



## Diplôme d'ingénieur en biotechnologie

## Diplôme d'ingénieur en biotechnologie

### Modalités pédagogiques

Moodle

### Enseignements délocalisés

#### 2ème année :

- 3 semaines à Bâle
- 6 semaines à Fribourg
- projets à Strasbourg, Bâle et Fribourg

#### 3ème année :

- projets à Strasbourg, Bâle et Fribourg

### Contacts

- Bruno Chatton : [bruno.chatton@unistra.fr](mailto:bruno.chatton@unistra.fr)
- Yves Nominé : [yves.nomine@unistra.fr](mailto:yves.nomine@unistra.fr)

Langue du parcours	Anglais
ECTS	180 ECTS
Volume horaire	
TP : 54h	TD : 60h
CI : 0h	CM : 4h
Formation initiale	Oui
Formation continue	Non
Apprentissage	Non
Contrat de professionnalisation	Non

# Diplôme d'ingénieur en biotechnologie - 1e année

## BT - Semestre 1

	ECTS	CM	CI	TD	TP	TE	Stage
<b>FB1 : Fundamentals of Biotechnology I</b>	<b>9 ECTS</b>	<b>44 h</b>		<b>6 h</b>	<b>8 h</b>		
Prokaryotic transcription		10 h			1 h		
Eucaryotic transcription for BT		12 h			1 h		
Translation		10 h		2 h	1 h		
Replication							
Protein Engineering		12 h		6 h			
<b>ES1 : Engineering sciences I</b>	<b>9 ECTS</b>	<b>68 h</b>		<b>36 h</b>	<b>14 h</b>		
Analytical biochemistry for BT		18 h		20 h	4 h		
Simulating biological systems		8 h		8 h	9 h		
General chemistry I		10 h			1 h		
Organic & inorganic chemistry		8 h		2 h	1 h		
Electronics & Biosensors		12 h					
<b>HE1 : Humanities, Economy &amp; Social sciences I</b>	<b>6 ECTS</b>	<b>16 h</b>		<b>143 h</b>			
Anglais - S1 Ingénieur				24 h		50 h	
Allemand - S1 ingénieur				24 h		50 h	
Français Langue Étrangère (FLE) I				39 h			
Health & safety		5 h		2 h			
Communication		2 h		6 h			
Professional project I				4 h			
<b>PR1 : Practicals I</b>	<b>6 ECTS</b>	<b>10 h</b>		<b>14 h</b>	<b>52 h</b>		
Instrumentation essentials		14 h		14 h	4 h		
Instrumentation & Biochemistry Practicals					52 h		

## BT - Semestre 2

	ECTS	CM	CI	TD	TP	TE	Stage
<b>FB2 : Fundamentals of biotechnology II</b>	<b>6 ECTS</b>	<b>61 h</b>		<b>13 h</b>	<b>10 h</b>		
Cellular biology		20 h		4 h	1 h		
Microbiology		12 h		4 h	1 h		
Enzymology							
Plant physiology		21 h		3 h	2 h		
<b>ES2 : Engineering sciences II</b>	<b>9 ECTS</b>	<b>56 h</b>		<b>38 h</b>	<b>24 h</b>		
Computer sciences for biotechnologies		6 h		12 h	12 h		
Bioinformatics		14 h		10 h	2 h		
General chemistry II		8 h		2 h	1 h		
Bio organic chemistry		8 h		2 h	1 h		
Bioenergetics		10 h		6 h	2 h		
Modelling biological systems		8 h		8 h	9 h		
<b>HE2 : Humanities, Economy &amp; Social sciences II</b>	<b>3 ECTS</b>			<b>94 h</b>			
Anglais - S2 Ingénieur				24 h		50 h	
Allemand - S2 ingénieur				24 h		50 h	
Français Langue Étrangère (FLE) II				24 h			
Professional project II		4 h		1 h			
Project management		10 h					
Economics & Industries				12 h			
<b>PR2 : Practicals II</b>	<b>6 ECTS</b>	<b>12 h</b>		<b>9 h</b>	<b>124 h</b>		
Genetic engineering practicals					35 h		
Microbiology practicals		2 h		1 h	27 h		
Enzymology practicals		10 h		8 h	27 h		
<b>Internship I</b>	<b>6 ECTS</b>						<b>12 sem</b>
1st year internship							12 sem

# Diplôme d'ingénieur en biotechnologie - 2e année

## BT - Semestre 3

	ECTS	CM	CI	TD	TP	TE	Stage
<b>AB1: Advanced biotechnology I</b>	9 ECTS	88 h		24 h	10 h		
Immunology		20 h					
Immunotechnology		12 h					
Genetic engineering		26 h		14 h	8 h		
Genomics & epigenomics		18 h		10 h			
<b>ES3 : Engineering sciences III</b>	9 ECTS	56 h		44 h			
Experimental design		14 h		12 h			
Fondamentals of bioproduction		12 h		12 h			
In silico protein engineering		6 h		16 h			
Statistics		10 h		10 h			
<b>HE3 : Humanities, Economy &amp; Social sciences III</b>	6 ECTS	26 h		80 h			
Anglais - S3 Ingénieur				24 h		50 h	
Allemand - S3 ingénieur				24 h		50 h	
Français Langue Étrangère (FLE) III				24 h			
Industrial finances		4 h		8 h			
BioEthics		10 h					
Quality		12 h					
<b>PR3 : Practicals III</b>	6 ECTS						
DSP : Protein purification practicals		4 h		4 h	62 h		
Cell culture practicals		8 h			56 h		

## BT - Semestre 4

	ECTS	CM	CI	TD	TP	TE	Stage
<b>AB2 : Advanced biotechnology II</b>	9 ECTS						
Synthetic microbiology		15 h					
Plant molecular biology		24 h					
Virology		14 h			2 h		
Neurobiotechnology		22 h					
<b>ES4 : Engineering sciences IV</b>	9 ECTS						
Advanced experimental design		14 h		12 h			
Advanced statistics				10 h			
Images in biology : Processing		12 h		12 h			
Metabolism & Biotechnologies for BT		20 h		4 h			
<b>HE4 : Humanities, Economy &amp; Social sciences IV</b>	3 ECTS	10 h		72 h	9 h		
Anglais - S4 Ingénieur				24 h		50 h	
Allemand - S4 ingénieur				24 h		50 h	
Français Langue Étrangère (FLE) IV				20 h			
Projects in Bioethics				4 h	9 h		
Scientific fact checking		2 h		8 h			
National & International labor regulation		10 h					
<b>PR4 : Practicals IV</b>	9 ECTS	12 h		4 h	258 h		
Synthetic microbiology practicals					55 h		
Plant molecular biology practicals					140 h		
Advanced Genetic engineering Practicals					35 h		

# Diplôme d'ingénieur en biotechnologie - 3e année

## Semestre 5

	ECTS	CM	CI	TD	TP	TE	Stage
<b>Specialization in Synthetic Biotechnology</b>							
<b>SB1 (BS) : Specialized biotechnology I</b>	6 ECTS						
Current topics in synthetic biology				12 h			
Project design in synthetic biology				8 h	4 h		
Images in biology : Practicals					16 h		
Images in biology : Classification		4 h		8 h			
Integration and reporting of practical results				20 h			
<b>ES5 (BS) : Engineering sciences V</b>	9 ECTS						
Comparative and medical genomics		16 h		12 h			
High throughput approaches		20 h		8 h	2 h		
Introduction to data sciences		4 h		4 h	4 h		
Introduction to system biology		6 h		21 h			
<b>HE5 : Humanities, Economy &amp; Social sciences V</b>	3 ECTS	13 h		20 h			
Intellectual property		12 h					
Professional integration				28 h			
<b>PR5 (BS) : Specialized projects (5 weeks)</b>	12 ECTS						
Project in synthetic biology II					125 h		
<b>Specialization in High throughput</b>							
<b>SB1 (HD) : Specialized biotechnology I</b>	6 ECTS	30 h		20 h	13 h		
Current topics in synthetic biology				12 h			
Project design in omics				8 h	4 h		
Images in biology : Practicals					16 h		
Images in biology : Classification		4 h		8 h			
Integration and reporting of practical results				20 h			
<b>ES5 (HD) : Engineering sciences V</b>	9 ECTS						
Comparative and medical genomics		16 h		12 h			
High throughput approaches		20 h		8 h	2 h		
Introduction to data sciences		4 h		4 h	4 h		
Introduction to system biology		6 h		21 h			
<b>HE5 : Humanities, Economy &amp; Social sciences V</b>	3 ECTS	13 h		20 h			
Intellectual property		12 h					
Professional integration				28 h			
<b>PR5 (HD) : Specialized projects (5 weeks)</b>	12 ECTS						
Project in high throughput biotechnology II					125 h		
<b>Specialization in Bioproduction</b>							
<b>SB1 (BP) : Specialized Biotechnology I</b>	6 ECTS				70 h		
Current topics in synthetic biology				12 h			
Images in biology : Practicals					16 h		
Images in biology : Classification		4 h		8 h			
Integration and reporting of practical results				20 h			
<b>ES5 (BP) : Engineering sciences V</b>	9 ECTS						
USP Development practicals					70 h		
Comparative and medical genomics		16 h		12 h			
<b>HE5 : Humanities, Economy &amp; Social sciences V</b>	3 ECTS	13 h		20 h			
Intellectual property		12 h					
Professional integration				28 h			
<b>PR5 (BP) : Specialized projects (5 weeks)</b>	12 ECTS						
Project New business		40 h		40 h			
USP : from bench to factory				25 h	50 h		
<b>Specialization at University of Freiburg</b>							
<b>SB1 (Freiburg) : Specialized biotechnology I</b>							
Current topics in synthetic biology				12 h			
Images in biology : Practicals					16 h		
Images in biology : Classification		4 h		8 h			
Integration and reporting of practical results				20 h			
<b>HE5 : Humanities, Economy &amp; Social sciences V</b>	3 ECTS	13 h		20 h			
Intellectual property		12 h					
Professional integration				28 h			
<b>PR5 (Freiburg) : Specialized projects (5 weeks)</b>							
Project in Biotech processes					125 h		

## Semestre 6

	ECTS	CM	CI	TD	TP	TE	Stage
<b>Engineer Internship</b>	30 ECTS						24 sem
Internship							

