



Diplôme d'ingénieur en biotechnologie

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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

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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
FB1 : Fundamentals of Biotechnology I	9 ECTS	44 h		6 h	8 h		
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			
ES1 : Engineering sciences I	9 ECTS	68 h		36 h	14 h		
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					
HE1 : Humanities, Economy & Social sciences I	6 ECTS	16 h		143 h			
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			
PR1 : Practicals I	6 ECTS	10 h		14 h	52 h		
Instrumentation essentials		14 h		14 h	4 h		
Instrumentation & Biochemistry Practicals					52 h		

BT - Semestre 2

	ECTS	CM	CI	TD	TP	TE	Stage
FB2 : Fundamentals of biotechnology II	6 ECTS	61 h		13 h	10 h		
Cellular biology		20 h		4 h	1 h		
Microbiology		12 h		4 h	1 h		
Enzymology							
Plant physiology		21 h		3 h	2 h		
ES2 : Engineering sciences II	9 ECTS	56 h		38 h	24 h		
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		
HE2 : Humanities, Economy & Social sciences II	3 ECTS			94 h			
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			
PR2 : Practicals II	6 ECTS	12 h		9 h	124 h		
Genetic engineering practicals					35 h		
Microbiology practicals		2 h		1 h	27 h		
Enzymology practicals		10 h		8 h	27 h		
Internship I	6 ECTS						12 sem
1st year internship							12 sem

Diplôme d'ingénieur en biotechnologie - 2e année

BT - Semestre 3

	ECTS	CM	CI	TD	TP	TE	Stage
AB1: Advanced biotechnology I	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			
ES3 : Engineering sciences III	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			
HE3 : Humanities, Economy & Social sciences III	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					
PR3 : Practicals III	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
AB2 : Advanced biotechnology II	9 ECTS						
Synthetic microbiology		15 h					
Plant molecular biology		24 h					
Virology		14 h			2 h		
Neurobiotechnology		22 h					
ES4 : Engineering sciences IV	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			
HE4 : Humanities, Economy & Social sciences IV	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					
PR4 : Practicals IV	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
Specialization in Synthetic Biotechnology							
SB1 (BS) : Specialized biotechnology I	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			
ES5 (BS) : Engineering sciences V	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			
HE5 : Humanities, Economy & Social sciences V	3 ECTS	13 h		20 h			
Intellectual property		12 h					
Professional integration				28 h			
PR5 (BS) : Specialized projects (5 weeks)	12 ECTS						
Project in synthetic biology II					125 h		
Specialization in High throughput							
SB1 (HD) : Specialized biotechnology I	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			
ES5 (HD) : Engineering sciences V	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			
HE5 : Humanities, Economy & Social sciences V	3 ECTS	13 h		20 h			
Intellectual property		12 h					
Professional integration				28 h			
PR5 (HD) : Specialized projects (5 weeks)	12 ECTS						
Project in high throughput biotechnology II					125 h		
Specialization in Bioproduction							
SB1 (BP) : Specialized Biotechnology I	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			
ES5 (BP) : Engineering sciences V	9 ECTS						
USP Development practicals					70 h		
Comparative and medical genomics		16 h		12 h			
HE5 : Humanities, Economy & Social sciences V	3 ECTS	13 h		20 h			
Intellectual property		12 h					
Professional integration				28 h			
PR5 (BP) : Specialized projects (5 weeks)	12 ECTS						
Project New business		40 h		40 h			
USP : from bench to factory				25 h	50 h		
Specialization at University of Freiburg							
SB1 (Freiburg) : Specialized biotechnology I							
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			
HE5 : Humanities, Economy & Social sciences V	3 ECTS	13 h		20 h			
Intellectual property		12 h					
Professional integration				28 h			
PR5 (Freiburg) : Specialized projects (5 weeks)							
Project in Biotech processes					125 h		

Semestre 6

	ECTS	CM	CI	TD	TP	TE	Stage
Engineer Internship	30 ECTS						24 sem
Internship							

