

## EMJM – ERASMUS MUNDUS JOINT MASTER

### PROGRAMME Leading International Vaccinology Education – LIVE

#### SUPPLEMENTARY DOCUMENT 1

# LIVE3 TEACHING UNIT SHEETS

## PREAMBLE

This file is the supplementary document 1 for the project of the Erasmus Mundus Joint Master “Leading International Vaccinology Education” (LIVE). LIVE3 is submitted to the Erasmus Mundus call of Feb 16<sup>th</sup>, 2023.

This document contains:

- Figures and tables explaining the general organisation of the LIVE programme
- All the teaching unit sheets describing: Title, ECTS, hours, Head, programme, learning outcomes and assessment methods.
- Example of schedule and all the evaluation forms required to assess the Master thesis

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hyperlinks refer to the paragraph

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## 1. LIVE General organisation




The students will study at higher level a **first specialisation** in immunology and immunopathology in Barcelona, then a **second specialisation** in infectiology including microbiology, virology and host-pathogen interactions in Antwerp, and a **third specialisation** in vaccinology in Lyon & Saint-Etienne, to reach the level for doing a master thesis.

### 1.1 General organisation and mobility during the LIVE Master



#### Master 1

							
Semester 1 - Spain			Semester 2 - Belgium				
Immunopathology 12 ECTS	GCW* & Languages 3 ECTS	Immunology 15 ECTS	Infectiology 12 ECTS	GCW* & Languages 3 ECTS	Immuno- logy 3 ECTS	Research & clinical vaccinology 9 ECTS	Transfe- rable skills 3 ECTS
* Grasping the Changing World							


#### Master 2

							
Semester 3 - France					Semester 4 - Internship		
Research & clinical vaccinology 12 ECTS	GCW* & Languages 3 ECTS	Transferable skills 9 ECTS	Immuno Pathology 3 ECTS	Infectio- logy 3 ECTS		Master thesis 27 ECTS including 10% professional work, 50% master thesis, 40% oral defense	GCW* & Languages 3 ECTS
* Grasping the Changing World							

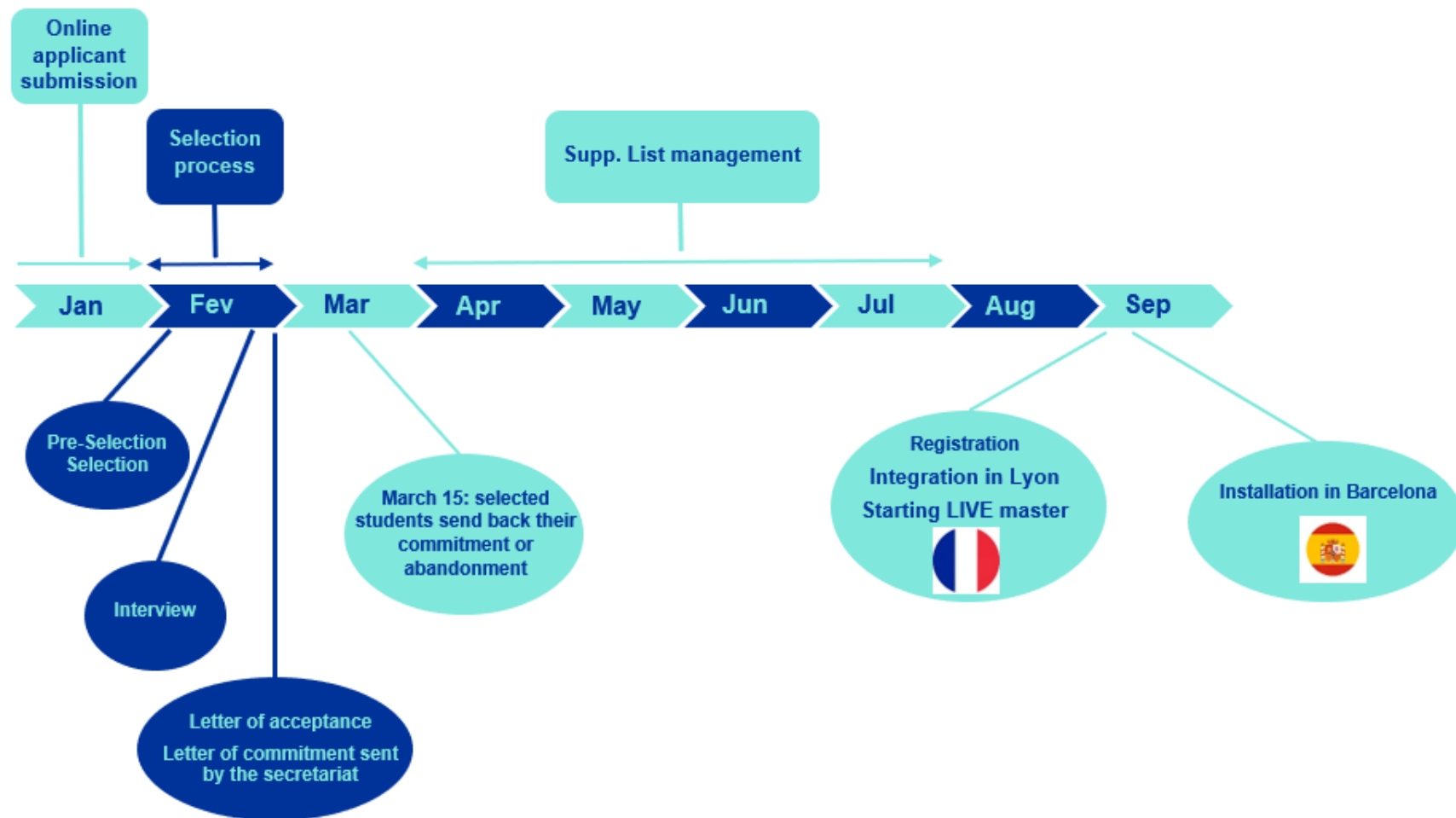
**Master 1-OPTIONS**

				
<b>Options - Semester 1 - Spain</b>			<b>Options - Semester 2 - Belgium</b>	
<b>6 ECTS to be chosen among 3 TU</b>			<b>3 ECTS to be chosen among 2 TU</b>	
Autoimmunity and immunodeficiencies 3ECTS	Languages 1 3 ECTS	Vaccines in society 3 ECTS	Languages 2 3ECTS	Molecular virology 3ECTS

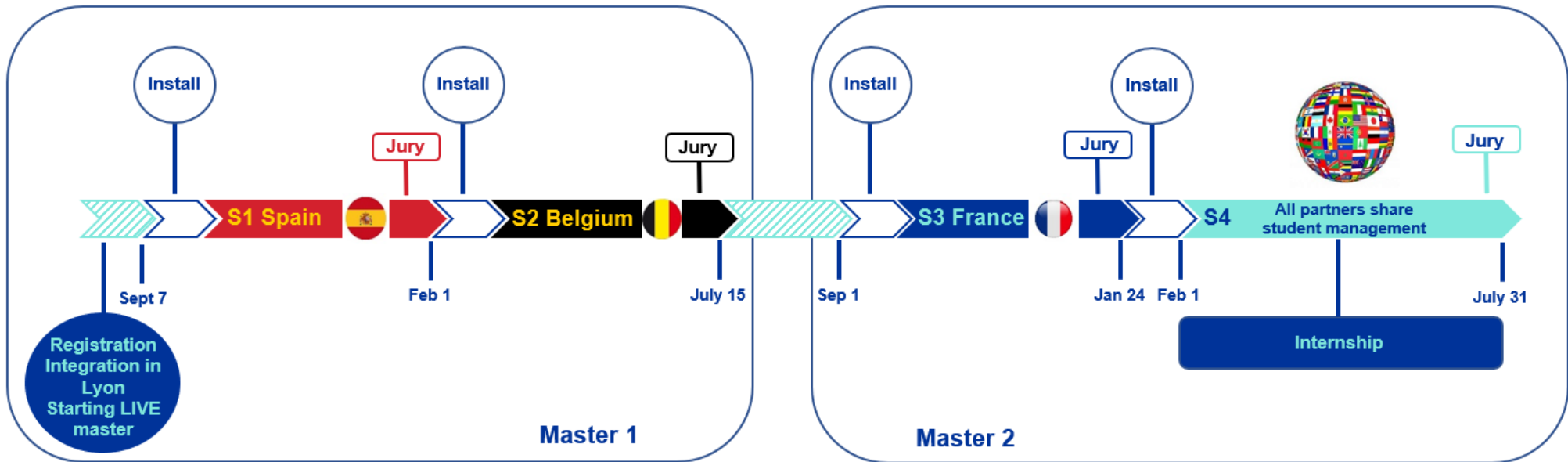
**Master 2-OPTIONS**

			
<b>Options - Semester 3 - France</b>			
<b>6 ECTS to be chosen among 5 TU</b>			<b>Student exchange</b>
Aging and cell death 3 ECTS	Expérimentation animale (option in FR) 6 ECTS		MSc in Health Management and Data Intelligence (HMDI) 12 ECTS
Neuro-immunology: immune privilege and biotherapies 3 ECTS	Immunology and cancer 3 ECTS	Languages 3 3 ECTS	

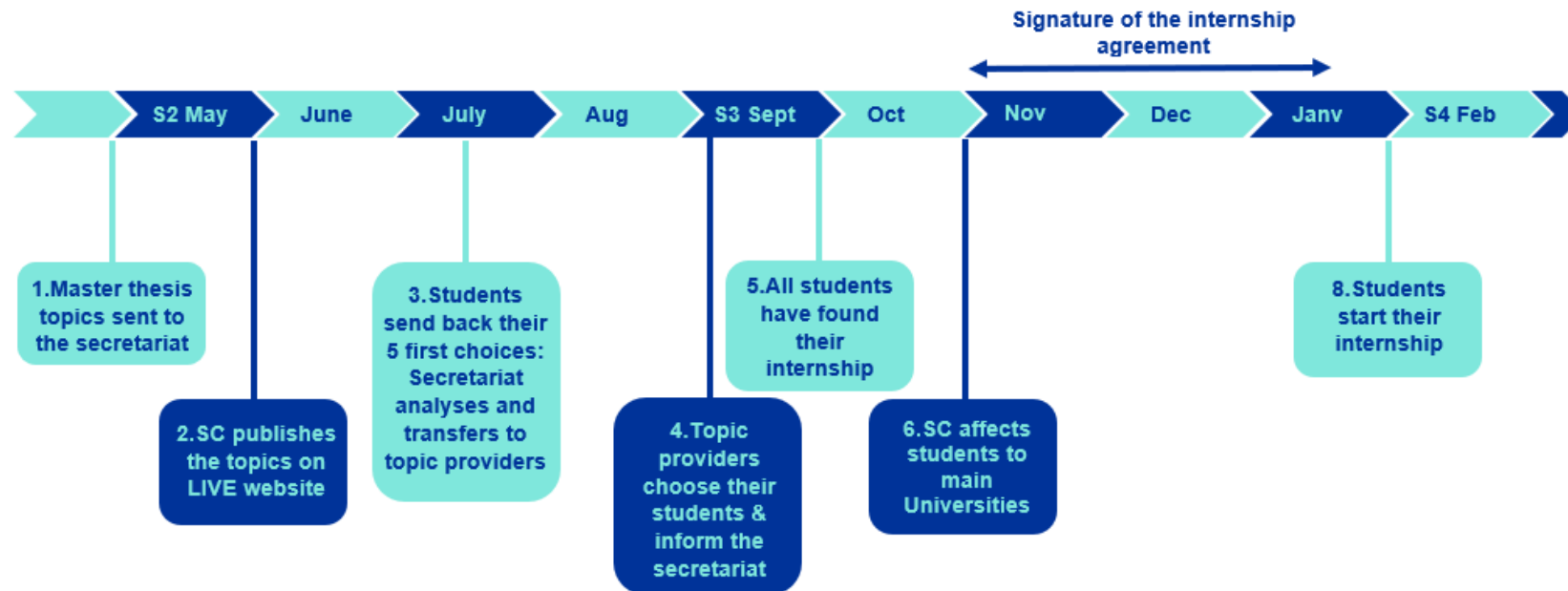
## 1.2 Selection process



### 1.3 Mobility scheme

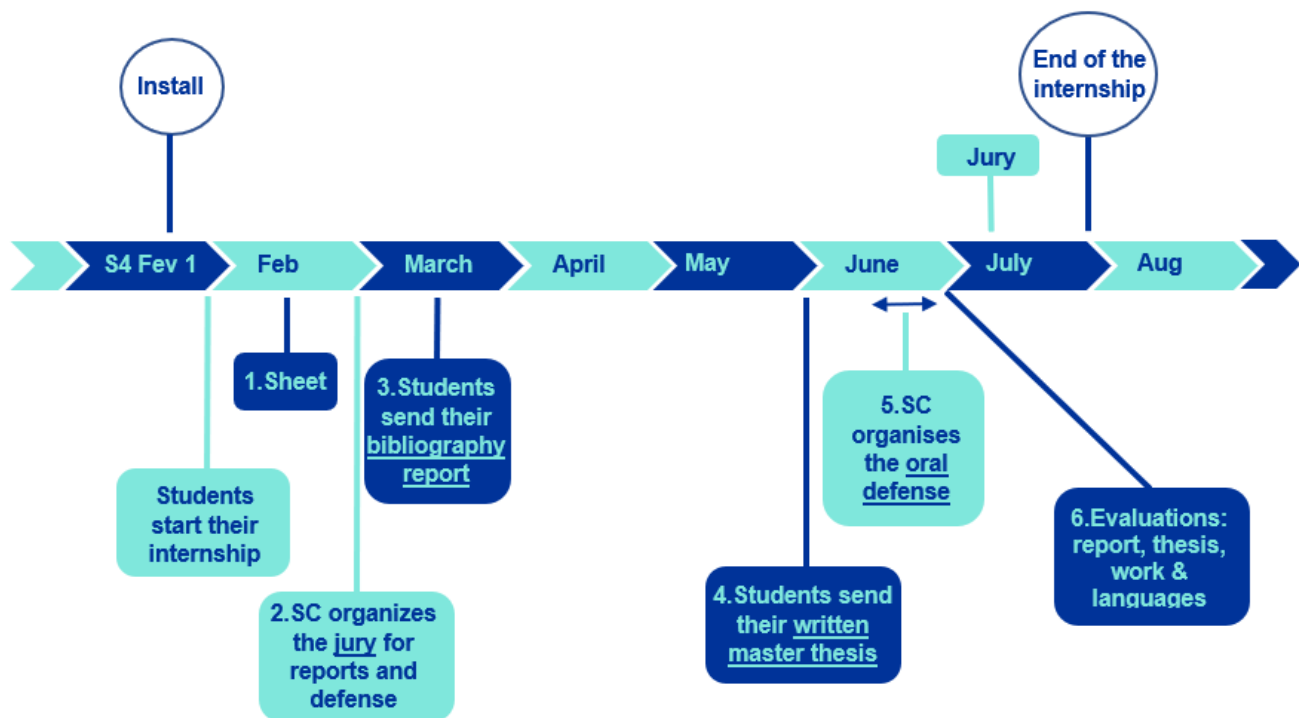


## 1.4 Management of the internship proposals





## 1.5 Management of internship



## 1.6 Contribution of European universities and countries in LIVE

University	Semester Country	ECTS	% in master
Universitat de Barcelona (UB)	S1 + S4	5 + 4.5	7.9
Universitat Autònoma de Barcelona (UAB)	S1 + S4	25 + 4.5	24.6
University of Antwerpen (AU)	S2 + S4	30 + 9	32.5
Université Jean Monnet Saint-Etienne (UJM)	S3 + S4	15 + 4.5	16.25
Université Claude Bernard Lyon 1 (UCBL)	S3 + S4	15 + 7.5	18.75
UB + UAB	Spain	39	32.5
AU	Belgium	39	32.5
UCBL + UJM	France	42	35
European universities: ARQUS, CHARMEU, ECIU, YUFE	European university network	conferences	
<b>All universities</b>	<b>Mobility</b>	<b>120</b>	<b>100</b>

## 1.7 Distribution of the executive functions

Partner organizations		Management tasks
UCBL	<b>Central Manager (CM)</b> <b>Christine DELPRAT</b>	Programme secretariat, central management of the study programme, monitoring the awarding of the multiple national diplomas and future LIVE joint Diploma, editing the Diploma Supplement, monitoring interface with IT and iCAP dpt at UCBL: MyLIVE application, LIVE website and LIVE blog structure, MOOC dvpt, digital evaluation, e-learning; (ii) Central management of grants: recruitment of LIVE Assistant, payment of student allowances, distribution of the participation costs, financial agreements with associated partners...; (iii) Meeting organisation: AMB, SC, EliC, I-QAC, E-QAC, editing the CA and the student agreement validated by the AMB; (iv) business development and sponsoring management: recruitment of Business dvpt Manager; (v) Reporting to EACEA
UAB-UB	<b>Selection Managers (SeIM)</b> <b>Carme ROURA-MIR</b> <b>Thomas STRATMANN</b>	Organisation of the applicant selection procedures
UAntwerpen	<b>Quality Assurance Manager (QAM)</b> <b>Peter DELPUTTE</b>	Organisation of the Quality Assurance (QA) according to the QA scheme
UJM	<b>Communication Manager (ComM)</b> <b>Stéphane PAUL</b>	LIVE communication, advertisement, LIVE blog & website contents

## 1.8 Distribution of the main scientific topics between the four semesters

Topics	S1 ECTS Spain	S2 ECTS Belgium	S3 ECTS France	S4 ECTS SP-BE-FR	TOTAL ECTS / field	% in Master
(1) Immunology, immunopathology	24	3	3		30	25
(2) Infectiology, Epidemiology	3	12	3		18	15
(3) Research, Clinical & Industrial Vaccinology		9	12		21	17.5
(4) Transferable skills, multidisciplinary training	3	6	12	3	24	20
(5) Professional Internship, Master thesis				27	27	22.5
Total ECTS / semester	30	30	30	30	120	100
(1-3) Core scientific knowledge	27	24	18		69	57.5
(4-5) Multidisciplinary aspects, grasping the changing world	3	6	12	30	51	42.5

### 1.9 Common grading system for the LIVE students

LIVE grading system Mention - explanation	LIVE, Belgian, French scores range 0-20	Spanish score ranges 0-10
Excellent – outstanding performance	$X \geq 18$	$X \geq 9$
Very Good – above the average standard but with some errors	$16 \leq X < 18$	$8 \leq X < 9$
Good – generally sound work with a number of notable errors	$14 \leq X < 16$	$7 \leq X < 8$
Satisfactory – fair but with significant shortcomings	$12 \leq X < 14$	$6 \leq X < 7$
Sufficient – performance meets the minimum criteria	$10 \leq X < 12$	$5 \leq X < 6$
Fail – some more work required before the ECTS can be awarded	$8 \leq X < 10$	$4 \leq X < 5$
Fail – considerable further work is required	$6 \leq X < 8$	$3 \leq X < 4$

## 1.10 Teaching unit title, head and ECTS

Table 1: Teaching unit title, heads and ECTS	Field	Head of the teaching unit	S1	S2	S3	S4	TOTAL ECTS
Antigen recognition	Immunology	ALVAREZ, Iñaki	3				3
Dynamics of innate and adaptive immunity	Immunology	VIDAL, Silvia VALLEDOR, Annabel	3				3
Functional anatomy of the immune system	Immunology	ROURA-MIR, Carme	3				3
Immune responses to pathogens	Immunopathology	COLOBRAN, Roger	3				3
Laboratory and computer practicals	Immunopathology	STRATMANN, Thomas ROURA-MIR, Carme	3				3
Mechanisms of immunopathology	Immunopathology	MARTINEZ CACERES, Eva HERNANDEZ, Manuel MARTINEZ GALLO, Monica	6				6
Receptor signalling	Immunology	SOLER, Concepció	3				3
Autoimmunity & Immunodeficiencies (option)	Immunopathology	DE LA CALLE, Oscar MARTINEZ, Laura	3				3
Languages 1: French, Spanish (option)	Grasping the changing world & Languages	PRATS-CARRERAS, Sònia	3				3
Vaccines in society (option)	Grasping the changing world & Languages	JARAQUEMADA, Dolores ROURA-MIR, Carme	3				3
Advanced data analysis	Transferable and multidisciplinary skills	LAUKENS, Kris FRANSEN, Erik		3			3
Description & variability of pathogens	Infectiology	DELPUTTE, Peter ARIEN, Kevin BARBEZANGE, Cyril		6			6
Host-pathogen interactions	Infectiology	CALJON, Guy		3			3
Immune system in early life, pregnant women and elderly	Immunology	MAERTENS, Kirsten VAN DAMME, Pierre		3			3
Languages 2a: English, French, Dutch, Italian, Spanish	Grasping the changing world & Languages	HEUGHEBAERT, Els		3			3
Novel technologies, vaccine administration routes & adjuvants	Research & clinical vaccinology	DELPUTTE, Peter		3			3
Summer school on vaccinology	Research & clinical vaccinology	VAN DAMME Pierre LEURIDAN, Elke		3			3
Vaccine manufacturing & quality control, regulatory approval process	Research & clinical vaccinology	DELPUTTE Peter VAN DAMME, Pierre		3			3
Languages 2b: English, French, Dutch, Italian, Spanish (option)	Grasping the changing world & Languages	HEUGHEBAERT, Els		3			3

Table 1: Teaching unit title, heads and ECTS	Field	Head of the teaching unit	S1	S2	S3	S4	TOTAL ECTS
Molecular virology (option)	Infectiology	<b>DELPUTTE, Peter</b> <b>ARIEN, Kevin</b> <b>BARBEZANGE, Cyril</b>		3			3
Clinical vaccine development	Research & clinical vaccinology	<b>BOTELHO-NEVERS, Elisabeth</b> <b>GAGNEUX-BRUNON, Amandine</b>			3		3
Communicating on vaccines & public health	Transferable and multidisciplinary skills	<b>PAUL, Stéphane</b> <b>DELPRAT, Christine</b>			6		6
Epidemiology	Infectiology	<b>VANHEMS, Philippe</b>			3		3
Immunomonitoring of preclinical and clinical vaccine trials	Research & clinical vaccinology	<b>PAUL, Stéphane</b>			3		3
Project management	Transferable and multidisciplinary skills	<b>GILBERT, Christophe</b>			3		3
Vaccine formulation	Research & clinical vaccinology	<b>PAUL, Stéphane</b>			3		3
Vaccine specific applications	Research & clinical vaccinology	<b>PAUL Stéphane</b>			3		3
Aging and cell death (option)	Grasping the changing world & Languages	<b>KRETZ, Carole</b>			3		3
Expérimentation animale (option in FR)	Transferable and multidisciplinary skills	<b>DUCREUX, Sylvie</b>			6		6
Immunology & cancer (option)	Immunopathology	<b>DELPRAT, Christine</b>			3		3
Languages 3: English, French, German, Italian, Spanish	Grasping the changing world & Languages	<b>DURANT-VALLLOT, Angeline</b>			3		3
Neuro-immunology: immune privilege and biotherapies (option)	Immunopathology	<b>DELPRAT, Christine</b> <b>DESESTRET, Virginie</b>			3		3
MSc in Health Management and Data Intelligence (HDMI) (student exchange)	Immunopathology	<b>EMLyon business school</b> <b>Mines Saint-Etienne, National School of Engineers</b>			12		12
Languages for vaccine future in the Anthropocene	Grasping the changing world & Languages	<b>DURAND-VALLLOT, Angeline</b> <b>BOURDONNAY, Emilie</b> <b>DELFATTI Natalia</b>				3	3
Master thesis	<b>Internship</b>	<b>BOURDONNAY, Emilie</b> <b>DELPUTTE, Peter</b> <b>DELPRAT, Christine</b> <b>STRATMANN, Thomas</b> <b>ROURA, Carme</b> <b>PAUL, Stéphane</b>				27	27

### 1.11 Grasping the changing world & Languages, multidisciplinary achievements in LIVE

Field	ECTS	% in master
(1) Immunology	15	12.5
(2) Immunopathology	18	15
(3) Infectiology	15	12.5
(4) Research & clinical vaccinology	21	17.5
<b>(1-4) Core scientific knowledge</b>	<b>69</b>	<b>57.5</b>
(5) Transferable and multidisciplinary skills	12	10
(6) Grasping the changing world & Languages	12	10
(7) Internship	27	22.5
<b>(5-7) multidisciplinary tasks</b>	<b>51</b>	<b>42.5</b>

### 1.12 Main fields in the LIVE

Teaching unit title	S1	S2	S3	S4	TOTAL ECTS
<b>Total ECTS / semester</b>	<b>30</b>	<b>30</b>	<b>30</b>	<b>30</b>	<b>120</b>
(1) Immunology, immunopathology	24	3	3		30
(2) Infectiology, Epidemiology	3	12	3		18
(3) Research, Clinical & Industrial Vaccinology		9	12		21
(4) Multidisciplinary training, including languages	3	6	12	3	24
(5) Professional Internship, Master thesis				27	27

### 1.13 Contribution of European universities and countries in LIVE

University	Semester Country	ECTS	% in master
Universitat de Barcelona (UB)	S1 + S4	5 + 4.5	7.9
Universitat Autònoma de Barcelona (UAB)	S1 + S4	25 + 4.5	24.5
University of Antwerpen (AU)	S2 + S4	30 + 9	32.5
Université Jean Monnet Saint-Etienne (UJM)	S3 + S4	15 + 4.5	16.25
Université Claude Bernard Lyon 1 (UCBL)	S3 + S4	15 + 7.5	18.75
UB + UAB	<b>Spain</b>	39	32.5
AU	<b>Belgium</b>	39	32.5
UCBL + UJM	<b>France</b>	42	35
University of Florence	<b>Italy</b>	conferences	
Université Libre de Bruxelles	<b>Belgium</b>	conferences	
<b>All universities</b>	<b>Mobility</b>	<b>120</b>	<b>100</b>

## 2. S1 Teaching unit sheets of the semester 1 in Barcelona (Spain)

S1 Teaching Units (TU)	Immuno-logy	Immuno Pathology	Grasping the changing world & Languages	TOTAL ECTS / TU
Antigen recognition	3			3
Dynamics of innate and adaptive immunity	3			3
Functional anatomy of the immune system	3			3
Immune responses to pathogens		3		3
Laboratory and computer practicals	3			3
Mechanisms of immunopathology		6		6
Receptor signalling	3			3
Autoimmunity and Immunodeficiencies (option)		3		6
Languages 1 (option)			3	
Vaccines in society (option)			3	
<b>Total ECTS / field</b>	<b>15</b>	<b>12</b>	<b>3</b>	<b>30</b>

ANTIGEN RECOGNITION					mandatory (EN)
ECTS	Lectures (hours/student)	Tutorials (hours/student)	Practical work (hours/student)	Internship (weeks/student)	Digital learning
3	21	6	6	0	0
Management Institute:		Universitat Autònoma de Barcelona			
Teaching unit head(s) Name:		Iñaki ALVAREZ			
Position:		Associate Professor of Immunology			
Contact, email:		<a href="mailto:inaki.alvarez@uab.cat">inaki.alvarez@uab.cat</a>			
Keywords: HLA, H-2, MHC, antigen processing, Immunoglobulins, T-cell receptor, NK receptors, bioinformatics, data management.					
<b>Course content:</b> 1. The HLA system. Genetic. HLA and disease: hypothesis. HLA typing methods and analysis of the results. KIR typing. HLA and transplantation: solid organs and bone marrow transplantation. Transplantation of hematopoietic stem cells. Influence of HLA typing in the prognostic of transplantation. Immunosuppression and HLA. 2. The H-2 system and its utilities. Genetics of H-2. Inbred mouse strains. Concepts: syngeneic, congenic, backcross. How is an inbred strain generated? Strains for the study of immune mechanisms. Transgenic, knock-out, knock-in and double transgenic animals. Bone marrow transplantation for the study of its development and function. 3. Antigen processing and presentation. Antigen processing. Ligand generation: pathways of antigen processing. Antigen presentation: MHC and antigen presentation. MHC function. Structure of MHC molecules. Peptide binding to MHC molecules. Non-classic molecules. 4. Genetics of the NK receptors. The NK cluster. Genetics and diversity of KIRs. NK receptors in different species. NK haplotypes. Association with HLA class I genes. Patterns of expression and clonality. KIR and disease. 5. Genetics of Immunoglobulins. B cell receptor (BCR). Genetics of the BCR. Classes of immunoglobulins. Effector function of immunoglobulins. 6-7. Genetics of the T cell receptor (TCR). The TCR. Genetics of the TCR. Generation of the peptide repertoire in the thymus. αβ and γδ receptors. Studies in animals. 8-9. Bioinformatics applied to immunogenetics. Databases. Access to databases for analysis of protein, DNA, sequencing, structure, homology, function, location, polymorphisms					
<b>Teaching Staff:</b> • Dr. Iñaki Alvarez, Head of the Teaching Unit, Senior Lecturer in Immunology, Dept. of Cell Biology, Physiology, and Immunology, Universitat Autònoma de Barcelona (UAB). • Dr. Eduard Palou, Consultant, Dept. of Immunology, Hospital Clínic, Universitat de Barcelona (UB). • Dr. Dolores Jaraquemada, Prof. of Immunology, Dept. of Cell Biology, Physiology, and Immunology, UAB. • Dr. María José Herrero, Senior Researcher, Banc de Sang i Teixits, BST, Barcelona • Dr. Pablo Engel, Prof. of Immunology, Dept. of Cellular Biology and Pathology. Medical School, UB. • Dr. Oscar de la Calle, Consultant, Immunology Division, Hospital de Sant Pau and Associate Prof. of Immunology, Faculty of Medicine, UAB. • Dr. Yaqoub Ashhab, Associate Professor of Biotechnology, Director of the Biotechnology Research Center, Palestine Polytechnic University.					
<b>Learning outcomes:</b> The course is designed to give students knowledge on the immune system genes, the generation of antigen receptor diversity, clonality, MHC genetic polymorphisms, the MHC and other antigen processing and presentation molecules and the genes of the NK receptors. To understand the genetic factors influencing the immune response and their applications to the diagnostic and specific therapies. Also, the use of relevant bioinformatic tools to study the genes of the immune system.					
<b>Assessment methods</b>					
<input type="checkbox"/> Oral questioning		<input type="checkbox"/> Presentation		<input type="checkbox"/> Practice report	
<input type="checkbox"/> Written examination		<input type="checkbox"/> Bibliography report		<input type="checkbox"/> Internship unwinding	
<input type="checkbox"/> Report / thesis		<input type="checkbox"/> Digital productions (video, poster, software, wiki...)			
<input checked="" type="checkbox"/> Other (specify): Multiple choice test					
<b>Teaching unit jury</b>					
1) Iñaki ÁLVAREZ			2) Dolores JARAQUEMADA		



DYNAMICS OF INNATE AND ADAPTIVE IMMUNITY					mandatory (EN)
ECTS	Lectures (hours/student)	Tutorials (hours/student)	Practical work (hours/student)	Internship (weeks/student)	Digital learning
3	35	8	0	0	0
Management Institute:		Part 1 - Universitat Autònoma de Barcelona Part 2 - Universitat de Barcelona			
Teaching unit head(s) Name:		Silvia VIDAL (Part 1) and Annabel VALLEDOR (Part 2)			
Position:		Associate Professors of Immunology			
Contact, email:		<a href="mailto:silvia.vidal@uab.cat">silvia.vidal@uab.cat</a>		<a href="mailto:afernandezvalledor@ub.edu">afernandezvalledor@ub.edu</a>	
<b>Keywords:</b> Natural defences; innate immune cells; innate receptors; innate effector mechanisms; inflammation; adaptive response; effector cells; adaptive effector mechanisms; immune regulation; tolerance; peripheral mechanisms of regulation; cytokines					
<b>Course content:</b>					
<b>Part 1</b>					
1. Introduction: the immune system.					
2. Cellular and molecular elements of the innate immune response.					
3. From recognition to the effective destruction of pathogens					
4. Components and phases of inflammation					
5. How an innate immune response induces an adaptive immune response.					
6. Cells, molecular elements and effector mechanisms of adaptive immune response					
7. First barrier against pathogens: Mucosa as physical, chemical, microbial and immunological defence					
<b>Part 2</b>					
8. Regulation of the immune response. Overview I					
9. Regulation of the immune response. Overview II					
10. Cytokines I					
11. Cytokines II					
12. Immunological Tolerance					
13. Treg cells					
14. immunometabolism					
15. Seminar: Interplay between SNC and Immune system. Immunosenescence					
16. Seminar: Nuclear receptors in the regulation of the Immune system					
<b>Teaching Staff:</b>					
• Prof. Silvia Vidal, Head of Part 1, Associate Professor of Immunology, Dept. of Cell Biology, Physiology, and Immunology and Research Group Leader, Institut de Recerca Hospital Sant Pau, UAB.					
• Prof. Annabel Valledor, Head of Part 2, Associate Professor of Immunology, Dept. of Cell Biology, Physiology, and Immunology, UB. Group Leader: Nuclear Receptors in metabolism, immune responses and cancer.					
• Other speakers to be announced: tutorials will involve seminars given by experts and discussion with the students.					
<b>Learning outcomes:</b>					
The course is intended for the students to achieve an understanding of the essentials of innate and adaptive immune responses and their regulation.					
<b>Assessment methods</b>					
<input type="checkbox"/> Oral questioning		<input type="checkbox"/> Presentation		<input type="checkbox"/> Practice report	
<input checked="" type="checkbox"/> Written examination		<input checked="" type="checkbox"/> Bibliography report		<input type="checkbox"/> Internship unwinding	
<input type="checkbox"/> Report / thesis		<input type="checkbox"/> Digital productions (video, poster, software, wiki...)			
<input type="checkbox"/> Other (specify): Multiple choice test					
<b>Teaching unit jury</b>					
1) Silvia VIDAL			2) Annabel VALLEDOR		

FUNCTIONAL ANATOMY OF THE IMMUNE SYSTEM					mandatory (EN)
ECTS	Lectures (hours/student)	Tutorials (hours/student)	Practical work (hours/student)	Internship (weeks/student)	Digital learning
3	21	6	6	0	0
Management Institute:		Universitat Autònoma de Barcelona			
Teaching unit head(s) Name:		Carme ROURA-MIR			
Position:		Associate Professor of Immunology			
Contact, email:		carme.roura@uab.cat			
<b>Keywords:</b> primary and secondary immune organs, lymphocyte development, cell traffic, homing, tolerance induction, adaptive immune response in lymph nodes, spleen, mucosa, skin. Immunological memory.					
<b>Course content:</b>					
<div>1. General anatomy of the Immune System.</div> <div>2. General histology of the lymphoid organs.</div> <div>3. Primary lymphoid organs. The foetal liver and the bone marrow. Haematopoiesis. Structure and cellular composition of the thymus. Differentiation and maturation of T and B cells.</div> <div>4. The lymphatic system. Traffic. Homing. High endothelial venules. Leukocyte extravasation. Homing receptors and chemokines. Inflammation. Effector and memory cell trafficking. Role of adhesion molecules.</div> <div>5. Secondary lymphoid organs. Cell composition and structure of the resting lymph node. Changes during the immune response. The spleen. Cell composition and structure of the white and the red pulp. The spleen contribution to the immune response.</div> <div>6. The mucosal immune tissue (MALT). Structure and cellular composition of the tonsils, Peyer patches, appendix. The mucosal immune response.</div> <div>7. Functional anatomy of the skin immune system. Physical barriers. Network of immune cells of the skin. The skin microbiome and its contribution to the homeostasis of the skin immune response.</div> <div>8. Functional anatomy of the immune system at the Central Nervous System. The CNS as immune privileged site: a controversy. CNS lymphatic system. Function of glial cells and T cells in the immune response.</div> <div>9. A practical session on histology of the immune system. Analysis of tissue slides of different lymphoid organs. Search and identification of the structures and cell types characterizing each lymphoid tissue.</div>					
<b>Teaching Staff:</b>					
<div>• Dr. Ricardo Pujol Borrell, Professor of Immunology, Hosp. Univ. Vall d'Hebron, UAB</div> <div>• Dr. Martí Pumarola, Professor of Histology, Dept. of Animal Med. and Surgery, Vet. Med. School, UAB</div> <div>• Dr. Dolores Jaraquemada, Professor of Immunology, Dept. of Cell Biology, Physiol. and Immunology, UAB</div> <div>• Dr. Miguel Vicente-Manzanares, Senior Investigator, Inst. of Cancer Molecular and Cellular Biology, Cancer Research Center, USAL-CSIC, Salamanca, Spain</div> <div>• Prof. Eduardo Martínez-Naves, Dept. of Immunology and Ophthalmology, Medicine School, Universidad Complutense, Madrid.</div> <div>• Dr. Carme Roura-Mir, Professor of Immunology, Dept. of Cell Biology, Physiology, and Immunology, UAB</div> <div>• Dr. Mercè Martí, Professor of Immunology, Dept. of Cell Biology, Physiology, and Immunology, UAB</div> <div>• Dr. Carlos Barcia, Group Leader of the Neuro-immunity Research Group, Neuroscience Institute, UAB</div> <div>• Dr. Anna Sala M.D, Ph.D., Allergist. Hosp. Univ. Vall d'Hebron. Associate Prof. of Immunology, Universitat Ramon Llull, Barcelona.</div>					
<b>Learning outcomes:</b>					
After completing the course, the students should achieve a full understanding of the generation, localization, distribution, and structure of the different components of the immune system and how they traffic and interact to produce a distinct immune response in the different secondary lymphoid tissues.					
<b>Assessment methods</b>					
<input type="checkbox"/> Oral questioning		<input type="checkbox"/> Presentation		<input type="checkbox"/> Practice report	
<input checked="" type="checkbox"/> Written examination		<input type="checkbox"/> Bibliography report		<input type="checkbox"/> Internship unwinding	
<input type="checkbox"/> Report / thesis		<input type="checkbox"/> Digital productions (video, poster, software, wiki...)			
<input checked="" type="checkbox"/> Other (specify): Multiple choice test					
<b>Teaching unit jury</b>					
1) Carme ROURA-MIR			2) Dolores JARAQUEMADA		

IMMUNE RESPONSE TO PATHOGENS					mandatory (EN)
ECTS	Lectures (hours/student)	Tutorials (hours/student)	Seminars (hours/student)	Internship (weeks/student)	Digital learning
3	24	4	8	0	0
Management Institute:		Universitat Autònoma de Barcelona			
Teaching unit head(s) Name:		Roger COLOBRAN			
Position:		Associate Professor of Immunology			
Contact, email:		<a href="mailto:roger.colobran@uab.cat">roger.colobran@uab.cat</a>			
<b>Keywords:</b> Immune response to bacteria, virus, fungi, parasites, vaccines, innate immune response, adaptive immune response, HIV, COVID-19, tuberculosis, malaria.					
<b>Course content:</b>					
1. Immune response to virus. <b>1.1</b> Innate and adaptive immune response to virus; <b>1.2</b> Inborn Errors of Immunity (IEI) causing viral infections; <b>1.3</b> Expert seminars on viral infections (COVID-19, HIV)					
2. Immune response to bacteria. <b>2.1</b> Immune response to extracellular bacteria; <b>2.2</b> Inborn Errors of Immunity (IEI) causing extracellular bacterial infections; <b>2.3</b> Expert seminars on extracellular bacteria; <b>2.4</b> Immune response to intracellular bacteria; <b>2.5</b> Inborn Errors of Immunity (IEI) causing intracellular bacterial infections; <b>2.6</b> Expert seminars on intracellular bacteria (mycobacteria, tuberculosis)					
3. Immune response to Fungi. <b>3.1</b> Innate and adaptive immune response to fungi; <b>3.2</b> Inborn Errors of Immunity (IEI) causing fungal infections.					
4. Immune response to parasites. <b>4.1</b> Innate and adaptive immune response to parasites (helminths). <b>4.2</b> Expert seminars on parasites (Plasmodium, malaria)					
5. Working group presentations on immune response, evasion mechanisms and vaccines to specific pathogens					
<b>Teaching Staff:</b>					
<b>Dr Roger Colobran:</b> Head of the Teaching Unit, Associate Professor of Immunology, Dept. of Cell Biology, Physiology, and Immunology, UAB.					
<b>Invited speakers:</b>					
Dr. Julià Blanco, Head of Cellular Immunology and Virology Group, AIDS Research Institute (IrsiCaixa), Hospital Germans Trias i Pujol (HUGTIP), UAB.					
Dr. Javier Martínez-Picado, ICREA Research Professor, AIDS Research Institute (IrsiCaixa), HUGTIP, UAB.					
Dr. Christian Brander, ICREA Research Professor, AIDS Research Institute (IrsiCaixa), HUGTIP), UAB					
Dr. Esteban Veiga, Centro Nacional de Biotecnología (CNB-CSIC), Madrid.					
Dr. Jesús Aranda, Lecturer in Microbiology, Dept of Genetics and Microbiology, UAB.					
Dr. Pere Joan Cardona, Senior Investigator, Head of the Experimental Tuberculosis Unit, Research Institute Hospital Germans Trias i Pujol (IGTP), Associate Professor of Microbiology, UAB.					
Dr. Alfred Cortés, ICREA Research Professor, Institute of Global Health (ISGlobal) Hospital Clínic, UB.					
Dr. Gemma Moncunill, Associate Research Professor, Institute of Global Health (ISGlobal) Hospital Clínic, UB.					
Dr. Hernando del Portillo, ICREA Research Professor, Institute of Global Health (ISGlobal), HUGTIP, UAB.					
<b>Learning outcomes:</b>					
The course is intended for the students to achieve a full understanding of the relationship between the type of immune response and characteristics of each pathogen: the way and the anatomical site of entry, the effector mechanisms of response and evasion. Understanding the relationships between a potential pathogen and its host and how genetic defects of specific immune genes lead to pathogen-specific infections.					
<b>Evaluation methods:</b> 2 written examination covering (1) immune response to virus and extracellular bacteria (2) immune response to intracellular bacteria, fungi and parasites. 35% value of total assessment for each exam. The remaining 30% will correspond to the oral presentation of a seminar.					
<b>Assessment methods</b>					
<input type="checkbox"/> Oral questioning		<input checked="" type="checkbox"/> Presentation		<input type="checkbox"/> Practice report	
<input checked="" type="checkbox"/> Written examination		<input type="checkbox"/> Bibliography report		<input type="checkbox"/> Internship unwinding	
<input type="checkbox"/> Report / thesis		<input type="checkbox"/> Digital productions (video, poster, software, wiki...)			
<input checked="" type="checkbox"/> Other (specify): Multiple choice test					
<b>Teaching unit jury</b>					
1) Roger COLOBRAN			2) Carme ROURA-MIR		

LABORATORY AND COMPUTER PRACTICALS					mandatory (EN)
ECTS	Lectures (hours/student)	Practical Sessions (hours/student)	Seminars (hours/student)	Internship (weeks/student)	Digital learning
3	4	28	3	0	8
Management Institute:		Universitat de Barcelona, Universitat Autònoma de Barcelona			
Teaching unit head(s) Name:		Thomas STRATMANN, Carme ROURA-MIR			
Position:		Associate Professors of Immunology and of Molecular Biology			
Contact, email:		<a href="mailto:thomas.stratmann@ub.edu">thomas.stratmann@ub.edu</a>		<a href="mailto:carme.roura@uab.cat">carme.roura@uab.cat</a>	
<b>Keywords:</b> Wet lab, quantitative analysis, qualitative analysis, functional analysis, genomic databases, <i>in silico</i> vaccine design, epitope prediction, gene expression data analysis, pathway enrichment analysis					
<b>Course content:</b>					
<b>Part 1 Wet lab practicals UB/UAB:</b>					
1. Preparation of buffers, calculation of dilutions.					
2. Determination of proteins concentrations in solutions by spectrophotometry.					
3. Analysis of antibody-antigen interactions, quantification by Enzyme Linked Immuno Sorbent Assay (ELISA)					
4. Isolation of PBMCs from peripheral blood, cell concentration and viability determination.					
5. Phagocytosis assay and cell phenotype analysis by flow cytometry.					
6. T cell proliferation assay and data analysis.					
<b>Part 2 Computer practicals UAB:</b>					
1. Introduction to Immunoinformatics.					
2. Immunological databases: hands-on training.					
3. Introduction to vaccine design and reverse vaccinology.					
4. Retrieval of genomic and proteomic data for different pathogens: hands-on training.					
5. Overview of bioinformatics pipelines for neoantigen-based personalized cancer vaccines.					
6. Tools for reverse vaccinology: hand-on training					
7. Introduction to gene expression resources for immunology research.					
8. Gene list enrichment analysis and pathway enrichment analysis: hands on training.					
<b>Part 3 Site visits:</b>					
Two visits each year being either:					
1. The vaccine producing biotech company Hipra (Amer, Girona) <a href="https://www.hipra.com/en/about-hipra">https://www.hipra.com/en/about-hipra</a> , and the Synchrotron Alba (Cerdanyola del Vallès, Barcelona) <a href="https://www.albasynchrotron.es/en/about/welcome">https://www.albasynchrotron.es/en/about/welcome</a>					
2. The vaccine producing biotech company Laboratorios Reig Jofre (St. Joan Despí, Barcelona) <a href="https://reigjofre.com/en/">https://reigjofre.com/en/</a> and the BCN Supercomputing Center (Barcelona) <a href="https://www.bsc.es/">https://www.bsc.es/</a> .					
<b>Teaching Staff:</b>					
• Teaching staff from Faculty of Biology, Universitat de Barcelona (UB), the Dept. of Cellular Biology, Physiology and Immunology, Faculty of Biosciences, UAB.					
• Invited scholar, Professor Yaqoub Ashhab, Director of the Biotechnology Research Center, Palestine Polytechnic University.					
<b>Learning outcomes:</b>					
The course is designed to give students a basic understanding to some basic laboratory instruments, understand antibody-antigen interactions, prepare and culture mammalian cells, perform immunophenotyping by flow cytometry and functional analysis of T and mononuclear cells. After completing the Immunoinformatics part the students should be able to: 1) Describe the fundamental concepts of Immunoinformatics; 2) Recognize the major publicly available data sources for immunology research; 3) Gain confidence in using software and tools to perform reverse vaccinology and gene-pathway analysis; 4) Identify and evaluate the potential of different bioinformatics methodologies to their own research.					
<b>Assessment methods</b>					
<input type="checkbox"/> Oral questioning		<input checked="" type="checkbox"/> Presentation		<input checked="" type="checkbox"/> Practice report	
<input checked="" type="checkbox"/> Written examination		<input type="checkbox"/> Bibliography report		<input type="checkbox"/> Internship unwinding	
<input type="checkbox"/> Report / thesis		<input type="checkbox"/> Digital productions (video, poster, software, wiki...)			
<input type="checkbox"/> Other (specify):					
<b>Teaching unit jury</b>					
1) Thomas STRATMANN			2) Carme ROURA-MIR		

MECHANISMS OF IMMUNOPATHOLOGY					mandatory (EN)
ECTS	Lectures (hours/student)	Tutorials (hours/student)	Practical work (hours/student)	Internship (weeks/student)	Digital learning
6	40	12	0	0	0
Management Institute:		Universitat Autònoma de Barcelona			
Teaching unit head(s) Name:		Eva MARTÍNEZ-CÁCERES, Manuel HERNÁNDEZ, Mónica MARTÍNEZ GALLO			
Position:		1) Head, Immunology Division HGTP and Prof of Immunology, 2) Head Immunology Division HVH, 3) Assistant Professor of Immunology			
Contact, email:		manhernandez@vhebron.net emmartinez.germanstrias@gencat.cat			
<b>Keywords:</b> immune-mediated diseases, hypersensitivity, autoimmunity, tumor immunology, immunodeficiencies, immunotherapies					
<b>Course content:</b>					
This course will introduce the students to the immune response in disease with special emphasis to immune mediated diseases. The students will have to apply their newly acquired concepts on the mechanisms of the normal immune response to these diseases. The students will also learn the principles of experimental immunopathology and the main diagnostics test currently in use in the clinical immunology laboratory.					
The course will cover with detail the following issues:					
1. Hypersensitivity as cause of disease.					
2. Autoimmune and auto inflammatory disease.					
3. Tumour Immunology.					
4. Transfusion Medicine and Transplantation.					
5. Primary immunodeficiencies.					
6. Tests for immune mediated diseases, the clinical laboratory, and the new molecular tools.					
7. Experimental immuno-pathology.					
8. Immunotherapies and its applications.					
<b>Teaching Staff:</b>					
• Prof Eva Martínez Cáceres, Prof of Immunology UAB, Head Immunology Division, Hospital Germans Trias i Pujol, UAB					
• Dr. Manuel Hernández, Head Immunology Division, Hospital Vall d'Hebron, UAB					
• Dr. Mónica Martínez Gallo, Assistant Professor of Immunology, Hospital Vall d'Hebron, UAB					
• Other speakers to be announced: tutorials will involve seminars given by experts and discussion with the students					
<b>Learning outcomes</b>					
After the course students will: be able to use immunopathology concepts for reasoning to understand clinical cases; know which immunology tests can help in the diagnosis of the main immune-mediated diseases; know the basis of immunotherapies and their potential in human disease; have the capability to discuss the relevant research results at a journal club or at a research meeting.					
<b>Assessment methods</b>					
<input checked="" type="checkbox"/> Oral questioning		<input type="checkbox"/> Presentation		<input type="checkbox"/> Practice report	
<input checked="" type="checkbox"/> Written examination		<input type="checkbox"/> Bibliography report		<input type="checkbox"/> Internship unwinding	
<input type="checkbox"/> Report / thesis		<input type="checkbox"/> Digital productions (video, poster, software, wiki...)			
<input checked="" type="checkbox"/> Other (specify): Multiple choice test, min attendance 80%					
<b>Teaching unit jury</b>					
1) Eva MARTÍNEZ CÁCERES		2) Manuel HERNÁNDEZ		3) Mónica MARTÍNEZ GALLO	

RECEPTOR SIGNALLING					mandatory (EN)
ECTS	Lectures (hours/student)	Tutorials (hours/student)	Seminars (hours/student)	Internship (weeks/student)	Digital learning
3	12	6	6	0	0
Management Institute:		Universitat de Barcelona			
Teaching unit head(s) Name:		Concepció SOLER			
Position:		Professor of Immunology			
Contact, email:		<a href="mailto:concepciosoler@ub.edu">concepciosoler@ub.edu</a>			
<b>Keywords:</b> Signal transduction: receptors, molecules, systems, pathways. Mechanisms of signal integration.					
<b>Course content:</b>  <ol style="list-style-type: none"><li>1. Signal transduction in the immune system</li><li>2. SMAD signalling pathway</li><li>3. Mechanisms of CARD14- induced inflammation</li><li>4. Adaptor molecules in mast cell signalling pathways</li><li>5. Epigenetic regulation in the Immune system</li><li>6. T-cell receptor dynamics and signalling</li><li>7. NOTCH signalling pathway</li><li>8. mTOR signalling pathway</li><li>6. Effects of Signal Transduction during Inflammation Mediated by CD4+ T cells</li><li>7. Manipulating innate immune signalling to promote virus- mediated immunotherapy</li><li>8. Oral teamwork presentations</li></ol>					
<b>Teaching Staff:</b>  Teaching Staff from Faculty of Biology and Faculty of Medicine, Universitat de Barcelona (UB). Other speakers will be invited based on their excellence. The tutorials will involve the discussion of articles covering various topics of this course.					
<b>Learning outcomes:</b>  Students should know and understand the cell signalling as a process integrated multiple signals, the molecular mechanisms involved and the basis for its modulation in immune cells.					
<b>Assessment methods</b>					
<input type="checkbox"/> Oral questioning		<input checked="" type="checkbox"/> Presentation		<input type="checkbox"/> Practice report	
<input checked="" type="checkbox"/> Written examination		<input type="checkbox"/> Bibliography report		<input type="checkbox"/> Internship unwinding	
<input type="checkbox"/> Report / thesis		<input type="checkbox"/> Digital productions (video, poster, software, wiki...)			
<input type="checkbox"/> Other (specify): Multiple choice test					
<b>Teaching unit jury</b>					
1) Concepció SOLER			2) Thomas STRATMANN		



AUTOIMMUNITY & IMMUNODEFICIENCIES					optional (EN)
ECTS	Lectures (hours/student)	Tutorials (hours/student)	Seminars (hours/student)	Internship (weeks/student)	Digital learning
3	20	6	12	0	0
Management Institute:		Universitat Autònoma de Barcelona			
Teaching unit head(s) Name:		Óscar de la CALLE, Laura MARTÍNEZ MARTÍNEZ			
Position:		Professor and Associate Prof. of Immunology, Hospital de Sant Pau, UAB			
Contact, email:		<a href="mailto:mmartinez@vhebron.net">mmartinez@vhebron.net</a>		<a href="mailto:lmartinezma@santpau.cat">lmartinezma@santpau.cat</a>	
<b>Keywords:</b> immune tolerance, autoimmune diseases, systemic autoimmunity, lupus, liver autoimmunity, inflammatory bowel diseases, autoimmunity, myopathies, experimental models, immunotherapy. Primary and secondary immunodeficiencies; innate immunity deficiencies, adaptive immunity deficiencies, diseases of immune dysregulation, acquired immunodeficiency syndrome					
<b>Course content:</b> <ol style="list-style-type: none"><li>1. The known mechanisms that lead to develop autoimmunity.</li><li>2. General features of the more common organ and non-organ specific autoimmune diseases.</li><li>3. Tests used for the diagnosis and follow up autoimmune diseases.</li><li>4. Experimental autoimmune diseases.</li><li>5. The basis of the therapies applied to autoimmune diseases.</li><li>6. Primary Immunodeficiencies (PID) definition, classification and epidemiology.</li><li>7. Molecular Basis of the PIDs. Advanced research techniques in PIDs.</li><li>8. Severe Combined Immunodeficiencies. Treatment.</li><li>9. Predominantly Antibody Deficiencies. Treatment.</li><li>10. Combined Immunodeficiencies with associated or syndromic features.</li><li>11. Diseases of Immune Dysregulation. Familial Hemophagocytic Lymphohistiocytosis and PID Syndromes with Autoimmunity (ALPS).</li><li>12. Complement Deficiencies.</li><li>13. Congenital Defects of Phagocytes.</li><li>14. Defects in Innate and Intrinsic Immunity.</li><li>15. Acquired ImmunoDeficiency Syndrome (AIDS).</li></ol>					
<b>Teaching Staff:</b> <ul style="list-style-type: none"><li>• Dr. Oscar de la Calle, Prof of Immunology, Hospital de St Pau, UAB</li><li>• Dr. Laura Martínez Martínez, Associate Prof of Immunology, Hospital St Pau, UAB</li><li>• Other speakers to be announced: tutorials will involve seminars given by experts and discussion with the students</li></ul>					
<b>Learning outcomes:</b> <p>After the course students should be able to apply immunopathology concepts to understand clinical cases of autoimmunity and immunodeficiencies; know the immunology tests that help diagnosis of autoimmune diseases; be able to design a strategy to approach research in autoimmune diseases. Know the immunology tests that help diagnosis of immunodeficiency diseases. Have the capability to discuss research results at a journal club or at a research meeting.</p>					
<b>Assessment methods</b>					
<input checked="" type="checkbox"/> Oral questioning		<input type="checkbox"/> Presentation		<input type="checkbox"/> Practice report	
<input checked="" type="checkbox"/> Written examination		<input type="checkbox"/> Bibliography report		<input type="checkbox"/> Internship unwinding	
<input type="checkbox"/> Report / thesis		<input type="checkbox"/> Digital productions (video, poster, software, wiki...)			
<input checked="" type="checkbox"/> Other (specify): Multiple choice test, Assistance min 80%					
<b>Teaching unit jury</b>					
3) Mónica MARTÍNEZ GALLO			4) Laura MARTÍNEZ MARTÍNEZ		

LANGUAGES 1					optional
ECTS	Lectures (hours/student)	Tutorials (hours/student)	Seminars (hours/student)	Internship (weeks/student)	Digital learning
3	21	6	0	0	0
Management Institute:		Universitat Autònoma de Barcelona Language Service <sup>[1]</sup>			
Teaching unit head(s) Name:		Sonia PRATS-CARRERA			
Position:		Director of Studies UAB Language Service			
Contact, email:		<a href="mailto:sonia.prats@uab.cat">sonia.prats@uab.cat</a>			
<b>Keywords:</b> W language courses, different levels (in accordance with the Common European Framework): A1, A2, B1, B2.1, B2, C1.1, C1.2.					
<b>Course content:</b>					
Improving the student's proficiency level, taking into account his or her previous knowledge of the language. The student is asked to take a placement test on arrival at the Language Service so as to be placed in the adequate course, according to his or her level.					
Languages offered through in-person teaching:					
1. Spanish course					
2. French course					
Basic Spanish and French will be taught in-person. Students who know Spanish and French will follow online courses on the Dexway Platform of any of the following European Languages: German, Italian or Portuguese. If any student needs a higher level of Spanish or French, they also may join other courses or else follow online courses in the Dexway platform.					
<b>Teaching Staff:</b>					
Experienced teachers at the UAB Language Service <a href="http://www.uab.cat/servei-llengues/">http://www.uab.cat/servei-llengues/</a>					
<b>Learning outcomes:</b>					
Depending on the initial level of the student: a specific level at the end of the course is monitored by the final exam and attested by certificate of level attained.					
<b>Assessment methods</b>					
<input type="checkbox"/> Oral questioning		<input type="checkbox"/> Presentation		<input type="checkbox"/> Practice report	
<input checked="" type="checkbox"/> Written examination		<input type="checkbox"/> Bibliography report		<input type="checkbox"/> Internship unwinding	
<input type="checkbox"/> Report / thesis		<input type="checkbox"/> Digital productions (video, poster, software, wiki...)			
<input type="checkbox"/> Other (specify):					
<b>Teaching unit jury</b>					
1) Sonia PRATS			2) Carme ROURA-MIR		



VACCINES IN SOCIETY					optional (EN)
ECTS	Lectures (hours/student)	Tutorials (hours/student)	Practical work (hours/student)	Internship (weeks/student)	Digital learning
3	15	5	0	0	6
Management Institute:		Universitat Autònoma de Barcelona			
Teaching unit head(s) Name:		Dolores JARAQUEMADA, Carme ROURA-MIR			
Position:		Professor of Immunology			
Contact, email:		dolores.jaraquemada@uab.cat		carme.roura@uab.cat	
<b>Keywords:</b> challenge-based research and innovation, Sustainable Development Goal 11, citizen science, societal challenges,					
<b>Course content:</b> This course will educate the future vaccinologist to face challenges of the future. They will learn how to adapt vaccinology to the changing world solving problems related to climate change, green energy, one-health, global response and global access to healthcare and also travel challenges. The content of the course will change in each edition depending on the courses offered by the ECIU university, the European Consortium of Innovative Universities (ECIU Erasmus+ project). This consortium is composed by the UAB and 11 universities each from different countries ( <a href="https://www.uab.cat/web/about-the-eciu-university-1345821748045.html">https://www.uab.cat/web/about-the-eciu-university-1345821748045.html</a> ). The ECIU University teaching projects are all related to Sustainable Development Goal 11 established by the United Nations General Assembly. This goal aims at having sustainable cities and communities.  The course will cover one of the following challenges: 1. Big Data & Climate Change challenge 2. Make cities and human settlements inclusive, safe, resilient, and sustainable. 3. Work in an international and multidisciplinary context that promotes the values of social and gender equity. 4. Address complex public intervention situations that may involve ethical dilemmas, according to proposals based both on the clarification of values and on conceptual and methodological rigor. 5. Promote the application and advancement of the principles of ecological, social and economic sustainability through citizen participation mechanisms. 6. Lead projects in inter-organizational environments, of different levels and political-administrative contexts.  <b>Course structure:</b> hybrid teaching combining online and in person classes Two different learning methodologies: 1) Challenge-based Learning, supported on a real experience: participants face a specific problem and explore possible options for improvement, coming up with the proposal of a solution, which is eventually implemented and evaluated. 2) Micro-modules, small training experiences that help the participants to the challenges to supplement those aspects where they may have shortcomings.  <b>Teaching Staff:</b> Teaching staff from the Universitat Autònoma de Barcelona participating at the European Consortium of Innovative Universities (ECIU Erasmus+ project) called ECIU University.  <b>Learning outcomes:</b> The course will prepare the students to grasp the changing world and help them to adapt future vaccines to the Anthropocene.					
Assessment methods					
<input type="checkbox"/> Oral questioning		<input type="checkbox"/> Presentation		<input type="checkbox"/> Practice report	
<input type="checkbox"/> Written examination		<input type="checkbox"/> Bibliography report		<input type="checkbox"/> Internship unwinding	
<input type="checkbox"/> Report / thesis		<input checked="" type="checkbox"/> Digital productions (video, poster, software, wiki...)			
<input type="checkbox"/> Other (specify): Multiple choice test					
Teaching unit jury					
1) Dolores JARAQUEMADA			2) Carme ROURA-MIR		

### 3. S2 Teaching unit sheets of the semester 2 in Antwerp (Belgium)

S2 Teaching Units	Immuno -logy	Infectio -logy	Research & clinical vaccino -logy	Transferab le skills	Grasping the changing world & Languages	TOTAL ECTS / TU
Advanced data analysis				3		3
Description & variability of pathogens		6				6
Host-pathogen interactions		3				3
Immune system in early life, pregnant women and elderly	3					3
Languages 2a: English, French, German, Italian, Spanish					3	3
Novel technologies, vaccine administration routes & adjuvants			3			3
Summer school on vaccinology			3			3
Vaccine manufacturing & quality control, regulatory approval processes			3			3
Languages 2b (option)					3	3
Molecular virology (option)		3				
<b>Total ECTS / field</b>	<b>3</b>	<b>12</b>	<b>9</b>	<b>3</b>	<b>3</b>	<b>30</b>

ADVANCED DATA ANALYSIS					mandatory (EN)														
ECTS	Lectures (hours/student)	Tutorials (hours/student)	Practical work (hours/student)	Internship (weeks/student)	Digital learning														
3	32	0	8	0	0														
Management Institute:		University of Antwerp																	
Teaching unit head(s) Name:		FRANSEN Erik, LAUKENS Kris																	
Position:		Associate professor, Professor																	
Contact, email:		erik.fransen@uantwerpen.be kris.laukens@uantwerpen.be																	
<p><b>Keywords:</b> Datasets; multivariate statistics; data mining; computational analysis</p> <p><b>Course content:</b></p> <p><b>Part 1: Theory</b></p> <ol style="list-style-type: none"> <li>Introduction to different data types and data mining problems: <ul style="list-style-type: none"> <li>A formal overview of different data types in biology and medicine, and more specifically vaccinology: quantitative data (e.g., coming from 'omics' platforms), string data (mainly DNA and protein sequences), longitudinal (temporal) data, (biomedical) text, graph data (networks), image data</li> <li>An introduction to the concepts and challenges of unsupervised and supervised data mining and machine learning</li> </ul> </li> <li>Overview of data mining techniques: <ul style="list-style-type: none"> <li>Introduction: pre-processing and basic exploratory analysis (univariate statistics) of quantitative data: a revision of statistical concepts (only a revision in the context of the course). Unsupervised learning: clustering, PCA, ...</li> <li>An introduction to classification methods: overview of classification systems, model validation (e.g., different cross-validation techniques); Biomedical feature selection and dimensionality reduction</li> <li>Supervised learning techniques (a solid introduction to commonly used techniques and algorithms): regression techniques, discriminant analysis, support vector machines, random forests, ensemble classifiers, decision trees, neural networks, naive Bayes, and association rule mining. Visual data mining</li> </ul> </li> <li>Biomedical data mining applications: <ul style="list-style-type: none"> <li>In a number of case studies, and through real research results it will be shown how these techniques can be employed to extract novel insights from real-world data in vaccination, immunology, infectious disease and epidemiology studies.</li> </ul> </li> </ol> <p><b>Part 2: Practice</b></p> <p>The practical part will familiarize the students with the statistical programming language R:</p> <ol style="list-style-type: none"> <li>Students should be able to correctly read in a dataset, generate graphs and perform elementary data manipulations.</li> <li>Some techniques for statistical data-analysis (linear regression, ANOVA, multivariate techniques,) are illustrated, whereby the students should be able to use the help files and search the internet for the code to solve a particular problem</li> <li>Programming techniques including for-loops and custom-made functions will be illustrated to facilitate repetitive analyses</li> </ol> <p><b>Teaching Staff:</b></p> <ul style="list-style-type: none"> <li>- Prof. Kris Laukens, full professor, Department of Computer Sciences, ADReM Data Lab, UA</li> <li>- Prof. Erik Franssen, associate professor and project coordinator, Department of Biomedical Sciences, Medical Genetics (MEDGEN), UA</li> <li>- Dr. Pieter Meysman, principal research fellow, Department of Computer Sciences, ADReM Data Lab, UA</li> </ul> <p><b>Learning outcomes:</b></p> <p>The course is intended for the students (i) to gain insights in various data types and their associated challenges, in the context of the broad biomedical sciences, and more specifically in the context of vaccinology and infectious diseases. (ii) to understand how and which computational techniques can be used to address common challenges in molecular and biomedical data analysis. (iii) to understand the underlying principles of a selection of computational techniques for biomedical data mining, especially in the context of vaccine development. (iv) to be able to select the appropriate technique for a given problem. (v) to be able to interpret the results of typical data mining task.</p> <p><b>Assessment methods</b></p> <table border="0"> <tr> <td><input type="checkbox"/> Oral questioning</td> <td><input checked="" type="checkbox"/> Presentation</td> <td><input checked="" type="checkbox"/> Practice report</td> </tr> <tr> <td><input checked="" type="checkbox"/> Written examination</td> <td><input type="checkbox"/> Bibliography report</td> <td><input type="checkbox"/> Internship unwinding</td> </tr> <tr> <td><input checked="" type="checkbox"/> Report / thesis</td> <td colspan="2"><input type="checkbox"/> Digital productions (video, poster, software, wiki...)</td> </tr> <tr> <td colspan="3"><input type="checkbox"/> Other (specify): Multiple choice test</td> </tr> </table> <p><b>Teaching unit jury (Name)</b></p> <table border="0"> <tr> <td>1) Kris LAUKENS</td> <td>2) Pieter MEYSMAN</td> </tr> </table>						<input type="checkbox"/> Oral questioning	<input checked="" type="checkbox"/> Presentation	<input checked="" type="checkbox"/> Practice report	<input checked="" type="checkbox"/> Written examination	<input type="checkbox"/> Bibliography report	<input type="checkbox"/> Internship unwinding	<input checked="" type="checkbox"/> Report / thesis	<input type="checkbox"/> Digital productions (video, poster, software, wiki...)		<input type="checkbox"/> Other (specify): Multiple choice test			1) Kris LAUKENS	2) Pieter MEYSMAN
<input type="checkbox"/> Oral questioning	<input checked="" type="checkbox"/> Presentation	<input checked="" type="checkbox"/> Practice report																	
<input checked="" type="checkbox"/> Written examination	<input type="checkbox"/> Bibliography report	<input type="checkbox"/> Internship unwinding																	
<input checked="" type="checkbox"/> Report / thesis	<input type="checkbox"/> Digital productions (video, poster, software, wiki...)																		
<input type="checkbox"/> Other (specify): Multiple choice test																			
1) Kris LAUKENS	2) Pieter MEYSMAN																		

DESCRIPTION AND VARIABILITY OF PATHOGENS					mandatory (EN)
ECTS	Lectures (hours/student)	Tutorials (hours/student)	Practical work (hours/student)	Internship (weeks/student)	Digital learning
6	55	0	16	0	0
Management Institute:		University of Antwerp			
Teaching unit head(s) Name:		DELPUTTE Peter, BARBEZANGE Cyril, ARIËN Kevin			
Position:		Professor, Guest Professor, Professor			
Contact, email:		peter.delputte@uantwerpen.be cyril.barbezange@uantwerpen.be kevin.arien@uantwerpen.be			
<b>Keywords:</b> Microbiology; virology; bacteriology; parasitology					
<b>Course content:</b>					
<ol style="list-style-type: none"><li>1. A systematic overview of micro-organisms is provided and the course deals successively with virology, bacteriology, parasitology, and mycology</li><li>2. For each type of micro-organism, the following aspects are discussed. The anatomy of micro-organisms, metabolism, reproduction, taxonomy, epidemiology, resistance, and pathogenicity</li><li>3. Detailed overview is given of specific viruses, bacteria, parasites, and fungi, with a special focus on the epidemiological aspects and pathogenicity of the various genera</li></ol>					
<b>Teaching Staff:</b>					
<ul style="list-style-type: none"><li>- Prof. Peter Delputte, professor, Department of Biomedical Sciences, Laboratory for Microbiology, Parasitology and Hygiene (LMPH) Group Leader of Virology, UA</li><li>- Prof. Cyril Barbezange, guest professor, Department of Biomedical Sciences, Laboratory for Microbiology, Parasitology and Hygiene (LMPH), UA</li><li>- Prof. Kevin Ariën, professor, Department of Biomedical Sciences, Laboratory for Microbiology, Parasitology and Hygiene (LMPH), UA</li><li>- Drs. Sara Van Looy, graduate teaching and research assistant, Department of Biomedical Sciences, Laboratory for Microbiology, Parasitology and Hygiene (LMPH), UA</li></ul>					
<b>Learning outcomes:</b>					
The course is intended for the students to gain theoretical and practical insights in infectious diseases with an emphasis on pathogenesis and diagnostics. The course aims at providing the following skills:					
<ol style="list-style-type: none"><li>1. The student can describe the structure and replication strategies of different pathogens.</li><li>2. The student knows the taxonomy of medically relevant viruses and bacteria</li><li>3. The student knows the most important fungi and parasites and their taxonomy.</li><li>4. The student can explain how viruses, bacteria and fungi can cause diseases.</li><li>5. The student has insights in the epidemiology of infectious diseases and can interpret prevention measures in a correct manner.</li><li>6. The student knows the different diagnostic methods and their advantages/disadvantages</li><li>7. The student can grow and identify bacteria.</li><li>8. The student can evaluate the activity of antibiotics and disinfectants.</li><li>9. The student can use a microbiological safety cabinet in a proper manner.</li><li>10. The student can work with cell cultures.</li><li>11. The student can make a primary cell culture.</li><li>12. The student knows how to isolate viruses on a cell culture and how to quantify viruses</li></ol>					
<b>Assessment methods</b>					
<input type="checkbox"/> Oral questioning		<input checked="" type="checkbox"/> Presentation		<input checked="" type="checkbox"/> Practice report	
<input checked="" type="checkbox"/> Written examination		<input type="checkbox"/> Bibliography report		<input type="checkbox"/> Internship unwinding	
<input type="checkbox"/> Report / thesis		<input type="checkbox"/> Digital productions (video, poster, software, wiki...)			
<input type="checkbox"/> Other (specify): Multiple choice test					
<b>Teaching unit jury (Name)</b>					
5) Peter DELPUTTE			6) Kevin ARIËN		

HOST-PATHOGEN INTERACTIONS					mandatory (EN)
ECTS	Lectures (hours/student)	Tutorials (hours/student)	Practical work (hours/student)	Internship (weeks/student)	Digital learning
3	20	0	12	0	0
Management Institute:		University of Antwerp			
Teaching unit head(s) Name:		CALJON Guy			
Position:		Research Professor			
Contact, email:		guy.caljon@uantwerpen.be			
<b>Keywords:</b> Immunity; protection; host; pathogen; interaction <b>Course content:</b> <ol style="list-style-type: none"> <li>To predict theoretical potentially protective immune responses to any given pathogen based on life cycle data</li> <li>To analyse the literature on host-pathogen interaction for a particular pathogen</li> <li>To discriminate potential protective immune responses from immunopathology</li> <li>To anticipate which type of vaccines could be potentially protective for a given pathogen</li> <li>In this course each student compiles and presents, from literature, a detailed overview of the immunity, the known and documented immune (protective) effector mechanisms, related immunopathology, and the progress in vaccine development against a particular pathogen</li> </ol> <b>Teaching Staff:</b> - Prof. Guy Caljon, research professor, Department of Biomedical Sciences, Laboratory for Microbiology, Parasitology and Hygiene (LMPH) Group Leader of Parasitology, UA <b>Learning outcomes:</b> The course is intended for the students to achieve an advanced understanding of the principles and mechanisms of immune protection against (tropical) infectious diseases. Knowledge to predict which immune responses are potentially essential in the defence against a particular pathogen. Justify the vaccine design against a particular pathogen. Acquired skill to give a comprehensive overview of the immunity against a particular pathogen.					
<b>Assessment methods</b>					
<input type="checkbox"/> Oral questioning		<input checked="" type="checkbox"/> Presentation		<input type="checkbox"/> Practice report	
<input checked="" type="checkbox"/> Written examination		<input type="checkbox"/> Bibliography report		<input type="checkbox"/> Internship unwinding	
<input type="checkbox"/> Report / thesis		<input type="checkbox"/> Digital productions (video, poster, software, wiki...)			
<input type="checkbox"/> Other (specify): Multiple choice test					
<b>Teaching unit jury (Name)</b>					
1) Guy CALJON			2) NA		

IMMUNE SYSTEM IN EARLY LIFE, PREGNANT WOMEN AND ELDERLY					mandatory (EN)
ECTS	Lectures (hours/student)	Tutorials (hours/student)	Practical work (hours/student)	Internship (weeks/student)	Digital learning
3	24	0	8	0	0
Management Institute:		University of Antwerp			
Teaching unit head(s) Name:		MAERTENS Kirsten, VAN DAMME Pierre			
Position:		Associate Professor and Professor			
Contact, email:		<p>pierre.vandamme@uantwerpen.be</p> <p>kirsten.maertens@uantwerpen.be</p>			
<p><b>Keywords:</b> Ontogeny; early life; pregnancy; aging immune system</p> <p><b>Course content:</b></p> <ol style="list-style-type: none"> <li>Immunological changes during pregnancy, in general and in relation to vaccination and vaccination strategies</li> <li>Ontogeny of the human immune system               <ul style="list-style-type: none"> <li>Innate system</li> <li>Adaptive immune system</li> </ul> </li> <li>Challenges for immunisation in early life</li> <li>Immune changes in elderly</li> <li>Effect of aging of the immune system on specific vaccine responses</li> </ol> <p><b>Teaching Staff:</b></p> <ul style="list-style-type: none"> <li>- Prof. Pierre Van Damme, full professor and vice-dean, Department of Medicine and Health Sciences and Vaccine &amp; infectious disease institute, Centre for the Evaluation of Vaccination Group Leader, UA</li> <li>- Prof. Kirsten Maertens, assistant professor and senior researcher, Department of Vaccine &amp; infectious disease institute, Centre for the Evaluation of Vaccination research group, UA</li> <li>- Guest speakers: experts in the field will give lectures</li> </ul> <p><b>Learning outcomes:</b></p> <p>The course is intended for the students to be able to understand (i) the changing immunology in pregnancy, (ii) the impact of the changing immunology during pregnancy on vaccine responses, (iii) the rationale for vaccination strategies in pregnant women. To gain knowledge on (i) ontogeny of the human immune system in general, (ii) specific ontogeny of the innate immune system, in general and in relation to vaccines administered during early life, (ii) specific ontogeny of the adaptive immune system in general and in relation to vaccines administered during early life. To understand (i) what the future challenges and possible solutions are for immunization in early life, beyond the neonatal period, (ii) the impact of aging on the immune system, (iii) what the challenges and possibilities are for immunisation of the elderly population.</p>					
<b>Assessment methods</b>					
<input type="checkbox"/> Oral questioning		<input checked="" type="checkbox"/> Presentation		<input type="checkbox"/> Practice report	
<input checked="" type="checkbox"/> Written examination		<input type="checkbox"/> Bibliography report		<input type="checkbox"/> Internship unwinding	
<input checked="" type="checkbox"/> Report / thesis		<input type="checkbox"/> Digital productions (video, poster, software, wiki...)			
<input type="checkbox"/> Other (specify): Multiple choice test					
<b>Teaching unit jury (Name)</b>					
3) Kirsten MAERTENS			4) Pierre VAN DAMME		

LANGUAGES 2a					mandatory
ECTS	Lectures (hours/student)	Tutorials (hours/student)	Practical work (hours/student)	Internship (weeks/student)	Digital learning
3	60	0	30	0	0
Management Institute:		University of Antwerp			
Teaching unit head(s) Name:		HEUGHEBAERT Els			
Position:		Language course coordinator			
Contact, email:		els.heughebaert@uantwerpen.be			
<b>Keywords:</b> Language course; trimester course; different levels					
<b>Course content:</b>					
1. Improving language skills in English, French, Dutch, Italian or Spanish via <ul style="list-style-type: none"><li>○ Active and communicative interactions</li><li>○ It is competency-focused</li><li>○ Formal accuracy</li><li>○ Varied teaching methods</li><li>○ Homogenous groups</li><li>○ Learning result and pleasure</li></ul>					
<b>Teaching Staff:</b>					
<ul style="list-style-type: none"><li>- Els Le Page, linguistic and pedagogical adviser, Department of Linguapolis, UA</li><li>- Eva De Volder, French language coordinator, Department of Linguapolis, UA</li><li>- Giorgio Rinaldi, Italian language teacher, Department of Linguapolis, UA</li><li>- Ana Lopez Antia, Spanish language teacher, Department of Linguapolis, UA</li><li>- To be decided, Dutch language teacher, Department of Linguapolis, UA</li></ul>					
<b>Learning outcomes:</b>					
The course is intended for the students to develop their language skills to the fullest.					
<b>Assessment methods</b>					
<input checked="" type="checkbox"/> Oral questioning		<input type="checkbox"/> Presentation		<input type="checkbox"/> Practice report	
<input checked="" type="checkbox"/> Written examination		<input type="checkbox"/> Bibliography report		<input type="checkbox"/> Internship unwinding	
<input type="checkbox"/> Report / thesis		<input type="checkbox"/> Digital productions (video, poster, software, wiki...)			
<input checked="" type="checkbox"/> Other (specify): Listening and reading examination					
<b>Teaching unit jury (Name)</b>					
1) Els LE PAGE (Linguistic and pedagogical Adviser)			2) Ginny DE VOS (Foreign Languages Team Co-ordinator)		



<b>NOVEL TECHNOLOGIES, VACCINE ADMINISTRATION ROUTES &amp; ADJUVANTS</b>					<b>mandatory (EN)</b>
<b>ECTS</b>	<b>Lectures (hours/student)</b>	<b>Tutorials (hours/student)</b>	<b>Practical work (hours/student)</b>	<b>Internship (weeks/student)</b>	<b>Digital learning</b>
<b>3</b>	<b>30</b>	<b>10</b>	<b>8</b>	<b>0</b>	<b>0</b>
<b>Management Institute:</b>		<b>University of Antwerp</b>			
<b>Teaching unit head(s) Name:</b>		<b>DELPUTTE Peter</b>			
<b>Position:</b>		<b>Professor, Professor</b>			
<b>Contact, email:</b>		<b>peter.delputte@uantwerpen.be</b>			
<p><b>Keywords:</b> Novel technology; adjuvant; immunology; vaccine development; mode of action; toll-like receptor; route of administration; clinical research; vaccine safety</p> <p><b>Course content:</b></p> <p>This course is designed in close collaboration with our industrial partners.</p> <ol style="list-style-type: none"> <li>1. Adjuvant definition Adjuvant families</li> <li>2. Role of adjuvants: Why do we need adjuvants?</li> <li>3. Matching the right one: Antigens may need help - why and when?</li> <li>4. General adjuvant mode of action (MoA): immunological interpretation, the relationship between innate and adaptive immunity</li> <li>5. Pre-clinical and clinical experience using novel adjuvants in vaccine formulations, impact on immune response</li> <li>6. Clinical tolerability, safety considerations, and current safety profile of adjuvanted vaccines</li> <li>7. Learning &amp; challenges in developing, manufacturing, and licensing AS-containing vaccines</li> <li>8. Considerations for use of adjuvanted vaccines in special populations</li> <li>9. Novel technologies, including routes of administrations</li> <li>10. Advances in Immunology and Vaccine Discovery: Considerations for future applications</li> <li>11. Tutorials: will involve reading relevant articles covering various topics of this course. Series of didactic presentations and practical exercises through group work</li> </ol> <p><b>Teaching Staff:</b></p> <ul style="list-style-type: none"> <li>- Prof. Peter Delputte, professor, Department of Biomedical Sciences, Laboratory for Microbiology, Parasitology and Hygiene (LMPH) Group Leader of Virology, UA</li> <li>- Staff from GSK Vaccines Wavre and GSK global</li> <li>- Guest speakers: experts in the field will give lectures</li> </ul> <p><b>Learning outcomes:</b></p> <p>The course is intended for the students to strengthen their capacity in vaccinology with comprehensive overview of the field, discuss recent scientific advances contributing to the progress of vaccine development, specifically related to adjuvants, novel technologies, and routes of administrations.</p>					
<b>Assessment methods</b>					
<input type="checkbox"/> Oral questioning		<input checked="" type="checkbox"/> Presentation		<input type="checkbox"/> Practice report	
<input checked="" type="checkbox"/> Written examination		<input type="checkbox"/> Bibliography report		<input type="checkbox"/> Internship unwinding	
<input type="checkbox"/> Report / thesis		<input type="checkbox"/> Digital productions (video, poster, software, wiki...)			
<input type="checkbox"/> Other (specify): Multiple choice test					
<b>Teaching unit jury (Name)</b>					
<b>1) Peter DELPUTTE</b>			<b>2) NA</b>		



SUMMER SCHOOL ON VACCINOLOGY					mandatory (EN)
ECTS	Lectures (hours/student)	Tutorials (hours/student)	Practical work (hours/student)	Internship (weeks/student)	Digital learning
3	20	0	10	0	0
Management Institute:		University of Antwerp			
Teaching unit head(s) Name:		VAN DAMME Pierre, LEURIDAN Elke			
Position:		Professor, Guest professor			
Contact, email:		pierre.vandamme@uantwerpen.be			
<b>Keywords:</b> Vaccinology summer course <b>Course content:</b> <ol style="list-style-type: none"> <li>1. Rationale, context, and history of immunization</li> <li>2. Key aspects of immunology</li> <li>3. Key aspects of vaccines               <ul style="list-style-type: none"> <li>o Vaccine preventable diseases</li> <li>o Immunisation policy and schedules</li> <li>o Future perspectives</li> <li>o Communication</li> </ul> </li> <li>4. Practical skills</li> </ol>					
<b>Teaching Staff:</b> <ul style="list-style-type: none"> <li>- Prof. Pierre Van Damme, full professor and vice-dean, Department of Medicine and Health Sciences and Vaccine &amp; infectious disease institute, Centre for the Evaluation of Vaccination Group Leader, UA</li> </ul>					
<b>Learning outcomes:</b> <p>The course is intended for the students to understand (i) the historical impact of vaccine preventable diseases, discuss the rationale for implementing immunisation programmes, explain concepts of control, elimination and eradication; (ii) Immunology: Explain innate and adaptive immunity, functions of B- and T cells, role of Ab and Ag, impact maternal Ab; Outline the role of immune response to a vaccine, active /passive vaccination, assess the capacity of immune system; (iii) Vaccines: Definition, components and function, different types of vaccines and their expected side effects and contraindications; Stages in vaccine development, procedures of safety control and monitoring of efficacy; (iv) Vaccines preventable diseases: Pathology, population at risk, available preventive measures for each disease; (v) Policy and schedules: Vaccines in immunisation schedule; Show historical impact of vaccination on epidemiology ; Spread of infections, herd immunity, role of modelling, economic evaluation; Factors informing policy decisions; Role of disease surveillance, vaccination coverage data; (vi) Future: List new target diseases; Vaccines in the pipeline, new ways of administration; Current research on components and techniques; Discuss current developments for HIV, dengue, malaria, hepatitis C; (vii) Communication Describe myths and facts relating to immunisation controversies, list common misconceptions, respond to objections of anti-vaccine movements; Critically evaluate media reporting, understand public perception; List key points for responding to parents' fear; Ethics of communication; how to respond to anti-vaccine lobbies; State advantages and risks that need to be communicated; Direct to other information sources; (viii) Practical skills: immunization site, immunization techniques, vaccine reconstitution, cold chain, storage, conditions, prepare and dispose vaccine equipment, avoid needle stick injuries, recognize true contraindications, distinguish anaphylaxis and fainting.</p>					
<b>Assessment methods</b>					
<input type="checkbox"/> Oral questioning		<input checked="" type="checkbox"/> Presentation		<input checked="" type="checkbox"/> Practice report	
<input checked="" type="checkbox"/> Written examination		<input type="checkbox"/> Bibliography report		<input type="checkbox"/> Internship unwinding	
<input type="checkbox"/> Report / thesis		<input type="checkbox"/> Digital productions (video, poster, software, wiki...)			
<input type="checkbox"/> Other (specify): Multiple choice test					
<b>Teaching unit jury (Name)</b>					
1) Pierre Van Damme			2) NA		

VACCINE MANUFACTURING & QUALITY CONTROL, REGULATORY APPROVAL PROCESSES					mandatory (EN)
ECTS	Lectures (hours/student)	Tutorials (hours/student)	Practical work (hours/student)	Internship (weeks/student)	Digital learning
3	30	10	0	0	0
Management Institute:		University of Antwerp			
Teaching unit head(s) Name:		DELPUTTE Peter, VAN DAMME Pierre			
Position:		Professor, Professor			
Contact, email:		peter.delputte@uantwerpen.be pierre.vandamme@uantwerpen.be			
<p><b>Keywords:</b> Vaccine development; vaccine manufacturing; vaccine quality; vaccine evaluation; vaccine standards; GMP; vaccine regulation; vaccine licensing; vaccine prequalification programme; international supply chains</p> <p><b>Course content:</b> This course is designed in close collaboration with our industrial partners.</p> <p><b>Part 1: Vaccine manufacturing and quality control</b></p> <ol style="list-style-type: none"> <li>1. Vaccine manufacturing: from working seed to filling and packaging</li> <li>2. Examples of vaccine production: viral and bacterial vaccines, recombinant protein vaccines</li> <li>3. GMP considerations</li> <li>4. Industry and new technologies: antigen sparing, cell culture, thermostability</li> <li>5. Quality control and quality assurance: supply chain protection, monitoring and testing</li> </ol> <p><b>Part 2: Vaccine regulatory approval processes</b></p> <ol style="list-style-type: none"> <li>6. Laws, regulations and guidances</li> <li>7. CTD format: content and review</li> <li>8. From development to licensure: examples of EU, US and international procedures</li> <li>9. Approval, variations and renewals</li> <li>10. Specific requirements: pediatric population, risk management</li> <li>11. Role of supranational organisations in vaccine approval and distribution: WHO prequalification and article 58</li> <li>12. The tutorials will involve the study of articles or patents covering various topics of this course. Technological monitoring of different subjects in these areas will be conducted in groups and presented during specific sessions</li> </ol> <p><b>Teaching Staff:</b></p> <ul style="list-style-type: none"> <li>- Prof. Peter Delputte, professor, Department of Biomedical Sciences, Laboratory for Microbiology, Parasitology and Hygiene (LMPH) Group Leader of Virology, UA</li> <li>- Prof. Pierre Van Damme, full professor and vice-dean, Department of Medicine and Health Sciences and Vaccine &amp; infectious disease institute, Centre for the Evaluation of Vaccination Group Leader, UA</li> <li>- Staff from GSK Vaccines Wavre and GSK global</li> <li>- Guest speakers: experts in the field will give lectures</li> </ul> <p><b>Learning outcomes:</b> The course is intended for the students to be able to understand vaccine manufacturing principles, rules and regulations related to vaccine development, manufacturing, assessment and release, to explain regulatory process for vaccine review and approval, to explain role of supranational organisation in vaccine registration and surveillance and how the expedited procedure fits into the existing legal framework for licensing of vaccines.</p>					
<b>Assessment methods</b>					
<input type="checkbox"/> Oral questioning		<input checked="" type="checkbox"/> Presentation		<input type="checkbox"/> Practice report	
<input checked="" type="checkbox"/> Written examination		<input type="checkbox"/> Bibliography report		<input type="checkbox"/> Internship unwinding	
<input type="checkbox"/> Report / thesis		<input type="checkbox"/> Digital productions (video, poster, software, wiki...)			
<input type="checkbox"/> Other (specify): Multiple choice test					
<b>Teaching unit jury (Name)</b>					
1) Peter DELPUTTE			2) Pierre VAN DAMME		

LANGUAGES 2b					optional
ECTS	Lectures (hours/student)	Tutorials (hours/student)	Practical work (hours/student)	Internship (weeks/student)	Digital learning
3	60	0	30	0	0
Management Institute:		University of Antwerp			
Teaching unit head(s) Name:		HEUGHEBAERT Els			
Position:		Language course coordinator			
Contact, email:		els.heughebaert@uantwerpen.be			
<b>Keywords:</b> Language course; trimester course; different levels <b>Course content:</b> 2. Improving language skills in English, French, Dutch, Italian or Spanish via <ul style="list-style-type: none"> <li>○ Active and communicative interactions</li> <li>○ It is competency-focused</li> <li>○ Formal accuracy</li> <li>○ Varied teaching methods</li> <li>○ Homogenous groups</li> <li>○ Learning result and pleasure</li> </ul>					
<b>Teaching Staff:</b> <ul style="list-style-type: none"> <li>- Els Le Page, linguistic and pedagogical adviser, Department of Linguapolis, UA</li> <li>- Eva De Volder, French language coordinator, Department of Linguapolis, UA</li> <li>- Giorgio Rinaldi, Italian language teacher, Department of Linguapolis, UA</li> <li>- Ana Lopez Antia, Spanish language teacher, Department of Linguapolis, UA</li> <li>- To be decided, Dutch language teacher, Department of Linguapolis, UA</li> </ul>					
<b>Learning outcomes:</b> The course is intended for the students to develop their language skills to the fullest.					
<b>Assessment methods</b>					
<input checked="" type="checkbox"/> Oral questioning		<input type="checkbox"/> Presentation		<input type="checkbox"/> Practice report	
<input checked="" type="checkbox"/> Written examination		<input type="checkbox"/> Bibliography report		<input type="checkbox"/> Internship unwinding	
<input type="checkbox"/> Report / thesis		<input type="checkbox"/> Digital productions (video, poster, software, wiki...)			
<input checked="" type="checkbox"/> Other (specify): Listening and reading examination					
<b>Teaching unit jury (Name)</b>					
3) Els LE PAGE (Linguistic and pedagogical Adviser)			4) Ginny DE VOS (Foreign Languages Team Co-ordinator)		

MOLECULAR VIROLOGY					optional (EN)
ECTS	Lectures (hours/student)	Tutorials (hours/student)	Practical work (hours/student)	Internship (weeks/student)	Digital learning
3	30	0	8	0	0
Management Institute:		University of Antwerp			
Teaching unit head(s) Name:		DELPUTTE Peter, BARBEZANGE Cyril, ARIËN Kevin			
Position:		Professor, Guest Professor, Professor			
Contact, email:		peter.delputte@uantwerpen.be cyril.barbezange@uantwerpen.be kevin.arien@uantwerpen.be			
<p><b>Keywords:</b> Microbiology; virology; bacteriology; parasitology</p> <p><b>Course content:</b></p> <p>This course will teach students advanced knowledge on virus replication strategies, including</p> <ul style="list-style-type: none"> <li>• Target cells and virus entry</li> <li>• viral genomes and strategies for genome replication</li> <li>• virus assembly and release.</li> </ul> <p>Attention will be given to pathogenesis and viral immune evasion, virus evolution, emerging and zoonotic viruses and surveillance of viruses, with a focus on medically important viruses and selected methods, such as full genome sequencing of viruses. Practical aspects, and the application of prior lectures will be discussed, including methods to study virus replication and pathogenesis, virus-host interactions, development of antivirals and vaccines, and applications of viruses (pseudotypes, cancer treatment, gene modification, vaccine delivery, study of cell biology...). Finally, students will give a presentation on selected topics of specific viruses.</p> <p><b>Teaching Staff:</b></p> <ul style="list-style-type: none"> <li>- Prof. Peter Delputte, professor, Department of Biomedical Sciences, Laboratory for Microbiology, Parasitology and Hygiene (LMPH) Group Leader of Virology, UA</li> <li>- Prof. Cyril Barbezange, guest professor, Department of Biomedical Sciences, Laboratory for Microbiology, Parasitology and Hygiene (LMPH), UA</li> <li>- Prof. Kevin Ariën, professor, Department of Biomedical Sciences, Laboratory for Microbiology, Parasitology and Hygiene (LMPH), UA</li> <li>- Drs. Sara Van Looy, graduate teaching and research assistant, Department of Biomedical Sciences, Laboratory for Microbiology, Parasitology and Hygiene (LMPH), UA</li> </ul> <p><b>Learning outcomes:</b></p> <ul style="list-style-type: none"> <li>• you understand the main molecular virological terminology and specific aspects</li> <li>• you have an in depth understanding of the molecular biology of viruses</li> <li>• you have good knowledge of the molecular infection cycle of a selected set of human and animal viruses</li> <li>• you comprehend the molecular interactions between viruses and their host cells and can explain on molecular level how virus infections may lead to disease</li> <li>• you can translate the theoretical knowledge towards practical understanding of virus biology and applications of viruses, such as methods to study virus replication and virus infected cells, virus-based gene transfer, development of antivirals and vaccines</li> </ul>					
<b>Assessment methods</b>					
<input type="checkbox"/> Oral questioning		<input checked="" type="checkbox"/> Presentation		<input checked="" type="checkbox"/> Practice report	
<input checked="" type="checkbox"/> Written examination		<input type="checkbox"/> Bibliography report		<input type="checkbox"/> Internship unwinding	
<input type="checkbox"/> Report / thesis		<input type="checkbox"/> Digital productions (video, poster, software, wiki...)			
<input type="checkbox"/> Other (specify): Multiple choice test					
<b>Teaching unit jury (Name)</b>					
1) Peter DELPUTTE			2) Kevin ARIËN		

#### 4. S3 Teaching unit sheets of the semester 3 in Lyon/Saint-Etienne (France)

S3 Teaching Units	Immuno pathology	Infectio -logy	Research & clinical vaccino -logy	Transferable skills	Grasping the changing world & Languages	TOTAL ECTS
Clinical vaccine development			3			3
Communicating on vaccines & public health				6		6
Epidemiology		3				3
Immunomonitoring of preclinical and clinical vaccine trials			3			3
Project management				3		3
Vaccine formulation			3			3
Vaccine specific applications			3			3
Aging and cell death (option)					3	6
Expérimentation animale (option in FR)				6		
Immunology and cancer (option)	3					
Languages 3: English, French, Italian, Spanish (option)					3	
Neuro-immunology: immune privilege and biotherapies (option)	3					
*MSc in Health Management and Data Intelligence (HMDI) (student exchange)	12				12	
<b>Total ECTS</b>	<b>3</b>	<b>3</b>	<b>12</b>	<b>9</b>	<b>3</b>	<b>30</b>

(\*) Student exchange: a LIVE student who exchange for 12 ECTS takes no option from the Master LIVE programme and conduct his reality project in the frame of the business school teaching unit called "Transforming Early Makers".

CLINICAL VACCINE DEVELOPMENT					mandatory (EN)
ECTS	Lectures (hours/student)	Tutorials (hours/student)	Practical work (hours/student)	Internship (weeks/student)	Digital learning
3	30	0	0	0	0
Management Institute:		Université Jean Monnet Saint Etienne			
Teaching unit head(s) Name:		BOTELHO-NEVERS Elisabeth			
Position:		Professor-hospital practitioner (PU-PH1)			
Contact, email:		BOTELHO-NEVERS Elisabeth		Elisabeth.Botelho-Nevers@chu-st-etienne.fr	
<p><b>Keywords:</b> clinical trial, biobanking, phase, reglementation, evaluation, recruitment,efficacy, effectiveness, statistics</p> <p><b>Course content:</b></p> <p>1. Overview of clinical vaccine development in routine or in an epidemic context</p> <p>2. Challenges in participant's recruitment</p> <p>3. Regulatory affairs, policies</p> <p>4. Statistical methodology for clinical vaccine trials</p> <p>5. Clinical data management</p> <p>6. Clinical trials operations</p> <p>7. Safety</p> <p><b>Teaching Staff:</b></p> <p>Teaching Staff Clinical research in vaccinology, Infectious diseases from UJM and from different associated partners.</p> <p>Conferences concerning news items will be organized. Speakers will be invited based on their excellence.</p> <p><b>Learning outcomes:</b></p> <p>To know how vaccine are clinically developed, regulatory methodology and monitoring of participants.</p>					
Assessment methods					
<input type="checkbox"/> Oral questioning		<input type="checkbox"/> Presentation		<input type="checkbox"/> Practice report	
<input checked="" type="checkbox"/> Written examination		<input type="checkbox"/> Bibliography report		<input type="checkbox"/> Internship unwinding	
<input type="checkbox"/> Report / thesis		<input type="checkbox"/> Digital productions (video, poster, software, wiki...)			
<input type="checkbox"/> Other (specify): Multiple choice test					
Teaching unit jury (Name)					
1) Elisabeth BOTELHO-NEVERS			2) Amandine GAGNEUX-BRUNON		

COMMUNICATING ON VACCINES AND PUBLIC HEALTH					mandatory (EN)
ECTS	Lectures (hours/student)	Tutorials (hours/student)	Practical work (hours/student)	Internship (weeks/student)	Digital learning
6	40	10	16	0	0
Management Institute:		Université Jean Monnet Saint Etienne			
Teaching unit head(s) Name:		PAUL Stéphane DELPRAT Christine			
Position:		Professor-hospital practitioner (PU-PH1) Professor (PU1)			
Contact, email:		Stéphane PAUL stephane.paul@chu-st-etienne.fr			
<b>Keywords:</b> communication, vaccine hesitancy, perception, global health, policies, WHO, CEPI, GAVI, MOOC					
<b>Course content:</b>  Vaccines have been and remain a major tool for public health strategies. But the growing complexity of current vaccine agendas for children, the ongoing introduction of new vaccines (conjugate vaccines, programs targeting adults or the aging, addressing chronic or non-infectious diseases) have made decision-making more complex for vaccine producers and authorities in public health and blurred the meanings and purposes of vaccination for the general public. Accordingly, it appears important to provide all apprentices and professionals dealing with vaccines with knowledge pertaining to social sciences as well as biomedical sciences. <b>(1)</b> History of vaccination and vaccines; <b>(2)</b> Epidemiology and vaccination; <b>(3)</b> The place of vaccination in public health decisions; <b>(4)</b> Social factors influencing vaccine policies and strategies in different countries; <b>(5)</b> Anthropology of vaccine acceptance and rejection; <b>(6)</b> Public and media perception of vaccination and vaccines; <b>(7)</b> Health economics and vaccines; <b>(8)</b> the future of vaccinology. <b>Practices:</b> students will build a Massive Open Online Course (MOOC) related to vaccination, being managed by the MOOC managers of the TU “Project management” developing digital skills and networking capacities					
<b>Teaching Staff:</b>  Teaching Staff Immunology from UJM (S Paul, S Longet), University of Claude Bernard Lyon 1 and from the CNRS supporting partner “SPHERE”. Conferences concerning news items will be organized. Speakers will be invited on specific subjects, selected for their excellence					
<b>Learning outcomes:</b>  The course is intended for the students to achieve an understanding of how to collect informations and communicate on vaccination and vaccines, elaborate recommendations to authorities for education, information of the public. History of vaccines and anthropology of human and veterinary vaccines					
<b>Assessment methods</b>					
<input type="checkbox"/> Oral questioning		<input checked="" type="checkbox"/> Presentation		<input type="checkbox"/> Practice report	
<input type="checkbox"/> Written examination		<input type="checkbox"/> Bibliography report		<input type="checkbox"/> Internship unwinding	
<input type="checkbox"/> Report / thesis		<input checked="" type="checkbox"/> Digital productions (video, poster, software, wiki...)			
<input type="checkbox"/> Other (specify): Multiple choice test					
<b>Teaching unit jury (Name)</b>					
1) Stéphane PAUL			2) Christine DELPRAT		



EPIDEMIOLOGY					mandatory (EN)
ECTS	Lectures (hours/student)	Tutorials (hours/student)	Practical work (hours/student)	Internship (weeks/student)	Digital learning
3	30	0	0	0	0
Management Institute:		Université Claude Bernard Lyon 1, UFR Biosciences			
Teaching unit head(s) Name:		Philippe VANHEMS			
Position:		Professor-hospital practitioner (PU-PH)			
Contact, email:		Selilah AMOUR <a href="mailto:selilah.amour@chu-lyon.fr">selilah.amour@chu-lyon.fr</a>			
<b>Keywords:</b> epidemiology, clinical research, design, cross-sectional studies, case-control studies, cohort studies, role of chance, individual risks; public health surveillance, vaccination investigation, effectiveness and impact					
<b>Course content:</b> Epidemiology is the study of the distribution and determinants of disease frequency in human populations. Human diseases and especially infectious diseases does not occur at random and then has causal and preventive factors that can be identified through systematic investigation in different populations, in different places or at different times. Vaccine is a key preventive factor in the process of transmission and infection. Then, it is an important determinant involved in the natural history of infectious diseases. Sharing with the students the basic methodological concepts regarding epidemiology Discussing the applications of epidemiological concepts in the field of diseases which can be prevented by vaccine. 1. Basic concepts: definition, study designs, measures of disease frequency 2. Types of epidemiologic studies: Descriptive studies, Case-control studies, Cohort studies, Intervention studies 3. Description and analysis of epidemiological data 4. Role of chance, Bias and Confounding 5. The epidemiology of vaccination 6. Epidemiology of infectious diseases, of non-infectious diseases Design in the field of vaccination, vaccine effectiveness, impact of vaccination					
<b>Teaching Staff:</b> Teaching Staff Epidemiology from Université Claude Bernard Lyon 1 Conferences concerning news, items will be organized. Speakers will be invited based on their excellence.					
<b>Learning outcomes:</b> To know epidemiology and its main developments in health sciences. How to choose, justify and execute the appropriate study set up.					
<b>Assessment methods</b>					
<input type="checkbox"/> Oral questioning		<input type="checkbox"/> Presentation		<input type="checkbox"/> Practice report	
<input checked="" type="checkbox"/> Written examination		<input type="checkbox"/> Bibliography report		<input type="checkbox"/> Internship unwinding	
<input type="checkbox"/> Report / thesis		<input type="checkbox"/> Digital productions (video, poster, software, wiki...)			
<input type="checkbox"/> Other (specify): Multiple choice test					
<b>Teaching unit jury (Name)</b>					
1) Philippe VANHEMS			2) Thomas BENET		



IMMUNOMONITORING OF PRECLINICAL AND CLINICAL TRIALS					mandatory (EN)
ECTS	Lectures (hours/student)	Tutorials (hours/student)	Practical work (hours/student)	Internship (weeks/student)	Digital learning
3	10	0	40	0	0
Management Institute:		Université Jean Monnet Saint Etienne			
Teaching unit head(s) Name:		PAUL Stéphane			
Position:		Professor-hospital practitioner (PU-PH1)			
Contact, email:		Stéphane PAUL <a href="mailto:stephane.paul@chu-st-etienne.fr">stephane.paul@chu-st-etienne.fr</a>			
<p><b>Keywords:</b> vaccination, animal models, immunomonitoring, flow cytometry, elispot, elisa, ficoll, microscopy, mouse, organs, transcriptomics, monkeys, NHP, challenge</p> <p><b>Course content:</b></p> <p>Practical work will teach the students how to monitor reactogenicity, innate immunity, humoral and cellular immune response in mice. Practical immunology includes multi-parameter flow cytometry analysis, elispot assay, elisa, microscopy, transcriptomics, route of administration in mice, mouse immunology.</p> <ol style="list-style-type: none"><li>1. Methods of immunisation in mice, uptake of organs and secretions</li><li>2. Multiparameter spectral flow cytometry</li><li>3. In vivo imaging</li><li>4. Monitoring of B cell responses (elispot, antibody titers)</li><li>5. Monitoring of T cells (cytometry, polyfunctionality, elispot)</li><li>6. Transcriptomic, Proteomic and Glyconomics tools of the measure of vaccine efficiency</li><li>7. New methods as the measure of immune diversity, reactogenicity and innate immunity</li><li>8. Management of samples for vaccine trial (AQ)</li><li>9. Choice of the good animal model and correlate of protection or efficiency</li></ol> <p><b>Teaching Staff:</b></p> <p>Teaching Staff Immunology from UJM Conferences concerning news items will be organized. Speakers will be invited based on their excellence. Practical training for preclinical immunomonitoring will be done with the CEA in Fontenay aux Roses (2 days) and UJM.</p> <p><b>Learning outcomes:</b></p> <p>The course is intended for the students to achieve an understanding of how to monitor and to practice monitoring of vaccine efficiency in animal models and in humans.</p>					
Assessment methods					
<input type="checkbox"/> Oral questioning		<input checked="" type="checkbox"/> Presentation		<input checked="" type="checkbox"/> Practice report	
<input type="checkbox"/> Written examination		<input type="checkbox"/> Bibliography report		<input type="checkbox"/> Internship unwinding	
<input type="checkbox"/> Report / thesis		<input type="checkbox"/> Digital productions (video, poster, software, wiki...)			
<input type="checkbox"/> Other (specify): Multiple choice test					
Teaching unit jury (Name)					
1) Stéphane PAUL			2) Stéphanie LONGET		

PROJECT MANAGEMENT					mandatory (EN)
ECTS	Lectures (hours/student)	Tutorials (hours/student)	Practical work (hours/student)	Internship (weeks/student)	Digital learning
3	30	15	20	0	15
Management Institute:		Université Claude Bernard Lyon 1			
Teaching unit head(s) Name:		Christophe GILBERT			
Position:		Assistant-Professor			
Contact, email:		Christophe GILBERT christophe.gilbert.bio@univ-lyon1.fr			

**Keywords:** analyse, plan, organize, motivate, execute, control, grant application

**Course content:**  
Learning and experimenting the benefits to manage a project to achieve specific goals in the international context of a scientific and multidisciplinary challenge in vaccinology.

- Life of a project:** from the initiation to the closing including all the planning and executing processes related to the project and the risk analysis
- Specific project management expertise** e.g. Managing a project in a P4 laboratory
- Risk management**, case-studies
- Virtual international project development:** e e.g. "Tuberculosis vaccine", recommendations, research aims, research development, regulations, scale-up, GMP production, pre-clinical safety and toxicity studies in animal models, clinical phase I-II-III, industrial production, cost-effectiveness analysis, commercialization
- Project management Methods:** Five W's, brainstorming, Ishikawa diagram, SWOT, SMART, GANTT, PERT, DESC, PDCA...
- Practices** corresponds to **reality international projects** such as vaccinology MOOC production, annual Research Instructive Workshop, Junior scientific committee organizing the VaxInLive Symposium, social acute questions in vaccinology, proof of concept for innovation, organizing junior interactive research workshop, or... other reality projects decided by the teaching team each year. Groups of (4-10 student) managers organize themselves either horizontally or vertically in a mini-enterprise to lead their project... innovative project pedagogy: enjoy your project progress sheets from one week to another for a real result “out of the box” of your academic results.

**Teaching Staff:**  
Teaching Staff from UCBL : Viktor Vochkov for P4 pathogens infectious problem in laboratory and in the natural environment, Emilie Bourdonnay, Mathias Faure and Christine Delprat to frame the practices. Conferences concerning real past project management on infectious problems and vaccines will be illustrated by industrial staff from LIVE Associated partners: Sanofi Pasteur, Boehringer Ingelheim/Merial, Butantan Institute...

**Learning outcomes:**  
To learn different methods and practice them facing to reality project; to develop the ability to analyse, plan, execute and control a scientific and multidisciplinary project linked to vaccinology.

Assessment methods		
<input checked="" type="checkbox"/> Oral questioning	<input checked="" type="checkbox"/> Presentation	<input type="checkbox"/> Practice report
<input type="checkbox"/> Written examination	<input type="checkbox"/> Bibliography report	<input type="checkbox"/> Internship unwinding
<input type="checkbox"/> Report / thesis	<input checked="" type="checkbox"/> Digital productions (video, poster, software, wiki...)	
<input type="checkbox"/> Other (specify):		

Teaching unit jury (Name)	
1) Christophe GILBERT	2) Viktor VOLCHKOV

VACCINE FORMULATION					mandatory (EN)
ECTS	Lectures (hours/student)	Tutorials (hours/student)	Practical work (hours/student)	Internship (weeks/student)	Digital learning
3	30	0	16	0	0
Management Institute:		Université Jean Monnet Saint Etienne			
Teaching unit head(s) Name:		Stéphane PAUL			
Position:		Professor-hospital practitioner (PU-PH1)			
Contact, email:		Stéphane PAUL <a href="mailto:stephane.paul@chu-st-etienne.fr">stephane.paul@chu-st-etienne.fr</a>			

**Keywords:** vaccine, formulation, adjuvant, production, DNA, mRNA, vectors, production

**Course content:**

1. Description of the different types of vaccine (lived, inactivated, killed, recombinant) and methods of production/inactivation

2. Particulated or nanoparticulated vaccines (NPs, LNPs, VLPs)

3. Recombinant vaccines (production system E. coli, yeast, baculovirus, cell lines) and characterization methods

4. Viral/Bacterial-based vaccines (poxvirus, adenovirus, retrovirus, HSV, lentivirus, Salmonella...)

5. DNA and mRNA formulated vaccines (synthesis, production, reactogenicity, controls)

6. Targeted-specific vaccines (immunoantigens, antibody, scFv, ligands)

7. Antigen identification and optimisation (epitopes, antigen structure, reverse vaccinology), vaccinomics, personalized vaccinology, structural vaccinology, artificial intelligency..

8. Immunization routes (mucosal administration, devices for intranasal, oral, intradermal administration)

9. Practical approach for vaccine formulation in VFI laboratory (o/w emulsion, aluminium, VLPs, saponins, adjuvants knowledges). Validation and qualification

**Teaching Staff:**

Teaching Staff Immunology from UJM (S Paul, S Longet).

Practical training for adjuvant formulation will be done with VFI in Geneva (2 days) and UJM

Conferences concerning news items will be organized. Speakers will be invited based on their excellence.

**Learning outcomes:**

The course is intended for the students to achieve an understanding of the different types of formulated vaccines, type of vaccines, inactivation methods, viral vectors for vaccine, adjuvant, routes of immunization, production of vaccine, choice of the antigen, practical approach of the formulation.

Assessment methods		
<input type="checkbox"/> Oral questioning	<input type="checkbox"/> Presentation	<input type="checkbox"/> Practice report
<input checked="" type="checkbox"/> Written examination	<input type="checkbox"/> Bibliography report	<input type="checkbox"/> Internship unwinding
<input type="checkbox"/> Report / thesis	<input type="checkbox"/> Digital productions (video, poster, software, wiki...)	
<input type="checkbox"/> Other (specify): Multiple choice test		

Teaching unit jury (Name)	
1) Stéphane PAUL	2) Stéphanie LONGET

VACCINE SPECIFIC APPLICATIONS					mandatory (EN)
ECTS	Lectures (hours/student)	Tutorials (hours/student)	Practical work (hours/student)	Internship (weeks/student)	Digital learning
3	40	0	0	0	0
Management Institute:		Université Jean Monnet Saint Etienne			
Teaching unit head(s) Name:		PAUL Stéphane			
Position:		Professor-hospital practitioner (PU-PH1)			
Contact, email:		Stéphane PAUL stephane.paul@chu-st-etienne.fr			

**Keywords:** vaccine, infectious diseases, pandemy, epidemy, zoonosis, cancer, neurological diseases, allergy, autoimmunity

**Course content:**

1. Infectious diseases-specific vaccines (Flu, coronaviruses, Malaria, Schistosomiasis, Leishmaniasis, RSV, HMPV, Haemorrhagic fevers, antibioresistant bacteria, *pneumococcus*, *streptococcus*, *staphylococcus*, *H pylori*, BCG, *Bordetella pertussis*, TB, HIV...)

2. Cancer-specific vaccines (peptide vaccination, oncolytic vaccine, personalized vaccine, combotherapy..)

3. Allergy-based vaccines/immunotherapy (tolerance, specific adjuvantation, allergen definition, schedule of immunization...)

4. Veterinary-specific vaccines (pets, horses, cow, poultry), type of immunization strategy, vaccine type, target for zoonosis

5. Vaccines for neurological diseases (Alzheimer, Parkinson, Sclerosis)

6. Vaccines for autoimmunity

7. Human challenge models as new way to define vaccine efficacy

**Teaching Staff:**

Teaching Staff Immunology from UJM (S Paul, S Longet).  
Two days' session on Veterinary vaccines will be organized in Boehringer Ingelheim facility (Lyon) and two days' session on human vaccines will be organized in Sanofi-Pasteur facility (Lyon)  
Conferences concerning news items will be organized. Speakers will be invited based on their excellence.

**Learning outcomes:**

The course is intended for the students to achieve an understanding of the different specific application of the vaccination in the prophylactic and therapeutic ways against different pathogens (preclinical and clinical development), new development of vaccination.

Assessment methods		
<input type="checkbox"/> Oral questioning	<input type="checkbox"/> Presentation	<input type="checkbox"/> Practice report
<input checked="" type="checkbox"/> Written examination	<input type="checkbox"/> Bibliography report	<input type="checkbox"/> Internship unwinding
<input type="checkbox"/> Report / thesis	<input type="checkbox"/> Digital productions (video, poster, software, wiki...)	
<input type="checkbox"/> Other (specify): Multiple choice test		

Teaching unit jury (Name)	
1) Stéphane PAUL	2) Stéphanie LONGET

AGING AND CELL DEATH					optional (EN)
ECTS	Lectures (hours/student)	Tutorials (hours/student)	Practical work (hours/student)	Internship (weeks/student)	Digital learning
3	15	5	0	0	0
Management Institute:		Université Claude Bernard Lyon 1			
Teaching unit head(s) Name:		Carole KRETZ			
Position:		Professor (PU1)			
Contact, email:		Carole KRETZ carole.kretz@univ-lyon1.fr			
<p><b>Keywords:</b> cell death, aging,</p> <p><b>Course content:</b></p> <p>The goal of this UE is to provide an overview and recent advances on cell death and cellular aging fields. During this teaching program the emphasis will be put on how both fields are critical to understand the aging process. Lectures on different topics of cell death and cellular aging will be given in English, by expert professors and researchers of the French scientific community; the scientists will present overviews and recent advances of those rapidly growing fields. The conferences will be followed by round table discussions with the experts. Then, choosing one of the lectures as starting point, students will go deeper into it and propose a research project including: a short “state of the art”, biological questions to be answered, experimental strategies to be performed and expected results.</p> <p>The following topics will be addressed:</p> <ul style="list-style-type: none"> <li>- Biology of cell death: necrosis, necroptosis, apoptosis and autophagy and their relationship to aging- Cellular senescence: molecular mechanisms of control and escaping</li> <li>- Cellular aging and damage to the molecules: reactive oxygen species, protein aggregation, telomere shortening</li> <li>- Cellular aging and metabolism: theories of caloric restriction, metabolic signalling pathways</li> <li>- Physiopathology of aging: organisms’ longevity, aging diseases and neurodegenerative diseases</li> </ul> <p><b>Teaching Staff:</b></p> <p>Teaching Staff cell biology, genetics from University Claude Bernard Lyon 1.</p> <p>Conferences concerning new research development in onco-immunology will be organized. Speakers will be invited based on their excellence.</p> <p><b>Learning outcomes:</b> In-depth knowledge in the fields of aging and cell death.</p> <p>Mobilizing prior knowledge in the field and making connections with other learning areas.</p> <p>Critical analysis of specialized resources and synthesis of these data.</p> <p>Oral communication to convey knowledge and request information.</p> <p>Scientific discussion with peers.</p> <p>Drafting of research projects.</p> <p>Scientific English.</p>					
<b>Assessment methods</b>					
<input type="checkbox"/> Oral questioning		<input checked="" type="checkbox"/> Presentation		<input type="checkbox"/> Practice report	
<input checked="" type="checkbox"/> Written examination		<input type="checkbox"/> Bibliography report		<input type="checkbox"/> Internship unwinding	
<input type="checkbox"/> Report / thesis		<input type="checkbox"/> Digital productions (video, poster, software, wiki...)			
<input type="checkbox"/> Other (specify): Multiple choice test					
<b>Teaching unit jury (Name)</b>					
1) X			2) Y		

EXPERIMENTATION ANIMALE					optional (FR)
ECTS	Lectures (hours/student)	Tutorials (hours/student)	Practical work (hours/student)	Internship (weeks/student)	Digital learning
6	30	10.5	15.5		
Management Institute:		Université Claude Bernard Lyon 1			
Teaching unit head(s) Name:		Sylvie DUCREUX			
Position:		Assistant-Professor			
Contact, email:		Sylvie DUCREUX sylvie.ducieux@univ-lyon1.fr			
<b>Keywords:</b> sciences des animaux de laboratoire					
<b>Course content:</b> Le cours est en français. Il utilise la législation française qui régit le droit des animaux et l'expérimentation pour concevoir et conduire de l'expérimentation animale nécessaire aux études pré-cliniques. Il vise à enseigner aux étudiants comment faire un usage optimal et scientifiquement fondé des animaux dans la recherche biomédicale et comment ce type de recherche est mené conformément à la législation française et la législation européenne. Cours utile dans le cadre d'un stage en France avec manipulation d'animaux au S4 Réglementation et éthique animale.  Modèle animal et méthodes alternatives.  Procédures expérimentales et approches statistiques.  Bien-être animal et prise en charge de la souffrance.  Aspects pratiques de l'expérimentation animale.  Evaluation et validation. L'UE est une formation diplômante, délivrance d'un diplôme d'expérimentation animale de niveau 2 "Application des procédures". The course is in French. It uses French legislation which governs animal rights and experimentation to design and conduct the animal experimentation necessary for pre-clinical studies. It aims to teach students how to make optimal and scientifically sound use of animals in biomedical research and how this type of research is conducted in accordance with French and European legislation. Useful course as part of an internship in France with animal handling in S4. Animal regulations and ethics.   Animal model and alternative methods.  Experimental procedures and statistical approaches.  Animal welfare and management of suffering.  Practical aspects of animal experimentation.  Evaluation and validation. The EU is a diploma course, issuance of a level 2 animal experimentation diploma "Application of procedures".					
<b>Teaching Staff:</b> Teaching Staff physiology from University Claude Bernard Lyon 1. Conferences concerning laws and ethics given by invited veterinary from the VetegroSup school of veterinary fo Lyon.					
<b>Learning outcomes:</b> L'étudiant est capable d'analyser une question biomédicale, et peut formuler une stratégie de recherche utilisant l'expérimentation animale cfr. l'état de l'art (par exemple 3R, selon la norme européenne directives et la loi française, selon les dossiers éthiques). L'étudiant peut communiquer par écrit et oralement en anglais sur l'expérimentation animale. Il/elle peut réfléchir sur le social et l'éthique implications des études animales et a développé une attitude d'apprentissage tout au long de la vie afin de suivre les évolutions dans ce domaine.					
<b>Assessment methods</b>					
<input checked="" type="checkbox"/> Oral questioning		<input type="checkbox"/> Presentation		<input type="checkbox"/> Practice report	
<input checked="" type="checkbox"/> Written examination		<input type="checkbox"/> Bibliography report		<input type="checkbox"/> Internship unwinding	
<input type="checkbox"/> Report / thesis		<input type="checkbox"/> Digital productions (video, poster, software, wiki...)			
<input type="checkbox"/> Other (specify): Multiple choice test					
<b>Teaching unit jury (Name)</b>					
1) Sylvie DUCREUX			2) Sylvie DUPRE-AUCOUTURIER		

IMMUNOLOGY AND CANCER					optional (EN)
ECTS	Lectures (hours/student)	Tutorials (hours/student)	Practical work (hours/student)	Internship (weeks/student)	Digital learning
3	25	0	5	0	0
Management Institute:		Université Claude Bernard Lyon 1			
Teaching unit head(s) Name:		Christine DELPRAT			
Position:		Professor (PU-EX)			
Contact, email:		Christine DELPRAT christine.delprat@univ-lyon1.fr			
<p><b>Keywords:</b> cancerogenesis, oncopathogens, immunoediting, immunotherapy, cancer vaccines</p> <p><b>Course content:</b></p> <p>Using the knowledge of the students in immunology, immunopathology and infectiology, this unit is developing the concepts issued from fundamental research and leading to clinical and pharmaceutical applications in cancerology.</p> <p>1. Overview of the multi-hits multi-steps and immunoediting in cancerogenesis 2. Interactions between malignant tumors and the immune system: cancer immunogenicity, immune activation versus suppression by tumor environment 3. Mechanisms of pathogen-induced oncogenesis 4. Cancers of the immune system and consequences 5. Preventive and therapeutic anti-tumor vaccinology 6. Protection of immune-suppressed patients against secondary oncogenesis</p> <p><b>Teaching Staff:</b></p> <p>Teaching Staff Immunology, oncology from University Claude Bernard Lyon 1. Conferences concerning new research development in onco-immunology will be organized. Speakers will be invited based on their excellence. Participation of the CNRS-CRCL Associated Partner.</p> <p><b>Learning outcomes:</b></p> <p>To analyse, understand and manipulate interactions between tumor cells and the immune system to overcome the cancer progression; to have the capability to present and to discuss research results at a journal club or at a research meeting; to develop speed-reading skills.</p>					
Assessment methods					
<input type="checkbox"/> Oral questioning		<input checked="" type="checkbox"/> Presentation		<input checked="" type="checkbox"/> Practice report	
<input checked="" type="checkbox"/> Written examination		<input type="checkbox"/> Bibliography report		<input type="checkbox"/> Internship unwinding	
<input type="checkbox"/> Report / thesis		<input type="checkbox"/> Digital productions (video, poster, software, wiki...)			
<input checked="" type="checkbox"/> Other (specify): Interactivity with the speakers					
Teaching unit jury (Name)					
1) Christine DELPRAT			2) Karène MAHTOUK		



LANGUAGES S3					mandatory
ECTS	Lectures (hours/student)	Tutorials (hours/student)	Practical work (hours/student)	Internship (weeks/student)	Digital learning
3	20	0	20	0	0
Management Institute:		Université Claude Bernard Lyon 1			
Teaching unit head(s) Name:		DURAND-VALLLOT Angeline			
Position:		Director of the Common Service Language Department			
Contact, email:		Solange TALAVERA-GOY solange.talavera-goy@univ-lyon1.fr			

**Keywords:** language courses, different levels: A1, A2, B1, B2.1, B2, C1.1, C1.2.

**Course content:**  
Improving the student's proficiency level, taking into account his or her previous knowledge of the language in English, French, Spanish, Italia. The student will be placed in the adequate course, according to the level he/she reached after the first two semesters in Barcelona and Antwerp.  
The language level is defined in accordance with the [Common European Framework](#))  
**A language user at A1 level:** Can understand and use familiar everyday expressions and very basic phrases aimed at the satisfaction of needs of a concrete type. Can introduce himself/herself and others and can ask and answer questions about personal details.  
**A language user at A2 level:** Can understand sentences and frequently used expressions related to areas of most immediate relevance (e.g. very basic personal and family information, shopping, local geography and employment). Can communicate in simple and routine tasks requiring a simple and direct exchange of information on familiar and routine matters.  
**A language user at B1 level:** Can understand the main points of clear standard input on familiar matters regularly encountered in work, school, leisure, etc. Can deal with most situations likely to arise whilst travelling in an area where the language is spoken. Can produce simple connected text on topics which are familiar or of personal interest.  
**A language user at B2 level:** Can understand the main ideas of complex text on both concrete and abstract topics, including technical discussions in his/her field of specialisation. Can interact with a degree of fluency and spontaneity that makes regular interaction with native speakers quite possible without strain for either party.  
**A language user at C1 level:** Can understand a wide range of demanding, longer texts, and recognise implicit meaning. Can express fluently and spontaneously without much obvious searching for expressions. Can use language flexibly and effectively for social, academic and professional purposes.

**Teaching Staff:**  
Experienced teachers at the UCBL Service Commun des Enseignements de Langues

**Learning outcomes:**  
The student will be placed in the adequate course, according to the level he/she reached to improve language skills in accordance with the Common European Framework of Reference for Languages.

Assessment methods		
<input type="checkbox"/> Oral questioning	<input type="checkbox"/> Presentation	<input type="checkbox"/> Practice report
<input type="checkbox"/> Written examination	<input type="checkbox"/> Bibliography report	<input type="checkbox"/> Internship unwinding
<input type="checkbox"/> Report / thesis	<input type="checkbox"/> Digital productions (video, poster, software, wiki...)	
<input checked="" type="checkbox"/> Other (specify): continuous assessment and final exam assessing the 4 linguistic skills (listening, speaking, reading and writing).		

Teaching unit jury (Name)	
1) Joann PIGAT	2) Solange TALAVERA-GOY




NEURO-IMMUNOLOGY : IMMUNE PRIVILEGE AND BIOTHERAPIES					optional (EN)
ECTS	Lectures (hours/student)	Tutorials (hours/student)	Practical work (hours/student)	Internship (weeks/student)	Digital learning
3	18	4.5	0	0	0
Management Institute:		Université Claude Bernard Lyon 1			
Teaching unit head(s) Name:		Christine DELPRAT, Virginie DESESTRET			
Position:		Professor (PU), Professor-hospital-practionner (PU-PH1)			
Contact, email:		Christine DELPRAT christine.delprat@univ-lyon1.fr			
<b>Keywords:</b> blood-brain interfaces, neurodegeneration, neuroinflammation, immune intervention in neuro-immunology,					
<b>Course content:</b>					
This teaching unit, in English, builds on students' basic neurology and immunology knowledge to develop fundamental research concepts in neuro-immunology that have applications in clinical and pharmaceutical research in the field of oncology and neurology. The topics will be:					
1) The nervous system, definition of an immuno-privileged site; migration of immune system cells into the nervous system; role of cerebrospinal fluid in blood / brain exchanges; neuro-immunology detected by the neuropathologist.					
2) Interactions between cancer, immune system and nervous system; Anti-tumor immunity and paraneoplastic neurological syndromes					
3) Innate neuro-immunity and stress					
4) Biotherapies: treatments based on the use of cytokines or antibodies; immuno-targeted therapeutics in neurodegenerative diseases; immunotherapies in multiple sclerosis and related diseases: mechanisms and strategies.					
Insight on neuroimmunological structures and diseases, paraneoplastic disorders and central nervous system cancers, with emphasis on research for pathogenesis, diagnosis and biotherapy treatments; to understand interactions of cells from the central nervous system and the immune system; to study recent scientific advances in biotherapy treatments; to develop written and oral communication in English, to present and to discuss research results at a journal club or at a research meeting; to develop speed-reading skills.					
<b>Teaching Staff:</b>					
Pedagogical team of immunology and neurology of the University of Lyon, UFR Biosciences, Faculty of Medicine of Lyon East and South. Conferences on news items will be organized. The speakers will be invited on the basis of their notoriety.					
<b>Learning outcomes:</b>					
The student gains theoretical and practical insights in neuro-immunological structures and diseases with an emphasis on pathogenesis and research development for diagnosis and biotherapy treatments.					
- Neuro-immunology knowledge: the student can describe central nervous system cells and structure interacting with the immune system and involved in several neuro-immunological diseases, has insights in the epidemiology of these diseases, can interpret measures to diagnose or correct these diseases, explain how biological mechanisms cause these diseases and acquire a comprehensive overview of the field.					
- Future: the student can discuss recent scientific advances contributing to the progress of biotherapy treatments, analyse, understand and manipulate interactions between central nervous system and the immune system, specifically related to the context of the immune privilege sites, paraneoplastic disorders and cancers of the central nervous system.					
- Practical skills: the student can develop his English proficiency, speed-reading capacities, listening, writing and oral presenting skills, and interactivity in scientific questioning.					
<b>Assessment methods</b>					
<input type="checkbox"/> Oral questioning		<input checked="" type="checkbox"/> Presentation		<input type="checkbox"/> Practice report	
<input checked="" type="checkbox"/> Written examination		<input type="checkbox"/> Bibliography report		<input type="checkbox"/> Internship unwinding	
<input type="checkbox"/> Report / thesis		<input type="checkbox"/> Digital productions (video, poster, software, wiki...)			
<input checked="" type="checkbox"/> Other (specify): scientific animation, interactions with invited speakers					
<b>Teaching unit jury (Name)</b>					
1) Christine DELPRAT			2) Virginie DESESTRET		

MSc in Health Management and Data Intelligence (HMDI)		Student exchange
Management Institute:	<b>EMLyon business school</b> <b>Mines Saint-Etienne, national School of engineers</b>	
		<p>Mines Saint Etienne's academic standing is committed to excellence, to a wealth of subject fields, and we desire to offer each student a curriculum tailored to his or her goals and the realities of the economic world.</p> <p>The <b>MSc in Health Management and Data Intelligence (HMDI)</b> is the outcome of the partnership between Mines Saint Etienne, a renowned engineering school, and <b>emlyon</b> business school, one of Europe's top business schools devoted to lifelong learning for entrepreneurial and international management.</p> <p><b>Emlyon</b> business school was founded in <b>1872</b> by the Lyon Chamber of Commerce and Industry. The courses offered by emlyon business school, which are part the MSc in Health Management &amp; Data Intelligence, will contribute to the understanding by selected LIVE students of specific health management practices and related technological issues.</p> <p>The HMDI modules will replace the optional TU, the project management TU and the communicating practices of their reality project (12 ECTS) from the LIVE Programme since the same skills will be acquired in the frame of the . The objective is to broaden the view of some LIVE students in health economics, business, data intelligence and innovation.</p> <p><b>MSc in Health Management and Data Intelligence (HMDI)</b> website available at <a href="https://msc-health-data-intelligence.com/en">https://msc-health-data-intelligence.com/en</a></p>
<b>The Pharmaceutical Ecosystem</b>		
<b>B. VERSAEVEL</b>	<b>12h</b>	<b>2 ECTS</b>
Economic overview of the biopharma industry : The course offers an overview of the pharmaceutical industry, the central element in an ecosystem that also involves biotech companies, contact-research organizations, academic research institutions, clinical trial sites, non-profit foundations, patent offices and regulators.		
<b>Patient-centric Ecosystems</b>		
<b>A. AYAD N'CIRI</b>	<b>12h</b>	<b>2 ECTS</b>
Bottom-up client-oriented instead of top-down approach: the customer-centric model is progressively being integrated in the healthcare sector, leading to a patient-centric model. This course will give participants specific clues to adapt "client-orientation" methodology and tools to this critical "patient-orientation" posture, which is increasingly required in any activity of the healthcare industry.		
<b>Ecosystems and Platform Business Models</b>		
<b>F. MOISAN</b>	<b>12h</b>	<b>2 ECTS</b>
Diigital technologies and new business models in health: New and frequently disruptive technologies and novel user behaviors lead to the emergence of new economic structures, new organizational forms and new business models in healthcare. The goal of the course is to trace these changes and discuss strategic responses while focusing on important key issues.		
<b>Innovation and Public Health</b>		
<b>F. SCHIAVONE</b>	<b>12h</b>	<b>2 ECTS</b>
Investing in innovation in relation to public health: this course focuses on project management methodology and provides participants with both concepts, tools and methods, and behavioral skills in order to successfully complete innovative projects. Key challenges for project managers include the ability to manage without influence; to gain the support of stakeholders; and to access resources not directly under their control.		
<b>Transforming Early Makers,</b>		
<b>Professional from the area will advise according to the project</b>	<b>54h</b>	<b>6 ECTS</b>
Collaborative design of a value proposition for a project: in this module, participants will design a disruptive value proposition relying on digital technolog &y in a collaborative way. External professionals will share their vision of a sector and the uncertainty and ambiguity they have to cope with. Participants will find innovative responses and design the value proposal, and finally present a prototype and pitch their proposal.		
The international students from the business school will be welcome in the following TU of the LIVE:		
Epidemiology (3 ECTS)		
Immunology and Cancer (3 ECTS)		
Clinical Vaccine Development (3 ECTS)		
Communicating on Vaccines and Public Health (6 ECTS)		

## 5. S4 Teaching unit sheets of the semester 4

<b>S4 Teaching Units Integrated Master Thesis programme</b>	<b>Master thesis</b>	<b>Grasping the changing world &amp; Languages</b>	<b>TOTAL ECTS</b>
<b>Professional work</b>	2.7		
<b>Master thesis</b>	13.5		
<b>Oral defence</b>	10.8		
<b>Total master thesis ECTS</b>	<b>27</b>		<b>27</b>
<b>Languages for vaccine future in the Anthropocene</b> (Bibliography report – essay to pitch video recommendations for future vaccinology)		3	3
<b>Total ECTS</b>	<b>27</b>	<b>3</b>	<b>30</b>

LANGUAGES FOR VACCINE FUTURE IN THE ANTHROPOCENE					mandatory (EN / FR)
ECTS	Lectures (hours/student)	Tutorials (hours/student)	Practical work (hours/student)	Internship (weeks/student)	Digital learning
3	12	0	0	0	30
Management Institute:		Université Claude Bernard Lyon 1			
Teaching unit head(s) Name:		Angeline DURAND-VALLLOT, Emilie BOURDONNAY, Natalia DELFATTI			
Position:		Director of the Common Service Language Department, Assistant-Professors			
Keywords: infodemics, climate-change,					
Course content (EN):Choice between a French or (exclusive) an English module.					
(EN)	Contact : Emilie BOURDONNAY emilie.bourdonnay@univ-lyon1.fr		(FR)	Contact : Natalia DELFATTI natalia.del-fatti@univ-lyon1.fr	
<b>“Vaccinology and infodemiology”:</b> Using the knowledge of the students in immunology and infectiology, vaccine calendar, oral and written communication, this unit is developing the ability to grasp the context of a vaccine-preventable disease to make decision for communication and public health management. 1. Videoconference Module: Infodemiology and infoveillance Infodemiology (or epidemiology of information) refers to a spread of (mis)information during epidemic or pandemic. Infoveillance refers to public health-related concerns to analyse online behavior by collecting, analyzing, and visualizing data from various sources on the Internet in real time during epidemic or pandemic. 2. MOOC Module A: Vaccines, lessons from the past 3. MOOC Module B: Vaccine efficacy and safety 4. MOOC Module C: Overview of global vaccine access 5. MOOC Module D: Vaccines for children, pregnant women, travelers and seniors 6. MOOC Module E: Perception, monitoring and impact of immunization on Public Health  In collaboration with WHO.			The <b>“Climate et Transitions”</b> cross-disciplinary course comes from a collective of teacher-researchers from various disciplines, united by their concern and their need for action in the face of the challenges of climate change and the collapse of biodiversity. A discussion forum is also dedicated to this course. 7 themes representing the main axes of the problem: Sequence 1: Climate #1 - what is the climate? Sequence 2: Climate #2 - ongoing climate change Sequence 3: Anthropocene - what world do we live in? Sequence 4: Energy - the heart of the matter Sequence 5: Biodiversity and the environment Sequence 6: Agriculture and food Sequence 7: Exploitation of natural environments and pollution Debates, allowing, at the end of each theme viewed, interaction between students and teacher-researchers, a time for questions and discussion. This course aims to train in the different aspects that make climate change and the extinction of the living world a global issue; in 2023-24, it will cover these different themes by focusing on their scientific aspects, keeping the social and economic aspects for a future in collaboration with other Lyon universities.		
Teaching Staff: Teaching Staff, from UFR Biosciences, University Claude Bernard Lyon 1. Conferences concerning new concepts about Infodemiology and Infoveillance will be organized. Speakers will be invited based on their excellence.					
Learning outcomes:					
To acquire knowledge about Infodemiology and Infoveillance, as well as vaccines. The TU will also allow you to assess how skilled you are at making safe decisions for public health management.			It is through a better knowledge of all the elements that change the world that students and teachers will be better equipped to build the transition projects that are to be invented in each field.		
Assessment methods					
<input checked="" type="checkbox"/> Bibliography report a max 10-page essay to discuss part of vaccinology facing the changing world, demonstrating skills in grasping complexity to elaborate bilingual recommendations (EN + a second language learned during the Master LIVE) according to the multidisciplinary angle(s) they studied.					
<input checked="" type="checkbox"/> Digital productions (video, poster, software, wiki...) Students pitch their justified recommendations in short video formats possibly use for further public debates.					
Teaching unit jury (Name)					
1) Emilie BOURDONNAY		3) Christine DELPRAT		5) Carme ROURA	
2) Peter DELPUTTE		4) Thomas STRATMANN		6) Stéphane PAUL	

MASTER THESIS					mandatory
ECTS	Lectures (hours/student)	Tutorials (hours/student)	Practical work (hours/student)	Internship (weeks/student)	Digital learning
27	0	0	0	25	0
Management Institute:		Universitat Autònoma de Barcelona / Universitat de Barcelona / University of Antwerp / Université Jean Monnet Saint Etienne / Université Claude Bernard Lyon 1			
Teaching unit head(s) Name:		ROURA Carme / STRATMANN Thomas / DELPUTTE Peter / PAUL Stéphane / DELPRAT Christine			
Position:		Professor / Assistant-Professor / Professor / Professor-hospital practitioner (PU-PH) / Professor (PU)			
Contact, email:		carme.Roura@uab.cat; <a href="mailto:thomas.stratmann@ub.edu">thomas.stratmann@ub.edu</a> ; <a href="mailto:vaccinology@uantwerpen.be">vaccinology@uantwerpen.be</a> ; <a href="mailto:stephane.paul@chu-st-etienne.fr">stephane.paul@chu-st-etienne.fr</a> ; <a href="mailto:christine.delprat@univ-lyon1.fr">christine.delprat@univ-lyon1.fr</a>			
<b>Keywords:</b> knowledge review, practical skills, professional expertise					
<b>Aims of “Master thesis”:</b>					
The students will have the chance to investigate research or clinical or industrial or public health environment in vaccinology at the forefront of current knowledge and expertise.					
1. Overview of specific knowledge through an introductory bibliographic review					
2. Acquire professional experience in labour environment					
3. Learn how to conduct experimental research or industrial project or clinical trials or health policy					
4. Write a practical professional report					
5. Acquire the ability to present and report his/her own professional work, in front of an international specialized audience					
<b>Teaching Staff:</b>					
Internship Supervisor and Academic Supervisor from the Master teaching staff of Barcelona, Antwerp, Saint-Etienne or Lyon					
<b>Learning outcomes:</b>					
How to be productive in a professional environment and communicate his/her production and conclusions in written and oral international context.					
<b>Assessment methods</b>					
<input checked="" type="checkbox"/> Oral questioning		<input type="checkbox"/> Presentation		<input type="checkbox"/> Practice report	
<input type="checkbox"/> Written examination		<input checked="" type="checkbox"/> Bibliography report		<input checked="" type="checkbox"/> Internship unwinding	
<input checked="" type="checkbox"/> Report / thesis		<input type="checkbox"/> Digital productions (video, poster, software, wiki...)			
<input type="checkbox"/> Other (specify): Multiple choice test					
<b>Teaching unit jury (Name)</b>					
1) Emilie BOURDONNAY		3) Christine DELPRAT		5) Carme ROURA	
2) Peter DELPUTTE		4) Thomas STRATMANN		6) Stéphane PAUL	

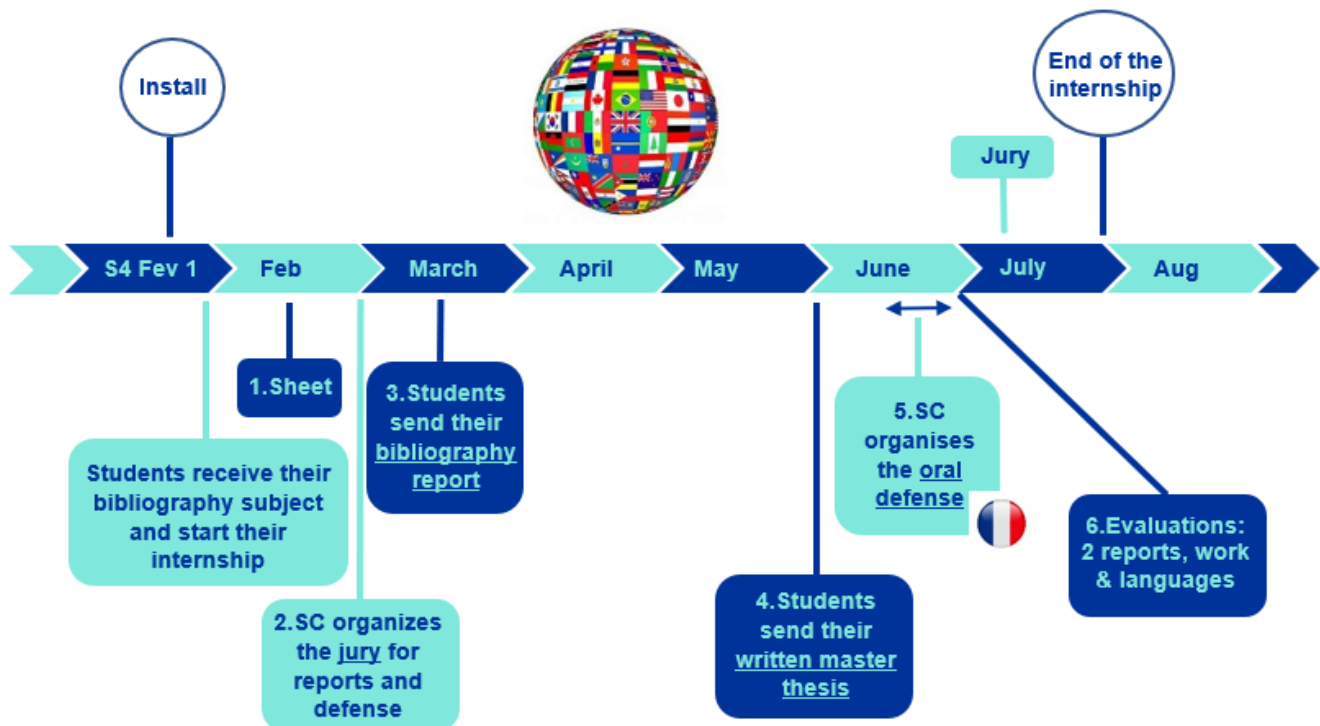
## 6. Assessment methods of teaching unit

Teaching unit title	Oral exam	Presentation	Practice report	Written exam	Bibliography report	Internship unwinding	Report/thesis	Digital production	Others
S1 - Antigen recognition				X					Multiple Choice test
S1- Dynamics of innate and adaptive immunity				X	X				Multiple Choice test
S1 - Functional anatomy of the immune system				X					Multiple Choice test
S1 - Immune responses to pathogens		X		X					Multiple Choice test
S1 – Laboratory and computer practicals		X	X	X					
S1 - Mechanisms of immunopathology	X			X					Multiple Choice test
S1 - Receptor signalling		X		X					Multiple Choice test
S1 – Autoimmunity & Immunodeficiencies (option)	X			X					Multiple Choice test
S1 - Languages 1: French, Spanish (option)				X					
S1 – Vaccines in society (option)								X	Multiple Choice test
S2 -Advanced data analysis		X	X	X			X		Multiple Choice test
S2 -Description & variability of pathogens		X	X	X					Multiple Choice test
S2 - Host-pathogen interactions		X		X					Multiple Choice test
S2 - Immune system in early life, pregnant women and elderly		X		X			X		Multiple Choice test
S2 – Languages 2: English, French, German, Italian, Spanish	X			X					Listening and Reading examination
S2 - Novel technologies, vaccine administration routes & adjuvants		X		X					Multiple Choice test
S2 -Summer school on vaccinology		X	X	X					Multiple Choice test
S2 - Vaccine manufacturing & quality control, regulatory approval processes		X		X					Multiple Choice test

Teaching unit title	Oral exam	Presentation	Practice report	Written exam	Bibliography report	Internship unwinding	Report/thesis	Digital production	Others
S2 – Languages 2b (option)	X			X					Listening and Reading examination
S2 – Molecular virology (option)		X	X	X					Multiple Choice test
S3 - Clinical vaccine development				X					Multiple Choice test
S3 - Communication on vaccines & public health		X						X	Multiple Choice test
S3 - Epidemiology				X					Multiple Choice test
S3 - Immunomonitoring of preclinical and clinical vaccine trials		X	X						Multiple Choice test
S3 - Project management	X	X						X	Multiple Choice test
S3 - Vaccine formulation				X					Multiple Choice test
S3 - Vaccine specific applications				X					Multiple Choice test
S3 – Aging and cell death (option)		X		X					Multiple Choice test
S3 – Expérimentation animale (option in FR)	X			X					Multiple Choice test
S3 - Immunology & cancer (option)		X	X	X					Interactivity with speakers
S3 – Languages 3									Continuous LSRW
S3 – Neuro-immunology: immune privilege and biotherapies (option)		X		X					Scientific animation, interaction with invited speakers
S4 – Languages for vaccine future in the Anthropocene					X			X	
S4 - Master thesis	X				X	X	X		



## 6.1 Master Thesis (example year 2022-23) schedule, guidelines & evaluation



### FEBRUARY 2023

**By Feb 3 (Fri)**

The **Student** sends the **Internship Installation Sheet (§4)**, signed by the Internship Supervisor, to the Academic Supervisor with copy to the **LIVE Secretariat**; Note: For installation later than this date, the installation sheet must be sent the very day of installation.  
The **Student** provides the **Professional Work Evaluation Form (§4)** to the Internship Supervisor.

**By Feb 10 (Fri)**

The Academic Supervisor appoints 2 reviewers / thesis from the national Masters supporting the Master LIVE and sends their First name, Last name, Institution, Function and email address to the **LIVE Secretariat**.

### MARCH-APRIL 2023

The **Student** organizes at least one mandatory tripartite meeting with both Supervisors. Formally, this meeting is divided into 3 stages of minimum 10 min each: the three together, then the two Supervisors, then the Academic Supervisor with the Student. If applicable, difficulties must be shared with the Supervisors, with no delay and without waiting for this formal meeting.

### MAY 2023

**By May 10 (Wed)**

The **Student** sends his/her advanced work of **Master thesis with the introductory bibliographic review** to the Academic and Internship Supervisors in order to obtain some independent advices.

**By May 31 (Wed)**

The **Student** submits electronically his/her final version of **Master thesis with the introductory bibliographic review** to the Academic Supervisor with copy to the **LIVE Secretariat**.

**WARNING:** Master thesis with a **Confidential Disclosure Agreement** must contain one **additional title page to provide a title with an abstract in lay terms** that can be formally published by the University of Antwerp (mandatory to issue the Belgian Diploma).

### JUNE 2023

**By June 2 (Fri)**

The Academic Supervisor provides the Master thesis and its evaluation form (§4) with the deadline (June 17, Fri) to the **Reviewers** (2/thesis). **WARNING:** Confidential Disclosure Agreement should be signed by the Reviewers beforehand, if applicable.



<b>By June 5 (Mon)</b>	The <b>Student</b> sends electronically his/her <b>PDF show</b> to the Academic and Internship Supervisors to obtain some advices.
<b>By June 11 (Sun)</b>	The <b>Student</b> submits electronically his/her <b>PDF show</b> on Claco in the Directory "LIVE S4 / Resources / PDF defence show". PDF is mandatory, pptx is facultative. About the rights for this directory: Students can upload and edit the uploaded file, but neither download, nor suppress the uploaded files. If your PDF is confidential, you should protect opening by a password and provide the password by email to the <b>LIVE Secretariat</b>
<b>On June 14 (Wed)</b>	If necessary, 48h before their deadline, the Academic Supervisor sends a reminder to the <b>Reviewers</b> to harvest the filled form.
<b>From June 13 - 16 (Tue to Thu)</b>	The Steering Committee with the LIVE Secretariat organizes the <b>Oral Defence</b> of the <b>Students</b> in Antwerp (to be confirmed) <b>The Jury will include 5 members</b> from the LIVE Steering Committee and academic professors from the national Masters supporting the Master LIVE and possibly Associated Partners (when there is no Confidential Disclosure Agreement). The defence won't be open due to signed Confidential Disclosure Agreement that should be signed by the Jury members before the defence, if applicable. For the equity of treatment between students, <u>Supervisors cannot participate in Jury of their own supervised student.</u> At the end of the defence, the jury transfers the <b>Master Defence Evaluation Form (§4)</b> to the <b>LIVE Secretariat</b> .
<b>By June 19 (Mon)</b>	The Academic Supervisors send the <b>Master Thesis Evaluation Form (§4)</b> filled out by the 2 reviewers to the <b>LIVE Secretariat</b> . In case the two reviewer scores are very different (SD score >20%), the LIVE Steering Committee (five members) will study the thesis to provide a third assessment.
<b>On June 19 (Mon)</b>	If necessary, the Academic Supervisor sends a reminder to the Internship Supervisors to fill out the <b>Professional Work Evaluation Form (§4)</b> by June 22 to send it to the <b>LIVE Secretariat</b> <a href="mailto:mylive@univ-lyon1.fr">mylive@univ-lyon1.fr</a>
<b>By June 22 (Thu)</b>	If applicable, the 3 <sup>rd</sup> reviewer sends the scores of the <b>thesis</b> to the <b>LIVE Secretariat</b> ; the Internship Supervisor sends the <b>Professional Work Evaluation Form</b> to the <b>LIVE Secretariat</b> , with copy to the Academic Supervisor.
<b>By June 23 (Fri)</b>	The <b>LIVE Secretariat</b> provides all scores to the Coordinator who transfers to the UCBL-UJM administration to prepare the Jury.
<b>On June 30 (Fri)</b>	The <b>session 1 of the LIVE M2 semester 4 Jury</b> is held in France.
<b>JULY 2023</b>	
<b>By July 14 (Fri)</b>	The <b>Students who failed at the session 1</b> submits electronically his/her final version 2 of the <b>Master thesis with the introductory bibliographic review</b> to the Academic Supervisor with copy to the <b>LIVE Secretariat</b> for the session 2 evaluation.
<b>AUGUST 2023</b>	
<b>On August 24 (Thu)</b>	The <b>session 2 of the LIVE M2 semester 4 Jury</b> and the <b>final LIVE Diploma Jury</b> are held in France.

## 6.2 Criteria for Bibliography Report

### **Warning:**

Automatic plagiarism detection will be applied to the student reports (bibliography and Master thesis) with the powerful tool available at UCBL: text recognition and anti-plagiarism online server covering the web. More than 20% of plagiarism is not authorized in your text and will turn into 0 your score. Therefore, pay attention to elaborate your thought with your own sentences in your reports.

### **Objectives**

Objectives for the bibliography report are as follows:

- The student situates the subject within the scientific context.

- The student understands the scientific questioning around this subject.
- The student looks up and selects relevant information from the scientific literature.
- The student synthesizes and presents the relevant information in a written organized report following the provided guidelines.
- The student notices the questions to solve around this subject.

### **Formatting requirements for the bibliography report**

The bibliography report shall comprise maximum 10 pages, including tables and figures, excluding title page, summary and references. The bibliography report is conforming to the same formatting requirements as the Master thesis.

The language shall be English.

- Situate the topic within the scientific context
- Introduce the main concepts, vocabulary and questions
- Announce the terms of the development in the introduction
- Review the questioning and results concerning this subject, with a critical analysis of the methods used and of the conclusions published
- Along the report, present figures with legends and/or tables related to the main well-established knowledge
- Finally, write a specific section to underline the open questions for the next future related to the topic

## **6.3 Criteria for the Master thesis**

### **Objectives**

Objectives of the master thesis are as follows:

- The student looks up and selects relevant information from the scientific literature.
- The student synthesizes the relevant information and report it in writing.
- The student conducts scientific research under supervision.
- The student performs various techniques correctly and accurately.
- The student demonstrates critical thoughts on the information collected, the research conducted and the results obtained.
- The student clearly reports in writing in accordance with current academic standards following guidelines.
- The student presents and defends the professional work conducted in a clear and comprehensible manner.

### **Formatting requirements for the Master Thesis**

The Master thesis shall be a self-written text in which the student demonstrates the ability to apply specific methods and techniques characteristic to the field, as well as the ability to process the results of scientific papers.

It is not an absolute requirement that the student shall make an original contribution to the advancement of science. This is the objective of the doctoral thesis. The student must demonstrate, however, the ability to use the education received in order to address a problem in a scientific manner, related to the courses studied during the academic programme. It shall be the responsibility of the Internship Supervisor to work with the student to develop a schedule of tasks to be performed and to follow the elaboration of the topic. As a rule, the Master thesis shall be structured as a scientific article.

The Master thesis shall be written in English with the following components:

- The Master thesis comprises maximum 30 pages, including tables and figures, excluding title page, summary and references.
- A **title page** listing the following: title, author, professional site, name of the Internship Supervisor, name of the Academic Supervisor, date of defence, academic year and the statement: “Master thesis submitted in completion of the Joint Master Degree Leading International Vaccinology Education”
- A **summary** of maximum 250 words in English contains the essential details regarding objective, materials and methods, results and conclusions.
- The **introduction** includes a positioning of the scientific problem and a clear statement of the research question.

- The **material and method** chapter comprises a description of the methods, including a list of equipment, materials, animals, cell lines or other resources used.
- The **result** chapter describes the student's own observations and findings.
- The **discussion** should not re-iterate the observations; it compares them with the background of the international literature.
- The **literature references** are arranged at the end of the text, conforming to the following formatting requirements (according to the journal *Cell*):

Journal article: Sondheimer, N., and Lindquist, S. (2000). Rnq1: an epigenetic modifier of protein functions in yeast. *Mol. Cell* 5, 163–172.

Article from a book: King, S.M. (2003). Dynein motors: Structure, mechanochemistry and regulation. In *Molecular Motors*, M. Schliwa, ed. (Weinheim, Germany: Wiley-VCH Verlag GmbH), pp. 45–78.

Book: Cowan, W.M., Jessell, T.M., and Zipursky, S.L. (1997). *Molecular and Cellular Approaches to Neural Development* (New York: Oxford University Press).

Journal titles are abbreviated according to *Chemical Abstracts* or *Index Medicus*. In-text references are cited by indicating in brackets the first author, followed by the date. For example: (Coppen et al., 1998) or by number (1).

- List of **abbreviations** used is placed at the beginning of the text. Common abbreviations for important biochemical substances (e.g. ATP, NADH, DNA and amino acids in proteins) should not be explained. The names of enzymes are usually not abbreviated, except for those substrates that are customarily abbreviated. For example: ATPase, RNase. The trivial and systematic names shall be those recommended by international Gene Nomenclature Committee such as HUGO (<http://www.genenames.org/>).

#### Layout of the text:

- The text is produced in A4 format with 2.5 cm margins, single-spaced. The font may be chosen from the following: Times New Roman (12 point), Verdana (10 point) or Calibri (11 point).
- Tables or figures are inserted into the text, inasmuch as they are directly related to or clarify the text. Each table and figure must be accompanied by a number, title and legend. Text accompanying tables and figures should appear in the same font, but can be one size smaller.
- The reference number shall not exceed 50.

## 6.4 Defence

### Objectives

The objectives of the defence are as follows:

- The student creates a PowerPoint show with current academic standards.
- The student presents and defends the professional work conducted during the Master internship in a clear and comprehensible manner, respecting allowed time.

### Format of the Master thesis defence

The student shall defend the Master thesis through a public oral defence. This must include a PowerPoint presentation of **no more than 15 minutes**, after which questions can be raised, primarily by the jury and by other audience members, as time allows with **no more than 15 minutes questioning**.

The PowerPoint presentation should be submitted electronically no later than two working days prior to the defence to the LIVE secretariat.

### Confidentiality

As a rule, the defence shall be public and accessible to all interested parties. Exceptions may be made for students completing their dissertation research in a research site in which strict confidentiality must be observed with regard to the results (e.g. in the context of a patent application). Only in this case shall the defence be closed to the public, and only in the presence of the jury members, all of whom must also follow a confidentiality agreement. The request for such a 'closed' defence must be submitted to the secretariat by the student, and with approval/explanation of the Internship Supervisor, no later than June 7. Such closed defences shall be allowed only in exceptional cases. The fact that unpublished data are to be presented is not sufficient reason to organize a closed defence.

## 7. Evaluation form and sheets provided

List of the documents:

- The internship installation sheet
- Bibliography report Evaluation form
- Bibliography report Evaluation criteria
- Master thesis report Evaluation form
- Master thesis report Evaluation criteria
- Professional work Evaluation form
- Master defence Evaluation form



## 2025 INTERNSHIP INSTALLATION SHEET

The student must fill out and send this document by email to [mylive@univ-lyon1.fr](mailto:mylive@univ-lyon1.fr) and his/her Academic Supervisor with the following title: **StudentSURNAME\_2025\_Installation**.

**Deadline: February 4** (Note: if the installation is later than this deadline, the installation sheet must be sent the very day of installation.)

**Title of the research project:**

Student Name:		
Email:		
Address:		
Phone (international format):		
Internship address:		
Legal Representative, name:		
Department, Service, Laboratory:		
Internship Supervisor (IS) Name:		
Grade:		
Email:		
Effective internship starting date:		
Title of the research project:		
Date and Signature of the IS:		
Academic Supervisor Name:		
<b>KEYWORDS: tick words defining your topic</b>		
<input type="checkbox"/> Immunology	<input type="checkbox"/> Immunopathology	<input type="checkbox"/> Statistics
<input type="checkbox"/> Molecular Biology	<input type="checkbox"/> Biochemistry	<input type="checkbox"/> Bioinformatics
<input type="checkbox"/> Microbiology	<input type="checkbox"/> Virology	<input type="checkbox"/> Host-pathogen interactions
<input type="checkbox"/> Vaccinology	<input type="checkbox"/> Vaccine formulation	<input type="checkbox"/> Vaccine manufacturing
<input type="checkbox"/> Adjuvants	<input type="checkbox"/> Quality control process	<input type="checkbox"/> Immunomonitoring
<input type="checkbox"/> Epidemiology	<input type="checkbox"/> Infectiology	<input type="checkbox"/> Diagnosis
<input type="checkbox"/> Preclinical trial	<input type="checkbox"/> Clinical trial	<input type="checkbox"/> Public health
<input type="checkbox"/> Vaccine advertisement	<input type="checkbox"/> Oncology	
	<input type="checkbox"/> Other (specify):	



## 2025 BIBLIOGRAPHY REPORT EVALUATION FORM

The student must attach this evaluation form to his/her Bibliography report and send them in one PDF by email to [mylive@univ-lyon1.fr](mailto:mylive@univ-lyon1.fr) and to his/her Academic Supervisor, with the following title: 2025\_ Bibliography report\_ YOURNAME. Submission deadline: March 15.

Evaluation deadline: June 15

Student Name:  
Academic Supervisor Name:  
Reviewer Name:

Criteria	<10 fail mark	10- 12 pass	13-14 honors	15-16 high honors	17-18 highest honors	19-20 highest honors +
<b>1. Critical scientific approach (70 %)</b>						
a. Is the topic situated well within the broader scientific context?						
b. Is relevant, original and recent research cited and discussed critically?						
c. Is specific vocabulary clearly defined and appropriately used?						
d. Formulation of the concepts and questioning						
e. Does the student adopt a critical analysis of the applied methodologies?						
f. Does the student adopt a critical analysis of the published conclusion?						
g. Are relevant open questions proposed for the next future?						
<b>2. Structure of the final document (30 %)</b>						
h. Is there a clear and logical structure?						
i. Linguistic usage						
j. Quality of the figures, legends and display of references (and footnotes if applicable)						

Thank you, kindly comment on the report below:

Date:

Reviewer signature

### Bibliography report evaluation criteria

	Critical scientific approach		Structure of the final document
	Introduction, concepts, terms	Results reported, critical analysis of methods and conclusions, open questions	
<b>19-20 highest honours +</b>	a. Exceptionally good situation of the subject within the broader scientific context b. The cited research is relevant, original and recent; the literature is critically interpreted and processed by the student c. The vocabulary used demonstrates exceptional insight into the topic, the introduction is structured from an original but very functional perspective d. The concepts and questioning are formulated in a very clear manner and are challenging but feasible within the time frame of the study	e. The methods reported are very clearly defined; the relevance of the applied methods for achieving the objectives is clearly analysed f. Conclusions are very clearly reported and limitations are very clearly analysed g. It is very clear that open questions for the future were sought, and the selection is highly relevant	h. Exceptionally smooth and pleasurable readable text, logical and coherent structure i. Perfect linguistic usage j. Perfect use of references and perfect settings of figures and their legends
<b>17-18 highest honours</b>	a. Outstanding situation of the subject within the broader scientific context b. The cited research is relevant and recent; most of the cited literature is critically interpreted and processed by the student c. The vocabulary used demonstrates outstanding insight into the topic d. The concepts and questioning are clearly formulated and feasible within the time frame of the study	e. The methods reported are clearly defined; the relevance of the applied methods for achieving the objectives is analysed f. Conclusions are clearly reported and limitations are clearly analysed g. It is clear that open questions for the future were sought, and their selection are largely relevant	h. Smoothly readable text with a logical and coherent structure i. Very good linguistic usage j. Very good use of references, very good settings of figures and their legends
<b>15-16- high honours</b>	a. Very good situation of the subject within the broader scientific context b. The cited research is relevant and recent; a portion of the cited literature is critically interpreted and processed by the student c. The vocabulary used demonstrates very good insight into the topic d. The concepts and questioning are clearly defined	e. The methods are reported f. Conclusions are reported and limitations are analysed to a lesser extend g. Open questions for the future were sought, and most of them are relevant	h. Easily readable text, logically structured i. Good linguistic usage j. Good use of references, good settings of figures and their legends
<b>13-14 honours</b>	a. The subject is well situated within the broader scientific context b. The cited research is largely relevant; the literature is critically interpreted by the student to a limited extent c. The vocabulary used demonstrates good insight into the topic d. The concepts and questioning are formulated	e. The methods used are present but only briefly defined f. Conclusions are reported but limitations are not analysed g. Open questions for the future are only briefly mentioned. Most of them are relevant	h. Easily readable text with a largely logical structure i. Occasional grammatical errors j. Good use of references but some errors or off-topic in figures or their legends
<b>10-12 pass</b>	a. The subject is insufficiently situated within the broader scientific context b. The cited research is not completely relevant or recent; the literature is not sufficiently interpreted by the student c. The vocabulary used demonstrates limited insight into the topic d. The concepts and questioning are unclear/incomplete	e. The applied methods are present but reported with some minor errors f. Conclusions are not sufficiently reported g. Open questions for the future are only briefly mentioned. Some of are relevant	h. Text is acceptable, but not easily readable and has no clear structure i. Multiple grammatical errors j. Limited use of references and some errors or off-topic in figures or their legends

	Critical scientific approach		Structure of the final document
	Introduction, concepts, terms	Results reported, critical analysis of methods and conclusions, open questions	
<b>&lt;10 fail mark</b>	a. The subject is barely, not or incorrectly positioned within the broader scientific context. b. The cited research is nearly irrelevant; the literature is barely interpreted by the student at all c. The vocabulary used demonstrates very limited insight into the topic d. The concepts and questioning are barely stated or not stated correctly	e. The applied methods are not reported correctly or are not present f. Conclusions are barely stated or incorrectly stated g. Open questions for the future are not mentioned or inappropriate to the topic	h. Very unclear text i. Frequent grammatical errors j. Incorrect use of references and multiple errors or off-topic in figures or their legends



## 2025 MASTER THESIS EVALUATION FORM

The student must attach this evaluation form to his/her Master Thesis and send them in one PDF by email to [mylive@univ-lyon1.fr](mailto:mylive@univ-lyon1.fr) and to his/her Academic Supervisor, with the following title: StudentSURNAME\_2025\_EvalThesis. **Submission deadline for the students: May 31. The reviewers place their crosses in the boxes or write a score in the related box, as they prefer.**

**Evaluation deadline for the reviewers: June 17**

<b>Student Name:</b> <b>Academic Supervisor Name:</b> <b>Reviewer Name:</b>						
Criteria	<10 fail mark	10-12 pass	13-14 honors	15-16 high honors	17-18 highest honors	19-20 highest honors +
<b>1. Max 10-pages introductory bibliographic review (weighted 10)</b>						
a. Is the topic situated well within the broader scientific context?						
b. Is relevant, original and recent research cited and discussed critically?						
c. Quality of the structure of the introduction? Is specific vocabulary clearly defined and appropriately used?						
d. Formulation of the concepts, questioning & objectives						
<b>2. Critical material and method approach (weighted 10)</b>						
e. Definition of the applied methodology						
f. Does the Student adopt a critical view of the applied methodology?						
<b>3. Results &amp; discussion-perspectives (weighted 20)</b>						
g. Are the results presented clearly?						
h. Are the results processed and analysed in a correct and critical manner?						
i. Are the results interpreted within a broader context and relevant open questions proposed for the next future?						
j. Structure and readability of the discussion and perspectives						
<b>4. Structure of the final document (weighted 10)</b>						
k. Is there a clear and logical structure, with coherence between the various components?						
l. Linguistic usage						
m. Quality of tables/figures and graphs						
n. Quality of the abstract						
o. Display of references and footnotes						
<b>Please kindly comment on the report below:</b>  <div style="border: 1px solid black; height: 40px; width: 100%;"></div>						

Reviewer date & signature:

## MASTER THESIS EVALUATION CRITERIA

	1. Critical scientific approach		2. Results and discussion	3. Structure of the final document
	Introduction and objectives	Materials and methods		
<b>19-20</b> <b>highest honours</b> <b>+</b>	a. Exceptionally good positioning of the topic within the broader scientific context; the literature is critically interpreted and processed by the student b. The literature cited is relevant, original and recent c. The structure of the introduction demonstrates exceptional insight into the topic, the introduction is structured from an original but very functional perspective d. The objectives are formulated in a very clear manner and are challenging but feasible within the time frame of the study	e. The applied methods are exceptionally well defined f. The relevance of the applied methods for achieving the objectives is demonstrated clearly; limitations of the methods are stated exceptionally well	g. The results obtained are processed exceptionally well and analysed critically, and the analysis is of an exceptionally high level h. The results are presented in an exceptionally clear and logical manner, and only the relevant results are displayed i. The discussion places the obtained results within a broader scientific context and shows exceptional insight into the background of the research j. The discussion is pleasant to read, comprehensive, yet 'to the point'	k. Exceptionally smooth and pleasurable readable text, logical and coherent structure l. Perfect linguistic usage m. Tables, figures and graphs of exceptional quality and perfectly integrated into the text n. Perfect use of references o. High-quality summary that very clearly reflects the structure and conclusions of the study
<b>17-18</b> <b>highest honours</b>	a. Outstanding positioning of the topic within the broader scientific context, most of the cited literature is critically interpreted and processed by the student b. The cited research is relevant and recent c. The structure of the introduction demonstrates outstanding insight into the topic d. The objectives are clearly formulated and feasible within the time frame of the study	e. The applied methods are very clearly defined f. The relevance of the applied methods for achieving the objectives is demonstrated; limitations of the methods are stated very clearly	g. The results obtained are processed in an outstanding manner and analysed critically, and the analysis is of an outstanding level h. The results are presented clearly and logically, and only the relevant results are displayed i. The discussion places the obtained results within a broader scientific context and shows good insight into the background of the research j. The discussion is pleasant to read and comprehensive	k. Smoothly readable text with a logical and coherent structure l. Very good linguistic usage m. Tables, figures and graphs of very good quality and very well integrated into the text n. Very good use of references o. High-quality summary that clearly reflects the structure and conclusions of the study
<b>15-16-</b> <b>high honours</b>	a. Very good positioning of the topic within the broader scientific context; a portion of the cited literature is critically interpreted and processed by the student b. The cited research is relevant c. The structure of the introduction demonstrates very good insight into the topic d. The objectives are clearly defined	e. The applied methods are clearly defined f. The limitations of the method are discussed clearly to a certain extent	g. The results obtained are processed and analysed very well h. The results are presented clearly, but some of the results presented are not relevant i. The discussion demonstrates insight into the background of the research j. The discussion is pleasant to read	k. Easily readable text, logically structured l. Good linguistic usage m. Tables, figures and graphs of good quality and well integrated into the text n. Good use of references o. Good summary
<b>13-14</b>	a. The topic is well situated within the broader scientific context, and the literature is interpreted critically to a limited extent by the student b. The cited research is largely relevant	e. The applied methods are present and defined to a limited extent	g. The results obtained are processed and analysed well	k. Easily readable text with a largely logical structure l. Occasional grammatical errors

	1. Critical scientific approach		2. Results and discussion	3. Structure of the final document
	Introduction and objectives	Materials and methods		
<b>honours</b>	c. The structure of the introduction demonstrates good insight into the topic d. The objectives are formulated	f. The limitations of the method are discussed to a minimal extent	h. The results are presented clearly enough, but not all of the presented results are relevant i. The discussion demonstrates limited insight into the background of the research j. The discussion is pleasant to read, but lacks some essential points or is not always clear	m. Tables, figures and graphs can be clearer and better integrated (more info ...) n. Good use of references o. Solid summary
<b>10-12 pass</b>	a. The subject is situated within the broader scientific context to a limited extent; the literature is barely interpreted by the student b. The cited research is not entirely relevant or recent c. The structure of the introduction demonstrates limited insight into the topic d. The objectives are unclear/incomplete	e. The applied methods are present but not clearly defined f. The limitations of the method are not discussed	g. The results obtained are insufficiently processed and analysed h. The results are presented incorrectly in part i. The discussion demonstrates very limited insight into the background of the research j. The discussion is difficult to read and misses essential points or is not clear	k. Text is acceptable, but not easily readable and has no clear structure l. Multiple grammatical errors m. Tables, figures and graphs can be clearer and are not well integrated into the text n. Limited use of references o. Summary does not accurately reflect the structure and conclusions of the research
<b>&lt;10 fail mark</b>	a. The topic is incorrectly situated within the broader scientific context; the literature is not interpreted by the student b. The cited research is not relevant c. The structure of the introduction demonstrates very limited insight into the topic d. The objectives are not reflected accurately	e. The applied methods are not presented correctly or they are missing f. The limitations of the method are discussed incorrectly	g. The found data are not processed and analysed, or they are processed and analysed incorrectly h. The results are presented incorrectly i. The discussion demonstrates incorrect insight into the background of the research j. The discussion is very difficult to read and misses essential points or is not clear	k. Very unclear text l. Frequent grammatical errors m. Tables and figures and graphs are unclear or incorrect n. Incorrect use of references o. Summary is unclear or absent

## 2025 PROFESSIONAL WORK EVALUATION FORM

The Student must timely provide this evaluation form to his/her Internship Supervisor (IS), with the following title: **StudentSURNAME\_2025\_EvalPro**. The Internship Supervisor will fill out and send it by email to [mylive@univ-lyon1.fr](mailto:mylive@univ-lyon1.fr) with copy to the Academic Supervisor. When there are no or not only laboratory experiments, the IS can transpose “experiments” into “tasks”, “good (laboratory) practice”, etc.... If some section(s) cannot be evaluated, please write “NA” for “not applicable” so that the line is neutralized for the mean calculation. The IS places his/her crosses in the boxes or writes a score in the related box, as (s)he prefers.

**Evaluation deadline: June 23**

<b>Student Name:</b>						
<b>Internship Supervisor Name:</b>						
Criteria	<10 fail mark	10- 12 pass	13-14 honors	15-16 high honors	17-18 highest honors	19-20 highest honors +
<b>1. Practice (weighted 2)</b>						
a. Quality in protocol preparation						
b. Precision in the execution of the experiments						
c. Writing laboratory notebooks						
d. Computer use						
e. Learning new methods quickly						
<b>2. Laboratory life (weighted 2)</b>						
f. Apply Good Laboratory Practice						
g. Communication with researchers and Students						
h. Questioning in discussions and seminars						
i. Initiatives in contacts outside the laboratory						
<b>3. Aptitude for research (weighted 6)</b>						
j. General knowledge in biology						
k. Precision and critical reading of papers						
l. Classify and prioritise information						
m. Level of critical analysis of the results						
n. Fluency in writing						
o. Tenacity						
p. Quality and originality of the results obtained						
q. Display of references and footnotes						
r. Ability to pursue doctoral studies						
<b>Please kindly comment on the student's behaviour in the work environment:</b>						

IS date & signature

:

## 2025 MASTER DEFENCE EVALUATION FORM

The jury will fill out this evaluation form and send it by email to [mylive@univ-lyon1.fr](mailto:mylive@univ-lyon1.fr) StudentSURNAME\_2025\_EvalDefense. The Jury members place their crosses in the boxes or write a score in the related box, as they prefer.

Evaluation deadline: June 16

Student Name:						
Jury Member Names:						
Criteria	<10 fail mark	10- 12 pass	13-14 honors	15-16 high honors	17-18 highest honors	19-20 highest honors +
<b>1. Presentation (weighted 20)</b>						
a. Structure of the presentation & time control						
b. Knowledge: quality & quantities						
c. Quality of the slides						
d. Linguistic usage						
e. Interactive behaviour						
<b>2. Questions (weighted 20)</b>						
f. Accuracy of the response						
g. Correctness of the answer						
h. Critical point of view						
i. Linguistic usage						
j. Dynamic behaviour						
Please kindly comment:						

Date:

Jury Member signatures: