinger M, Daley CL, Nick JA, Lee JS, Rastogi N, Couvin D, **Hurtado-Ortiz R**, Bizet C, Suresh A, Rodwell T, Albertini A, Lacourciere KA, Deheer-Graham A, Alexander S, Russell JE, Bradford R and Riojas MA. Mycobacterial biomaterials and resources for researchers. Pathog Dis. 2018. Jun 1;76(4). DOI: 10.1093/femspd/fty042

CU to teach in the Course

Course Unit	Contact hours to teach in the Course	
	Face-to-face component	Component in *e-learning*(1)
Quality Standards and Biorisk Regulations	0	1

(1) Consider synchronous hours

Teacher Curricular Form

Personal data

Name	**Rosa Aznar Novella**
Higher Education Institution (HEI)	University of Valencia
Organic unit	Faculty of Biology
Category	Full Professor
Higher academic degree	PhD
Scientific area of this academic degree	Biology (Microbiology)
Year in which this academic degree was obtained	1991
Institution that awarded this academic degree	University of Valencia
Time regime at HEI	100%

Other academic degrees or titles

Year	Degree or title	Area	Institution	Classification
1996	Prof. Titular	Microbiology	U. Valencia	Approved
1985	Degree	Biology	U. Valencia	8.36/10

Relevant professional experience for the Course

Head of the Spanish Type Culture Collection (CECT) since 13/09/2012
Chair of the Interim National Coordinator Forum of the Microbial Resource Research Infrastructure since 01/03/2020
Coordinator of the Microbial Resource Research Infrastructure Spanish Node (Network of Excellence MicroBioSpain) since 01/07/2017

Research experience relevant to the Course

Principal investigator (UVEG, WP6 leader); Project reference: INFRADEV03 RIA GA Nº 871129

Title: Implementation and Sustainability of Microbial Resource Research Infrastructure for 21st Century (IS_MIRRI21) Financing entity: European Commission Duration: 01/02/2020 - 30/01/2023
Principal investigator; Project reference: CGL2016-81969-REDT Title: MicroBioSpain, integration of the Spanish network of microorganisms "REDESMI" in the European Research Infrastructure (MIRRI) Financing entity: Spanish Ministry of Science, Innovation and Universities Duration: 01/07/2017 - 30/06/2019
Principal investigator; Project reference: RMP2015-00001-00-00 Title: Sustainable conservation of Spanish microbial resources under quality standards through an integrative approach and enhancing their visibility Financing entity: INIA – AEI – Spanish Ministry of Science, Innovation and Universities Duration: 01/04/2017 - 31/12/2021

CU to teach in the Course

Course Unit	Contact hours to teach in the Course	
	Face-to-face component	Component in *e-learning*(1)
Principles and Foundations of Microbial Resource Centres	0	2
Decision-Making on Microbial Preservation	0	1

(1) Consider synchronous hours

Teacher Curricular Form

Personal data

Name	**Stéphane Declerck**
Higher Education Institution (HEI)	Université Catholique de Louvain
Organic unit	Earth and Life Institute
Category	Professor
Higher academic degree	PhD
Scientific area of this academic degree	Bio-engineering
Year in which this academic degree was obtained	1996
Institution that awarded this academic degree	Université d'Angers, France
Time regime at HEI	100%

Other academic degrees or titles

Year	Degree or title	Area	Institution	Classification
2004	Full Professor	Agronomy	Université Catholique de Louvain	

Relevant professional experience for the Course

Director of the Mycothèque de l'Université Catholique de Louvain (BCCM/MUCL) since 2006
Teacher in mycology

Research experience relevant to the Course

Lalaymia I, Cranenbrouck S., Declerck S. (2014). Maintenance and preservation of ectomycorrhizal and arbuscular mycorrhizal fungi. Mycorrhiza 24: 323-337.
Lalaymia I, Declerck S., Cranenbrouck S. (2014). Cryopreservation of arbuscular mycorrhizal fungi from root-organ and plant cultures. Mycorrhiza 24:233-237.
Crahay C, Munaut F, Colpaert JV, Huret S, Declerck S (2017). Genetic stability of ectomycorrhizal fungi is not affected by cryopreservation at -130 °C or cold storage with repeated sub-cultivations over a period of two years. Mycorrhiza 27 (6): 595-601.

CU to teach in the Course

Course Unit	Contact hours to teach in the Course	
	Face-to-face component	Component in *e-learning*(1)
Decision-Making on Microbial Preservation	0	2

(1) Consider synchronous hours

Teacher Curricular Form

Personal data

Name	**Vincent Van de Perre**
Higher Education Institution (HEI)	VUB - Free University of Brussels KULeuven - Catholic University of Leuven
Organic Unit (School or Faculty)	Faculty of Bioscience Engineering
Category	Quality Manager
Higher academic degree	PhD
Scientific area of this academic degree	Bioscience Engineering (Applied Biological Sciences)
Year in which this academic degree was obtained	2011
Institution that awarded this academic degree	KULeuven
Time regime at HEI	Full Time

Other academic degrees or titles

Year	Degree or title	Area	Institution	Classification
2013	Internal auditor HACCP-BRC-IFS-ISO 9001-ISO 22000	Internal auditor	IPV	Professional training

Relevant professional experience for the Course

Quality manager of BCCM since 2014 (multi-site ISO 9001)
P-member of ISO/TC 276 - Biotechnology (WG 2) since 2014
Liaison representative ISO/TC 276 - MIRRI since 2019
Speaker for BBMRI.QM Training and education programme on "General requirements for biobanking, ISO 20387:2018" in 2019
WFCC Standardisation and Best Practice Committee member since 2021

Research experience relevant to the Course

Responsible for the work on common standards in the EU INFRADEV-3 IS_MIRRI21 project since February 2020
Quality manager BCCM: ISO 9001 (ISO 17025 and ISO 15189) P-member of ISO/TC 276 (WG 2): development of standards in the Biotechnology field (ISO 20378:2018, ISO 21710:2020, ISO/FDIS 24088-1...)

CU to teach in the Course

Course Unit	Contact hours to teach in the Course	
	Face-to-face component	Component in *e-learning*(1)
Quality Standards and Biorisk Regulations	0	2

(1) Consider synchronous hours

Teacher Curricular Form

Personal data

Name	**Virginie Storms**
Higher Education Institution (HEI)	University of Ghent
Organic unit	Faculty of Science
Category	Communication Manager
Higher academic degree	PhD
Scientific area of this academic degree	Microbiology
Year in which this academic degree was obtained	2003
Institution that awarded this academic degree	University of Ghent
Time regime at HEI	Full Time

Other academic degrees or titles

Year	Degree or title	Area	Institution	Classification
2012		Marketing & Communication	HUB	
2015		Change Management	Artevelde Hogeschool	

Relevant professional experience for the Course

Part of BCCM Coordination cell (since 2011)
Follow-up of student Bachelor proofs
Participation in BCCM Training

Research experience relevant to the Course

Researcher at Project reference: INFRADEV03 RIA GA Nº 871129 Title: Implementation and Sustainability of Microbial Resource Research Infrastructure for 21st Century (IS_MIRRI21)

Financing entity: European Commission Duration: 01/02/2020 - 30/01/2023

CU to teach in the Course

Course Unit	Contact hours to teach in the Course	
	Face-to-face component	Component in *e-learning*(1)
Organisation and Management of Microbial Resource Centres	0	2

(1) Consider synchronous hours

1.3 - Deliberations of the governing bodies of the Engineering School (ex.: Department Council, Scientific Council, Pedagogical Council) with legal and statutory competence to propose the Course.

1.4 - Protocols (if applicable)

1.5 - Course Regulation Proposal (if it is an association course)

3. Concluding Remarks

3. Concluding Remarks

EuroMiRC course aims to integrate the available expertise in a single course in a Higher Education Institution (HEI) in order to create a new professional profile that enables to work on microbial Culture Collections (CC) or in the more advanced concept of Microbial Resource Centres (mBRC) that integrates a quality management system. With the launching of the course, UMINHO and IS_MIRRI21 partners are up for the challenge and already integrating the first cohort of candidates for this advanced specialization course.

Finally, this course is the first one of a series of advanced courses that are expected to be delivered in the future under the umbrella of MIRRI-ERIC, which headquarter is situated at University of Minho (Braga, Portugal).

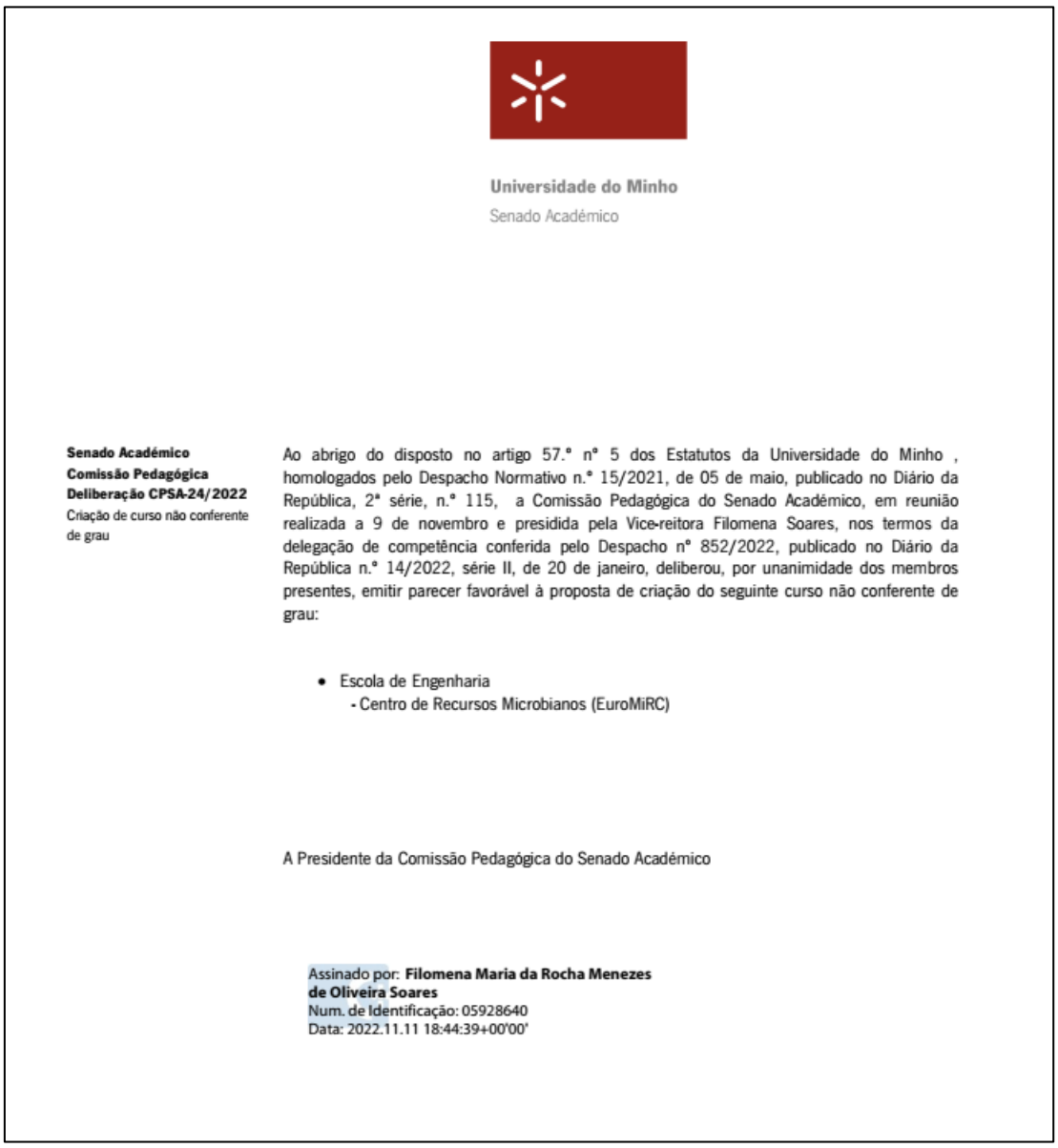
4. Annexes

4. Annexes

4.1. Formal approval letter of non-degree course at UMINHO

The following dispatch ratifies the approval of a non-degree course at the University of Minho (Figure 1).

Figure 1 Deliberation CPSA-24 2022



Universidade do Minho
Senado Académico

Senado Académico
Comissão Pedagógica
Deliberação CPSA-24/2022
Criação de curso não conferente de grau

Ao abrigo do disposto no artigo 57.º nº 5 dos Estatutos da Universidade do Minho , homologados pelo Despacho Normativo n.º 15/2021, de 05 de maio, publicado no Diário da República, 2ª série, n.º 115, a Comissão Pedagógica do Senado Académico, em reunião realizada a 9 de novembro e presidida pela Vice-reitora Filomena Soares, nos termos da delegação de competência conferida pelo Despacho nº 852/2022, publicado no Diário da República n.º 14/2022, série II, de 20 de janeiro, deliberou, por unanimidade dos membros presentes, emitir parecer favorável à proposta de criação do seguinte curso não conferente de grau:

- Escola de Engenharia
  - Centro de Recursos Microbianos (EuroMiRC)

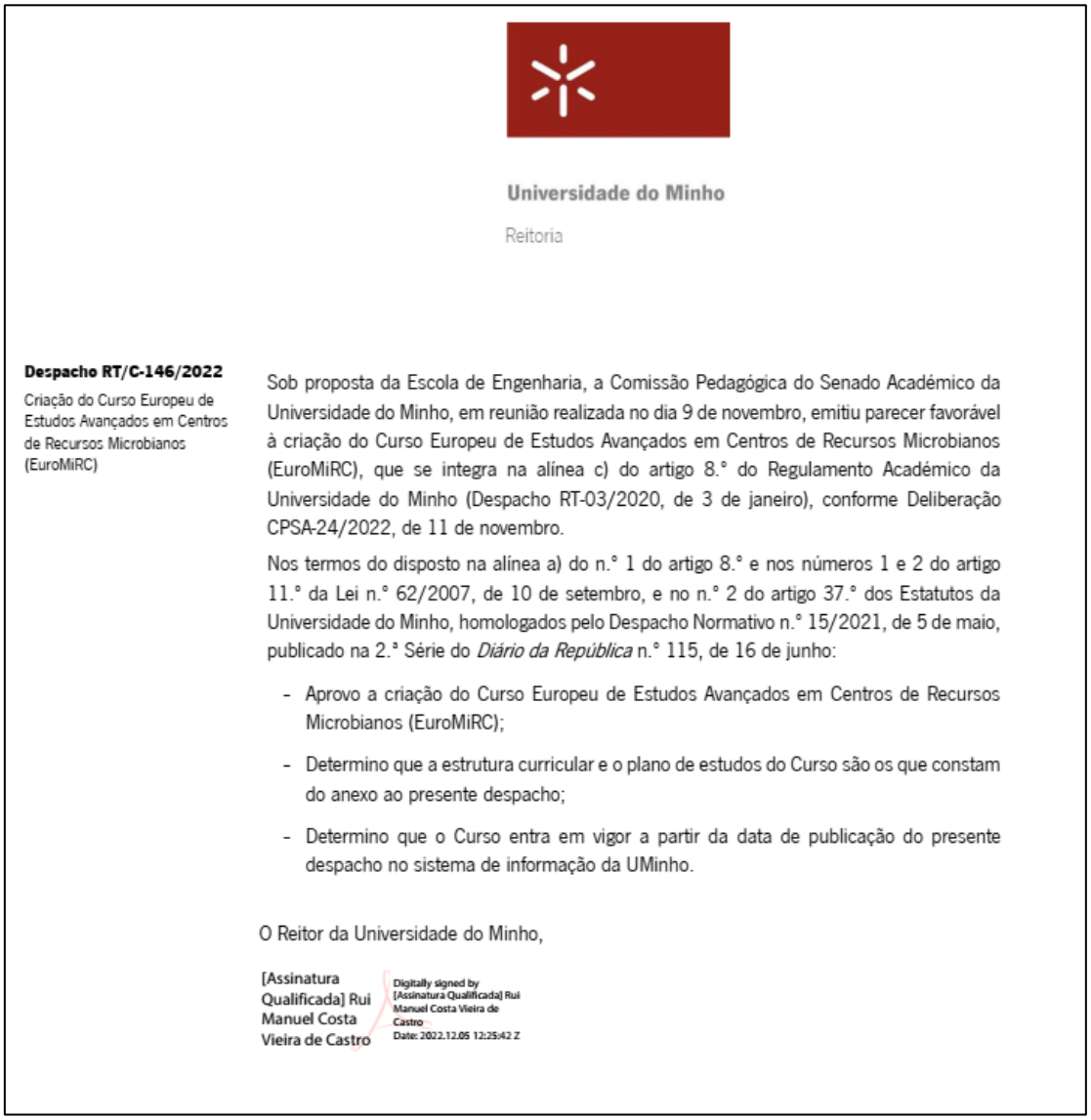
A Presidente da Comissão Pedagógica do Senado Académico

Assinado por: **Filomena Maria da Rocha Menezes de Oliveira Soares**
Num. de Identificação: 05928640
Data: 2022.11.11 18:44:39+00'00'

4.2. Formal EuroMiRC course creation at UMINHO

The following decree, signed by the Rector of the University of Minho, approves the creation of EuroMiRC course by which it enters into force and becomes part of the curricular structure and information system of the University of Minho (Figure 2-4).

Figure 2 Dispatch RT C-146 2022 (1)



Universidade do Minho

Reitoria

Despacho RT/C-146/2022

Criação do Curso Europeu de Estudos Avançados em Centros de Recursos Microbianos (EuroMiRC)

Sob proposta da Escola de Engenharia, a Comissão Pedagógica do Senado Académico da Universidade do Minho, em reunião realizada no dia 9 de novembro, emitiu parecer favorável à criação do Curso Europeu de Estudos Avançados em Centros de Recursos Microbianos (EuroMiRC), que se integra na alínea c) do artigo 8.° do Regulamento Académico da Universidade do Minho (Despacho RT-03/2020, de 3 de janeiro), conforme Deliberação CPSA-24/2022, de 11 de novembro.

Nos termos do disposto na alínea a) do n.° 1 do artigo 8.° e nos números 1 e 2 do artigo 11.° da Lei n.° 62/2007, de 10 de setembro, e no n.° 2 do artigo 37.° dos Estatutos da Universidade do Minho, homologados pelo Despacho Normativo n.° 15/2021, de 5 de maio, publicado na 2.ª Série do *Diário da República* n.° 115, de 16 de junho:

- Aprovo a criação do Curso Europeu de Estudos Avançados em Centros de Recursos Microbianos (EuroMiRC);
- Determino que a estrutura curricular e o plano de estudos do Curso são os que constam do anexo ao presente despacho;
- Determino que o Curso entra em vigor a partir da data de publicação do presente despacho no sistema de informação da UMinho.

O Reitor da Universidade do Minho,

[Assinatura Qualificada] Rui Manuel Costa Vieira de Castro

Digitally signed by [Assinatura Qualificada] Rui Manuel Costa Vieira de Castro
Date: 2022.12.05 12:25:42 Z

Figure 3 Dispatch RT C-146 2022 (2)

ANEXO

1. Estabelecimento de ensino: Universidade do Minho
2. Unidade orgânica: Escola de Engenharia
3. Tipo de curso: Estudos Avançados
4. Nível: 3.° ciclo
5. Curso: Curso Europeu de Estudos Avançados em Centros de Recursos Microbianos (EuroMiRC)
6. Área científica do curso: Engenharia Química e Biológica
7. Número de créditos ECTS necessários à obtenção do diploma: 30
8. Diploma: Estudos Avançados em Centros de Recursos Microbianos
9. Duração normal do curso: 6 meses
10. Regime de funcionamento: *B-learning*
11. Áreas científicas e créditos necessários à obtenção do diploma

QUADRO 1

Estrutura Curricular do Curso Europeu de Estudos Avançados em Centros de Recursos Microbianos (EuroMiRC)

Área científica	**Sigla**	**Créditos**	
		Obrigatórios	**Opcionais**
Informática	I	5	
Engenharia Industrial e de Sistemas	EIS	5	
Engenharia Química e Biológica	EQB	20	
	Subtotal	30	
	Total	30	

Figure 4 Dispatch RT C-146 2022 (3)

12. Plano de estudos

QUADRO 2

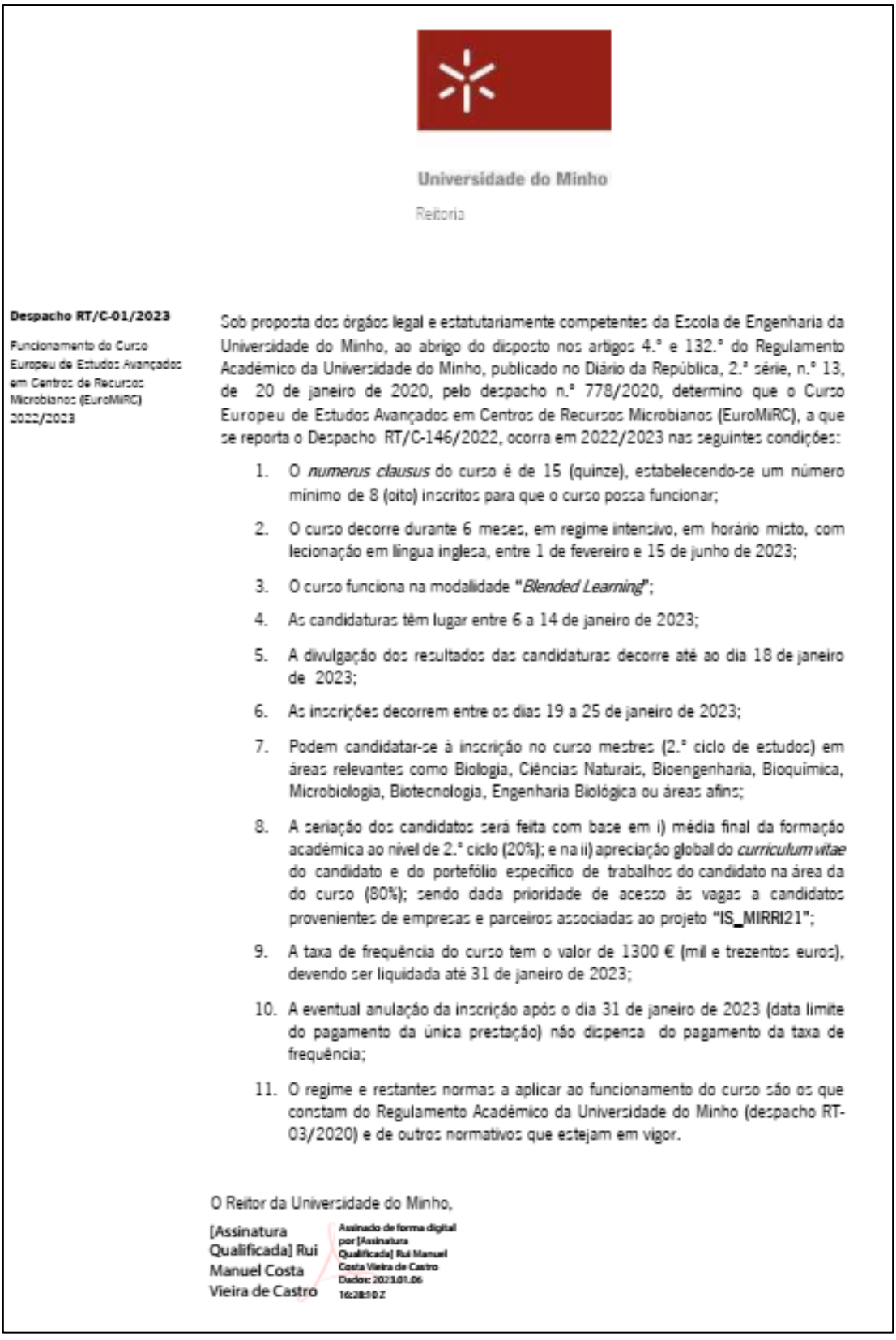
Plano de Estudos do Curso Europeu de Estudos Avançados em Centros de Recursos Microbianos (EuroMiRC)

Unidades curriculares	Área científica	Duração	ECTS	Componente Presencial							Componente à Distância			
				Total	Horas de trabalho						Horas de trabalho			
					T	TP	PL	TC	S	E	OT	Síncrono	Autónomo	Assíncrono	Prático
Princípios e Fundamentos dos Centros de Recursos Microbianos	EQB	2 meses	5	140					12		6	12	20	6	14
Tomada de Decisão em Preservação Microbiana	EQB	2 meses	5	140					12		6	12	20	6	14
Normas de Qualidade e Regulamentos de Biorisco	EIS	1 mês	5	140								30	90	6	14
Organização e Gestão de Centros de Recursos Microbianos	EQB	2 meses	5	140								30	90	6	14
Tecnologias de Informação e Gestão de Dados	I	2 meses	5	140								30	90	6	14
Projeto em Gestão de Centros de Recursos Microbianos	EQB	2 meses	5	140					2		14	8		40	

4.3. Formal Course Launch at UMINHO

With the below dispatch, the call for EuroMiRC is launched where the maximum number of students is 15 (and minimum is 8). It will be taught in English Language in Blended Learning format b-learning (Figure 5).

Figure 5 Dispatch RR C-01 2023



Universidade do Minho

Reitoria

Despacho RT/C-01/2023

Funcionamento do Curso Europeu de Estudos Avançados em Centros de Recursos Microbianos (EuroMiRC) 2022/2023

Sob proposta dos órgãos legal e estatutariamente competentes da Escola de Engenharia da Universidade do Minho, ao abrigo do disposto nos artigos 4.º e 132.º do Regulamento Académico da Universidade do Minho, publicado no Diário da República, 2.ª série, n.º 13, de 20 de janeiro de 2020, pelo despacho n.º 778/2020, determino que o Curso Europeu de Estudos Avançados em Centros de Recursos Microbianos (EuroMiRC), a que se reporta o Despacho RT/C-146/2022, ocorra em 2022/2023 nas seguintes condições:

1. O *numerus clausus* do curso é de 15 (quinze), estabelecendo-se um número mínimo de 8 (oito) inscritos para que o curso possa funcionar;
2. O curso decorre durante 6 meses, em regime intensivo, em horário misto, com lecionação em língua inglesa, entre 1 de fevereiro e 15 de junho de 2023;
3. O curso funciona na modalidade "*Blended Learning*";
4. As candidaturas têm lugar entre 6 a 14 de janeiro de 2023;
5. A divulgação dos resultados das candidaturas decorre até ao dia 18 de janeiro de 2023;
6. As inscrições decorrem entre os dias 19 a 25 de janeiro de 2023;
7. Podem candidatar-se à inscrição no curso mestres (2.º ciclo de estudos) em áreas relevantes como Biologia, Ciências Naturais, Bioengenharia, Bioquímica, Microbiologia, Biotecnologia, Engenharia Biológica ou áreas afins;
8. A seriação dos candidatos será feita com base em i) média final da formação académica ao nível de 2.º ciclo (20%); e na ii) apreciação global do *curriculum vitae* do candidato e do portefólio específico de trabalhos do candidato na área da do curso (80%); sendo dada prioridade de acesso às vagas a candidatos provenientes de empresas e parceiros associados ao projeto "IS_MIRRI21";
9. A taxa de frequência do curso tem o valor de 1300 € (mil e trezentos euros), devendo ser liquidada até 31 de janeiro de 2023;
10. A eventual anulação da inscrição após o dia 31 de janeiro de 2023 (data limite do pagamento da única prestação) não dispensa do pagamento da taxa de frequência;
11. O regime e restantes normas a aplicar ao funcionamento do curso são os que constam do Regulamento Académico da Universidade do Minho (despacho RT-03/2020) e de outros normativos que estejam em vigor.

O Reitor da Universidade do Minho,

[Assinatura Qualificada] Rui Manuel Costa Vieira de Castro

Assinado de forma digital por [Assinatura Qualificada] Rui Manuel Costa Vieira de Castro
Dados: 2023.01.06 16:28:10 Z

4.4. Course Launch at IS_MIRRI21 webpage.

EuroMiRC first edition (March – July 2023)

The call for applications to the first edition of EuroMiRC Advanced Studies Course is available for the candidates on the “Project Platforms” on the following link: https://ismirri21.mirri.org/project-platforms/euromirc_edition_1/

MIRRI IS21

IMPLEMENTATION AND SUSTAINABILITY FOR THE 21ST CENTURY

MICROBIAL RESOURCE RESEARCH INFRASTRUCTURE