COURSE GUIDE – extended form

Academic year 2026 – 2027

1. Program information

1.1 University	*Université de Rouen Normandie (URN)*
1.2 Faculty	
1.3 Department	*UFR Sciences et Techniques – Department of Biology*
1.4 Field	*Microbiology*
1.5 Study level	*Master 2*
1.6 Specialization	*Chemical and Biochemical Process Technology - CBPT*

2. Course information

2.1.1 Course name	**Pathogens and anti-infective strategies for biotechnology (sub-courses of UE Anti-infective Strategies - M1 Microbiology Health, Well-being and Industry)**						
2.1.2 Course code			2.1.3. Course category Fundamental/Specialized/Complementary)				S
2.2 Course instructor	Olivier Lesouhaitier, Emmanuelle Dé, Emeline Bouffartigues (Maillot), Sylvie Chevalier (Laurency), Ali Tahrioui, Nathalie Connil, Chervin Hassel, Romy Razakandrainibe.						
2.3 Course instructors for applied activities (S, L, P, Pr)	n/a						
2.4 Year of study [2]	2	2.5 Semesterl[3]	3	2.6 Evaluation type[4]	E, A	2.7 Course type [5]	DOB

3. Amount of time estimated for course activities (hours / term)

3.1 Hours /week	1.5	3.2 course	1.5	3.3a sem.	1.5	3.3b laboratory		3.3c project		3.3.d. practice		
3.4 Total hours from curriculum[6]	42	3.5 course	21	3.6a sem.	21	3.6b laboratory		3.6c project				

Time spent for related activities[7]	Hours
Study of recommended books, course support, scientific papers and course notes	20
Study in library and practical skills development	22
Preparation of seminars / laboratory works / project phases / home works / presentations	22
Evaluation[8]	2
Other activities:	30

3.7 Total hours of individual study [9]	64
3.8 Total hours per semestre[10]	108
3.9 Number of credits	4

4. Prerequisites (optional)

4.1 curriculum[11]	A solid understanding of basic concepts at the undergraduate level in microorganism biology, molecular and cell biology is required to successfully follow this course.
4.2 learning outcomes	This course is designed for students with a background in microbiology who wish to acquire essential knowledge in anti-infective strategies and deepen their understanding of pathogens and the emerging tools developed to fight them.

5. Requirements

5.1 Conditions for course delivery[12]	Blackboard, video projector. All digital course materials and resources will be provided through the university's virtual learning environment (UniversiTICE).
5.2 Seminar / Laboratory / Project delivery requirements[13]	Blackboard, video projector. All digital course materials and resources will be provided through the university's virtual learning environment (UniversiTICE).

	Some learning activities and coursework may involve frequent use of digital tools and computer-based resources.

6. Overall objective of the course

This course aims to raise student awareness of the development of innovative anti-infective strategies through a multidisciplinary approach. The following topics will be covered: Anti-biofilm and anti-persister strategies - Methods for identifying new molecular targets and bioactive compounds - Experimental approaches to studying anti-virulence and anti-biofilm agents- Biotechnological developments based on the therapeutic potential of bacteriocins - Strategies for antiviral vaccination-Therapeutic approaches targeting mesoparasites. By the end of the course, students will be able to critically evaluate emerging anti-infective strategies and contribute to the discovery of new therapeutic agents.

7. Learning outcomes

Knowledge	The student / graduate will be able to: - Understand the principles and mechanisms of anti-biofilm and anti-persister strategies - Understand methods to identify and evaluate new molecular targets and bioactive compounds - Analyze and interpret experimental designs and datasets related to anti-virulence, anti-biofilm, and bacteriocin-based biotechnological developments. - Show understanding with strategies for antiviral vaccination and therapeutic approaches for mesoparasitic infections, including current challenges and innovations.
Skills	The student / graduate: - Apply appropriate methods to measure the antimicrobial activity of bioactive molecules. - Critically engage with **scientific literature** to support the understanding of new therapeutic development. - Interpret experimental data from antibacterial resistance and anti-infective studies.
Responsibility and autonomy	The student / graduate: - Use advanced digital tools for data analysis. - Communicate scientific results effectively in written and oral English. - Contribute to a collaborative scientific analysis. - Demonstrated ability to perform bibliographic monitoring and literature reviews on bacterial resistance and anti-infective therapies.

8. Teaching methods

The teaching process will involve participatory lectures and discussions, supported by PowerPoint presentations made available to students if necessary. These presentations include images, text and diagrams to make the information easier to understand and assimilate. Each course/seminar may be accompanied by additional readings provided by the instructor.

The teaching method is also based on activities in the fields to illustrate or develop a piece of knowledge or specific skills (Self-assessments and reports on readings or case studies). Collaborative activities may be organized to foster peer interaction and teamwork among students.

Autonomy, adherence to instructions, and a positive attitude toward learning will be actively encouraged and developed throughout the course.

9. Course content

9. 1. Courses[15]	**Teaching methods**	**Time allocation**
9.1.1. Anti-biofilm strategies: New anti-biofilm tools	*Interactive lecture* *Guided discussions* *Clarifying explanations* *Conference of experts in the field*	2 hours
9.1.2. Anti-persister strategies		2 hours
9.1.3. Research of new target and bioactives molecules: Identification of new effectors and molecular targets		1 hour
9.1.4. Research of new target and bioactives molecules: Experimental approaches to anti-virulence and anti-biofilm identification		2 hours
9.1.5. Research of new target and bioactives molecules: Traditional medicine to the discovery of bioactive compounds		1 hour

9.1.6. Biotechnological development: Bacteriocin		2 hours
9.1.7. Strategies for antiviral vaccination		4 hours
9.1.8. Therapeutic strategies for mesoparasites		4 hours
Course bibliography: Scientific literature relevant to the topics covered—such as anti-biofilm strategies, anti-persister approaches, discovery of bioactive compounds or targets, biotechnological developments, and therapeutic strategies—will be used to support the understanding and critical analysis of key concepts presented in course. All sources, documents, and references used during the course sessions (including articles, book excerpts, presentation slides, videos, etc.) will be made available to students through the designated platform. This includes both required readings and supplementary resources intended to deepen understanding of the topics covered in class. Students are encouraged to consult these materials regularly to support their learning and active participation.		
9.2a Seminar Critical analysis of scientific articles and experimental datasets related to anti-infective strategies and pathogens will be carried out to reinforce understanding of the key themes discussed during lectures	Students will work individually or in groups to address, discuss, and report on experimental designs, scientific studies, or datasets.	21
Bibliography for applied activities (seminar / laboratory / project): Scientific literature relevant to the topics covered—such as anti-biofilm strategies, anti-persister approaches, discovery of bioactive compounds, biotechnological developments, and therapeutic strategies—will be used to support the understanding and critical analysis of key concepts presented in course. Activity derived from experimental data examples		

10. Evaluation

Activity type	10.1 Evaluation criteria	10.2 Evaluation method	10.3 Percentage of the final grade *(recommended to be proportional to the number of hours allocated to each type of activity)*
10.4 Type of evaluation: Final Exam / Assessment	*Completeness and correctness of knowledge.* *Logical coherence, fluency, strength of argumentation.* *Capacity for analysis, personal interpretation, originality, creativity.* *Degree of mastery of specialized terminology and communication skills.* *Ability to apply acquired skills.* *Ability to process data and solve given problems.*	*Summative assessment test (final evaluation).*	70 %
10.5a Seminar	*Ability to apply learned knowledge in practice. Ability for analysis, personal interpretation, originality, and creativity*	*Active participation in activities;* *Assessment test.*	30 %
10.6 Conditions for passing			
The final grade corresponds to the weighted average of all results obtained from exams and assessed activities completed by the student. Grades are expressed on a scale from 0 to 20. A score of 10/20 indicates that the student has acquired the minimum required knowledge and skills, and is sufficient to validate the ECTS credits.			

Date:

Course instructor: Olivier Lesouhaitier, Emmanuelle Dé, Emeline Bouffartigues (Maillot), Sylvie Chevalier (Laurency), Ali Tahrioui, Nathalie Connil, Chervin Hassel, Romy Razakandrainibe.

Course instructors for applied activities: Olivier Lesouhaitier, Emmanuelle Dé, Emeline Bouffartigues (Maillot), Sylvie Chevalier (Laurency), Ali Tahrioui, Nathalie Connil, Chervin Hassel, Romy Razakandrainibe.

Date of approval by the department: Head of Department: Anthony Delaune

Date of approval by the Faculty Council: Dean,